



CHASCON-2024



# NATIONAL CONFERENCE on

*"Indigenous Technologies for Viksit Bharat"*

## SOUVENIR 2024

# 17th CHASCON

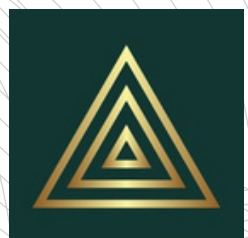
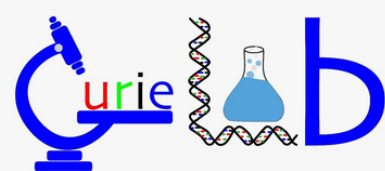
## (Chandigarh Science Congress)

November 6-8, 2024

Sponsored by:



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## TEAM CHASCON

*Welcomes You*

## TO SOUVENIR OF CHASCON 2024

### CHIEF PATRON

**Prof. Renu Vig**

Vice Chancellor

Panjab University, Chandigarh

### PATRONS

- Prof. R C Sobti, Former Vice Chancellor, Panjab University, Chandigarh and BBAU, Lucknow
- Prof. Arun K Grover, Former Vice Chancellor, Panjab University, Chandigarh
- Prof. Vivek Lal, Director, PGIMER, Chandigarh
- Prof. Rajesh Kumar Bhatia, Director (Interim), PEC, Chandigarh
- Prof. Anil Kumar Tripathi, Director, IISER, SAS Nagar
- Prof. Rajeev Ahuja, Director, IIT Ropar, Ropar
- Dr. Sanjeev Khosla, Director, IMTECH, Chandigarh
- Prof. Dulal Panda, Director, NIPER, S.A.S. Nagar, Punjab
- Prof. Shantanu Bhattacharya, Director, CSIR-CSIO, Chandigarh
- Prof. Amitava Patra, Director, INST, S.A.S. Nagar, Punjab
- Prof. Chandan Chowdhury Executive, Director, ISB, S.A.S. Nagar, Punjab
- Prof. Ashwani Pareek, Executive Director & CEO, NABI and CIAB, S.A.S. Nagar, Punjab
- Prof. Bhola Ram Gurjar, Director, NITTTR, Chandigarh
- Shri Parteek Kishore, Director, TBRL, Chandigarh
- Dr. Pramod K Satyawali, Director, DTRL and DGRE, Chandigarh

- **Sh. Kamal Kishor Yadav, Vice Chancellor, Punjabi University, Patiala**
- **Prof. A.K. Attri, Director-Principal, GMCH, Chandigarh**
- **Dr. Manpreet Singh, Principal, CCET, Chandigarh**
- **Er. Pritpal Singh, Executive Director, PSCST, Chandigarh**
- **Vijay Kumar Sharma, Director, C-DAC, S.A.S. Nagar, Punjab**
- **Dr. Om Prakash Chaurasia, Director, DIHAR, Chandigarh**
- **Shri Surinder Singh, Director, SCL, S.A.S. Nagar, Punjab**
- **Dr. Pramod Kumar, Chairperson, IDC, Chandigarh**
- **Dr. Bindu Duggal, Director (Acting), CRRID, Chandigarh**
- **Dr. Parvinder Singh, Vice Chancellor, Rayat Bahra University, S.A.S. Nagar, Mohali**
- **Dr. Archana Mantri, Vice Chancellor, Chitkara University, S.A.S. Nagar**
- **Prof. R.K Gupta, Vice Chancellor, Maharaja Agrasen University, Solan**
- **Shri Ashwani Garg, President, SVIET, S.A.S. Nagar**
- **Ms. Sunita Goyle, Director, NIELIT, Ropar**
- **Prof. Abhijit H Joshi, Vice Chancellor, Desh Bhagat University, Mandi Gobindgarh**

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## **ABOUT CHASCON 2024**

The 17<sup>th</sup> Chandigarh Science Congress (CHASCON) is scheduled to be held at Panjab University from November 06 - 08, 2024. Initiated in 2007, to provide a platform for young budding researchers from the Campus to showcase their work and nurture a culture of research at Panjab University, the Congress has over the years grown and evolved to acquire a National character and reach hosting highly acclaimed academicians and erudite researchers from all over India and even abroad. Focusing on the theme "**Indigenous Technologies for Viksit Bharat**" the 17<sup>th</sup> CHASCON aims to document and exhibit the contribution of research towards the building of a self-reliant India and the fruition of the "Amrit Kaal" in India's resurgence as a Global leader.

Spanning a period of three days, CHASCON-2024 offers a rare opportunity for researchers from diverse backgrounds, disciplines, specialisations and age-groups to meet, debate and innovate in the interest of a resurgent and self-reliant Bharat. Organised in collaboration with the Chandigarh Region Innovation and Knowledge Cluster (CRIKC), the event will include plenary lectures, panel discussions, oral and poster presentations and exhibitions, all aimed at establishing and strengthening linkages between researchers, industry and policy makers. As always, the primary objective of the event remains to orient young minds towards research and to develop a scientific temperament by providing them an opportunity to share their vision of a developed India and contribute towards its realisation through scientific presentations and exhibits. We welcome you all to partake of this eclectic academic feast!!

## **ABOUT CHANDIGARH REGION INNOVATION AND KNOWLEDGE CLUSTER (CRIKC)**

Chandigarh Region Innovation and Knowledge Cluster (CRIKC) was initiated at Panjab University in 2013, whereby Institutions in and around Chandigarh came together for the creation of a Knowledge Cluster with a mandate to use Science, Technology and Innovation for Socio-Economic development in the region. The regional impetus was expected to contribute to national and global goals in tandem with the UN SDGs (Sustainable Development Goals) and bring together stakeholders from the fields of academia, industry, civil society, and the government.

The banner of CRIKC subsumes within itself diverse institutions of higher education and research with an aim to facilitate innovation and knowledge creation and achieve excellence in all academic spheres without compromising the autonomy of the participating institution. Faculty and scientists are encouraged to carry out joint and collaborative research and to run joint teaching/training programs at all levels of education & research. This encourages pooling of research facilities of the participating institutions, promoting and sustaining excellence in research and policy

planning for better comprehension of Government of India programmes and catering to societal needs.

The Institutes which are part of CRIKC include Medical Institutes like PGIMER and GMCH-32, Chandigarh; Engineering Institutes like IIT (Ropar), PEC, NITTTR, CCET at Chandigarh, C-DAC, Mohali; Higher Education Institutes like Panjab University, Chandigarh; IISER, NIPER, Chitkara, Rayat-Bahra University, Mohali, Desh Bhagat University, Gobindgarh and Maharaja Agarsen University, Baddi; and Research and Development Institutes like CSIR-IMTECH, DRDO-SASE, DRDO-TBRL, PSCST, IDC, CRRID, Chandigarh and DBT-CIAB, DBT-NABI, DST-INST, SCL in Mohali.

CRIKC domains which have left a noteworthy impact on the society and scientific community include: "CRIKC Ignited Minds" being run at various government schools to inculcate scientific temper among school students and science teachers; and "CRIKC Shodh Samwad" being organized at various institutes for fostering collaboration amongst PhD scholars and providing them leadership opportunities. Under the vertical of Industry-Academia collaboration and innovation an Advance Drone Tech Centre has been established at Panjab University campus.

## **ABOUT PANJAB UNIVERSITY**

Established at Lahore in the year 1882, Panjab University was one of the first four Universities to be established in India. It was also the first University to be established through public funding in the form of grants from people belonging to the region. Following the turmoil of partition and a series of displacements, Panjab University found its new home in Chandigarh in the year 1958-59. Here it served as one of the two major foci of the city's development and continued the established tradition of pursuing teaching and research in science and technology, humanities, social sciences, performing arts and sports. Today it features among the premier Institutions of Higher Education in the country and has not only maintained established traditions and standards but has rather emerged as an Institution taking major strides towards innovative teaching, research and community outreach.

With the Hon'ble Vice President of India, Shri Jagdeep Dhankhar as the Chancellor and Professor Renu Vig as its Vice Chancellor, Panjab University has a legacy to be proud of. It has produced contributed illustrious alumni in all walks of life. The University has been the alma mater of former President of India, Dr Shankar Dayal Sharma, former Prime Ministers Shri I K Gujral and Dr Manmohan Singh and a large number of Nobel laureates, scientists, sports-persons, renowned public figures, notable bureaucrats and theatre personalities who have contributed immensely to the cause of the nation building. Panjab University Campus at Chandigarh has seventy-three teaching and research departments/institutes/centres besides four independent Chairs for research.

Furthermore, the University has 189 affiliated/constituent colleges, spread over Punjab and Chandigarh besides Regional Centres at Muktsar, Ludhiana, Hoshiarpur and Kauni.

The University is an active partner in various prestigious International High Energy Research Programmes at Fermilab (USA), KEK (Japan) and CERN (Switzerland). It has MoUs with University of Nottingham (UK), University of Birmingham (UK), Nottingham Trent University (UK) and University of Western Sydney (Australia) and collaborations with National Science Technology and Development Agency, Thailand; University of Missouri, USA and Universidade de Aveiro, Portugal; International Crops Research Institute for Semi-Arid Tropics (ICRISAT), Hyderabad; International Centre for Agricultural Research in Dry Areas (ICARDA, Morocco; World Vegetable Research Centre, Taiwan and Baylor Medical centre, Dallas, U.S.A. The University also has collaborations with a number of national institutes like IARI, Delhi; GB Pant University of Agriculture and Technology, Pantnagar; HFRI, Shimla; IIT, Roorkee; PGIMER, Chandigarh; IMTECH, Chandigarh; CSIO, Chandigarh and many others.

In addition, the University has established Pre-Incubation Centres and Skill Development Centres under the Rashtriya Uchchar Shiksha Abhiyan of the Government of India to give impetus to research and innovation. BioNEST-PU was launched by BIRAC with a vision that focused on fostering the Biotech Innovation Ecosystem and nurture young entrepreneurs in the northern region of the country. DST-funded Tech Enabling Centre was established at Panjab University with the aim to provide technological solutions for needs of society and industry. University DST-Centre for Policy Research has the mandate to prepare guidelines for strengthening Industry-Academia Collaborations under Public Private Partnership mode. Recently the University has been awarded the Northern Region Science and Technology Cluster in association with IIT Ropar by the office of the PSA, PMO. In recognition of its many distinctions the University was awarded an A++ grade with a score of 3.68 by the National Assessment and Accreditation Council in the year 2023.

## **ABOUT CHANDIGARH**

Chandigarh, the dream city of India's first Prime Minister, Sh. Jawahar Lal Nehru, was planned by the famous French Architect, Le Corbusier. Picturesquely located at the foothills of Shivaliks, it is known as one of the best experiments in urban planning and modern architecture in the twentieth century in India.

Envisaged as a replacement for Lahore the erstwhile capital of Punjab, the Capital Project was initiated in 1948, by the Government of Punjab, in consultation with the Government of India. The foundation stone of the city was laid in 1952. After the reorganization of Panjab in 1966, the city was declared a Union Territory, however it continues to be the capital city of both, Punjab and

Haryana.

The concept of the city is based on four major functions: living, working, care of the body and spirit and circulation. Residential sectors constitute the living part whereas the Capitol Complex, City Centre, Educational Zone (Post Graduate Institute of Medical education and Research, Punjab Engineering College, Panjab University) and the Industrial Area constitute the working part. The Leisure Valley, Gardens, Sector Greens and Open Courtyards etc. are for the care of body and spirit. The circulation system comprises of 7 different types of roads known as 7Vs. Later on, a pathway for cyclists called V8 was added to this circulation system.

Popular tourist spots in Chandigarh include Leisure Valley spread over 8 km, including many parks like Rose Garden, Bouganvilla Garden, Topiary Park and more. Rock Garden one of the major icons of the city showcases a mosaic of colourful art pieces made using materials collected from demolished sites. Sukhna Lake is another iconic place worth visiting. One can enjoy its pristine beauty, go boating on the paddle boats and shikaras, go for camel ride, get a portrait made, ride a mechanical bull and not to miss a trip to Bird Park, Shimla and Kasauli hill stations are very nearby.



## CHASCON 2024 COMMITTEES

Team	Members
<b>Advisory Committee</b>	<ul style="list-style-type: none"> <li>• Prof. Rumina Sethi, Dean of University Instruction</li> <li>• Prof. Savita Bhatnagar, Director, Research and Development Cell</li> <li>• Prof. Y.P. Verma, Registrar</li> <li>• CA Vikram Nayyar, Finance and Development Officer</li> <li>• Prof. Rajat Sandhir, DUI Nominee for Faculty of Sciences</li> <li>• Prof. Ashish Jain, DUI Nominee for Faculty of Medical Sciences</li> <li>• Prof. Sanjay Kaushik, DUI Nominee for Faculty of Business and Management Sciences</li> <li>• Prof. Rajeev Kumar Puri, Coordinator, RUSA</li> <li>• Prof. Meenakshi Goyal, DUI Nominee for Faculty of Engineering and Technology</li> <li>• Prof. Kanwaljit Chopra, DUI Nominee for Faculty of Pharmaceutical Sciences</li> <li>• Prof. Jagtej Kaur Grewal, DUI Nominee for Faculty of Design and Fine Arts</li> <li>• Prof. Neena Capalash, Coordinator, CHASCON 2023</li> <li>• Prof. Namita Gupta, Human Rights Department</li> <li>• Mr. Vineet Punia, Director, Public Relations</li> <li>• Prof. Amit Chauhan, Dean Student Welfare</li> <li>• Prof. Simrit Kahlon, Dean Student Welfare (W)</li> <li>• Prof. Naresh Kumar, Associate Dean Student Welfare</li> </ul>
<b>Organizing Committee</b>	<ul style="list-style-type: none"> <li>• Prof. Sukhbir Kaur, Fellow, Panjab University</li> <li>• Prof. Anil Kumar, Chairperson, UIPS</li> <li>• Prof. Anu Gupta, Director, Dr. A.P.J. Abdul Kalam Computer Centre</li> <li>• Prof. Anupama Sharma, Chairperson, UICET</li> <li>• Prof. Deepak Kumar Gupta, Principal, HSJIDS</li> <li>• Prof. Ganga Ram Chaudhary, Director, CIL/SAIF</li> <li>• Prof. Gaurav Verma, Coordinator, CRIKC</li> <li>• Prof. Indu Pal Kaur, Coordinator, DPIIT-IPR Chair</li> <li>• Prof. Kashmir Singh, Coordinator, DST-CPR</li> <li>• Prof. Manu Sharma, Coordinator, TEC</li> <li>• Prof. Rohit Sharma, Project Leader, BioNEST</li> <li>• Prof. Sanjeev Puri, Director, UIET</li> <li>• Prof. Suveera Gill, Director, CSDE</li> <li>• Prof. Y. K. Rawal, Coordinator CHASCON-2024</li> <li>• Prof. Sonal Singhal, Co-coordinator CHASCON-2024</li> <li>• Prof. Sakshi Kaushal, Co-coordinator CHASCON-2024</li> </ul>
<b>Registration Committee</b>	<ul style="list-style-type: none"> <li>• Dr. Vijay Kumar (Zoology)</li> <li>• Dr. Pavita Ranawat (Biophysics)</li> <li>• Dr. P. Natarajan (Chemistry)</li> <li>• Dr. Jyoti Sharma (HSJIDS)</li> <li>• Dr. Vishwa Bandhu Singh (Geography)</li> </ul>

	<ul style="list-style-type: none"> <li>• Dr. Mahesh Thakur (Geology)</li> <li>• Prof. Rajesh Madan (UIET)</li> <li>• Dr. Sanjeev Gautam (UICET)</li> <li>• Dr. Manu Sharma (UIAMS)</li> <li>• Dr. Indu Sharma (Zoology)</li> <li>• Dr. Vijay Kumar (Zoology)</li> <li>• Dr. Ravinder Kumar (Zoology)</li> <li>• Dr. Charanjit Singh (Mathematics)</li> <li>• Dr. Amita Sarwal (UIPS)</li> <li>• Dr. Akash Katoch (NSNT)</li> </ul>
<b>Venue Committee</b>	<ul style="list-style-type: none"> <li>• Prof. Naresh Kumar (UIET)</li> <li>• Prof. Ajay Mittal (UIET)</li> <li>• Dr. Vishal Sharma (Institute of Forensic Science and Criminology)</li> <li>• Dr. Harbhinder Singh (Senior Lecturer, UIET and Warden BH-1)</li> <li>• Dr. Jodh Singh (Warden, BH-6)</li> <li>• Dr. Manesh Dev Sharma (Physics)</li> <li>• Dr. Avneet Saini (Biophysics)</li> <li>• Dr. Jaspreet Kaur (Botany)</li> </ul>
<b>Abstract Book and Certificates Committee</b>	<ul style="list-style-type: none"> <li>• Prof. Navneet Kaur (Chemical Science)</li> <li>• Dr. Tanzeer Kaur (Basic Medical Sciences)</li> <li>• Dr. Rosekanwaljeet Kaur (HSJIDS)</li> <li>• Prof. Vishwa B Singh (Earth Sciences)</li> <li>• Prof. Mamta Juneja (Engineering Sciences)</li> <li>• Prof. Monika Aggarwal (Management Sciences)</li> <li>• Prof. M.C. Sidhu (Life Sciences)</li> <li>• Prof. Dinesh Kumar Khurana (Mathematical Sciences)</li> <li>• Dr. Amita Sarwal (Pharmaceutical Sciences)</li> <li>• Dr. Akash Katoch (Physical Sciences)</li> </ul>
<b>Exhibition Committee</b>	<ul style="list-style-type: none"> <li>• Prof. Ajay Mittal (UIET)</li> <li>• Dr. Ravneet Kaur (Zoology)</li> </ul>
<b>Hospitality and Tentage Committee</b>	<ul style="list-style-type: none"> <li>• Prof. Naresh Kumar (UIET)</li> <li>• Prof. Harpreet Bimbira (Zoology)</li> <li>• Dr. Aman Bhalla (Chemistry)</li> <li>• Prof. Jasvinder Sharma (UIHMT)</li> <li>• Mr. Gaurav Kashyap (UIHMT)</li> <li>• Ms. Shruti Sharma (UIHMT)</li> </ul>

<p><b>Press Committee</b></p>	<ul style="list-style-type: none"> <li>• Sh. Vineet Punia (DPR)</li> <li>• Prof. Gaurav Verma (UICET)</li> <li>• Dr. Ranjana Jaiswara (Zoology)</li> </ul>
<p><b>Stage Management Committee</b></p>	<ul style="list-style-type: none"> <li>• Prof. Sakshi Kaushal (UIET)</li> <li>• Prof. Sonal Singhal (Chemistry)</li> <li>• Dr. Jaspreet Kaur (Botany)</li> <li>• Dr. Avneet Saini (Biophysics)</li> <li>• Dr. Varinder Kaur (Chemistry)</li> </ul>
<p><b>Scientific Sessions Committee</b></p>	<ul style="list-style-type: none"> <li>• Prof. Sukhbir Kaur (Zoology)</li> <li>• Prof. Rajat Sandhir (Biochemistry)</li> <li>• Prof. Gaurav Verma (UICET)</li> <li>• Prof. Naveen Aggarwal (UIET)</li> </ul>
<p><b>Finance/Purchase Committee</b></p>	<ul style="list-style-type: none"> <li>• Prof. Savita Gupta (UIET)</li> <li>• Prof. Sukhbir Kaur (Zoology)</li> <li>• Prof. Jagtar Singh (Biotechnology)</li> <li>• Dr. Ravneet Kaur (Zoology)</li> <li>• Dr. Varinder Kaur (Chemistry)</li> <li>• Dr. Y.K. Rawal (Zoology)</li> <li>• Prof. Sonal Singhal (Chemistry)</li> <li>• Prof. Sakshi Kaushal (UIET)</li> </ul>
<p><b>Technical/Multimedia Committee</b></p>	<ul style="list-style-type: none"> <li>• Prof. Anu Gupta, Director, Computer Centre</li> </ul>
<p><b>Transport/Stay Committee</b></p>	<ul style="list-style-type: none"> <li>• Prof. Amit Chauhan (DSW)</li> <li>• Prof. Simrit Kahlon (DSW-Women)</li> <li>• Prof. Naresh Kumar (Associate DSW)</li> <li>• Dr. Ravinder Kumar (Zoology)</li> <li>• Dr. Vijay Kumar (Zoology)</li> </ul>
<p><b>Traffic Management Committee</b></p>	<ul style="list-style-type: none"> <li>• Prof. Anil Monga (CPA)</li> <li>• Prof. Promila Pathak (Botany)</li> <li>• Prof. Naresh Kumar (UIET)</li> <li>• Dr. Rajeev Kumar (Environment Studies)</li> <li>• Mr. Vikram Singh (CUS)</li> </ul>

## **STUDENT VOLUNTEERS**

- Sidharth
- Mandeep Kaur
- Mohini Thakur
- Anju Antil
- Reecha Sharma
- Rishu
- Aditi
- Bhawna
- Anandita
- Vipasha
- Priya
- Muskan
- Chhavi

**National Conference on “Indigenous Technologies for Viksit Bharat”**  
**CHANDIGARH SCIENCE CONGRESS**  
**NOVEMBER 6-8, 2024**

<b>Day 1 - November 06, 2024</b>	
<b>Venue: Law Auditorium, Panjab University, Chandigarh</b>	
<b>08.00 - 09.45</b>	Registration
<b>10.00 – 11.30</b>	<b>Inauguration of CHASCON-2024</b> <b>10.30:</b> Address by Prof. Ashutosh Sharma, President, INSA and Institute Chair Professor, IIT, Kanpur <b>10.45:</b> Release of Souvenir <b>10.50:</b> Keynote Address by Ms. Shweta Khurana, Senior Director, Asia-Pacific and Japan, Govt. Partnerships & Initiatives, Global Govt. Affairs Group, Intel Corporation
<b>11.30</b>	<b>Inauguration of EXPO-CHASCON-2024</b> <b>Venue:</b> Law Auditorium Grounds
<b>11.30 – 12.30</b>	Lunch Break & Networking
<b>Technical Session-I</b>	
<b>Venue: Law Auditorium, Panjab University, Chandigarh</b>	
<b>Chair: Prof. Ashutosh Sharma, President, INSA</b>	
<b>12.30 - 13.00</b>	Plenary Lecture 1: “ <i>Unleashing Creativity for Brighter Tomorrow</i> ” Dr. Vipin Kumar, Scientist G and Former Director, National Innovation Foundation (NIF).
<b>13.00-13.30</b>	Plenary Lecture 2: “ <i>The Ideal Nuclear Medicine – Non-Medical Professional for Tomorrow</i> ” Prof. Venkatesh Rangarajan, Head, Department of Nuclear Medicine & Molecular Imaging, Tata Memorial Centre – Homi Bhabha National Institute, Mumbai.
<b>13.30 - 14.45</b>	Lunch Break & Networking
<b>Technical Session-II</b>	
<b>Venue: Law Auditorium, Panjab University, Chandigarh</b>	
<b>Chair: Professor Arun Grover, Former Vice Chancellor, Panjab University, Chandigarh</b>	
<b>14.45 - 15:30</b>	Plenary Lecture 3: “ <i>Vision and Scope of Homi Bhabha Centre in Chandigarh</i> ” Prof. Ashish Gulia, Director, Homi Bhabha Cancer Hospital & Research Centre, Mullanpur, SAS Nagar, Mohali.
<b>15.30 - 16.00</b>	Plenary Lecture 4: “ <i>Weight Reduction Strategy is Calling You: Are You Listening??</i> ” Prof. Sanjay Kumar Bhadada, Head, Department of Endocrinology, PGIMER, Chandigarh.
<b>16.00 - 17.00</b>	Tea Break & Networking
<b>14.45 - 15:30</b>	Plenary Lecture 3: “ <i>Vision and Scope of Homi Bhabha Centre in Chandigarh</i> ” Prof. Ashish Gulia, Director, Homi Bhabha Cancer Hospital & Research Centre, Mullanpur, SAS Nagar, Mohali.
<b>Day 2 - November 7, 2024</b>	
<b>Venue: Respective Departments for session activities</b>	
<b>(Details for sectional activities are available on CHASCON website)</b>	
<b>09.30 - 10.30</b>	Scientific Session
<b>10.30 - 11.00</b>	Tea Break & Networking
<b>11.00 - 13.00</b>	Oral Presentations
<b>13.00 - 14.00</b>	Lunch Break & Networking
<b>14.00 - 15.30</b>	Poster Presentations
<b>15.30 - 16.00</b>	Tea Break & Networking
<b>16.00 - 17.00</b>	Poster Presentations

**Day 3 – November 8, 2024**

**Technical Session-III**

**Venue: Law Auditorium, Panjab University, Chandigarh**

<b>10.00 - 11.30</b>	CHASCON – CRIKC SHODH SAMVAD
<b>11.30 - 12.30</b>	Valedictory Function
<b>12.30 - 14.00</b>	Lunch

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# *Messages*

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**Professor Renu Vig**  
*Vice - Chancellor*



**PANJAB UNIVERSITY**  
CHANDIGARH, India 160 014



### **VICE-CHANCELLOR'S MESSAGE**

It awards me a great deal of happiness and a sense of deep satisfaction to inaugurate the seventeenth Chandigarh Science Congress, bearing the acronym CHASCON-2024. CHASCON, an annual event organized at Panjab University is a manifestation of the research initiatives and academic dynamism of our faculty, research scholars and students as well as our symbiotic relationship with our sister organisations under the umbrella of CRIKC.

The theme of the Congress this year, "Indigenous Technologies for Viksit Bharat" beautifully encapsulates the Indian endeavour of assuming its rightful place at the helm of world affairs as we enter into the *Amrit Kaal* of Independent India. The theme is of even greater relevance for Institutions of Higher Education and Research like us for whom it serves as an inspiration to orient our researchers towards competing and making their mark in the International arena. It is thus a matter of pride for us that the Keynote Address today will be delivered by an Indian who enjoys a global stature. We are delighted to welcome in our midst Ms Shweta Khurana, Director, Asia Pacific and Japan - Government Partnerships & Initiatives, Global Government Affairs Group, Intel

The Congress theme is also reminiscent of the ideals of post-independence India wherein we pledged to develop our country into a nation with a scientific temper and rational modern outlook. Our own city Chandigarh and more so our Panjab University is an ode to the resilience of our nation in general and the Punjabi community in particular as we rose phoenix-like from the ashes of Partition. Even in that state of dismemberment Panjab University continued to contribute to Scientific Research in India as one of our Sterling academicians Professor S.S. Bhatnagar, better known as the Laboratory Man of India, served as the first President of INSA in Independent India. It is an honour today to welcome his successor Prof Ashutosh Sharma, President INSA as our Chief Guest for the Inaugural Function.

I welcome all dignitaries, scientists, industry representatives, academicians and researchers who will be visiting our campus over the next three days. I do hope that our student's researchers and faculty make the best of this opportunity and derive lasting experiences, associations and lessons from this event. My compliments and best wishes to all those who have been associated with the organization of the event!

With best wishes

  
(Renu Vig)



Director  
Research & Development Cell



PANJAB UNIVERSITY  
CHANDIGARH  
INDIA-160014



### MESSAGE

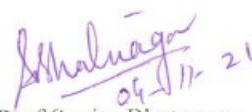
It is with a great deal of joy and a deep sense of satisfaction that I share my thoughts in anticipation of the conduct of CHASCON-2024, a landmark in the annual calendar of academic events held at Panjab University. While it has always been Panjab University's endeavour to initiate and promote activities related to development of science and technology in the region the Chandigarh Science Congress remains a special event as it not only brings together all Departments in the Faculties of Science, Engineering and Management; rather it brings together researchers from across Institutions and transcends boundaries of both space and age.

Over the years, CHASCON has evolved in response to the changing times and contexts both in terms of content and orientation. It has now acquired a national character. Further the establishment of the Chandigarh Region Innovation and Knowledge Cluster in 2013, facilitated the association and participation of various other research institutions and organisations of the region thus adding strength to the Chandigarh Science Congress. We duly appreciate the contribution of all our sister institutions and look forward to their playing a more active role in the organisation of CHASCON in the years to come.

The theme of CHASCON-2024: "Indigenous Technologies for Viksit Bharat" aligns with the national agenda of claiming for India its rightful place as a decisive player in world affairs by moving it from the category of Developing to Developed Countries. This is possible only through achieving self-reliance in technology. Indigenous technologies may be produced only if adequate stress is laid and impetus granted to Research and Development activities in the country. The Congress provides a platform for young researchers to present their work in the presence of eminent scholars and to be enthused through the exposure gained through interaction with the best experts in their respective fields.

It pleases me to know and share that CHASCON-2024 has elicited tremendous response and we have once again surpassed all previous records in terms of registration and abstract submission. In this regard I would like to place on record my gratitude to our eminent Vice Chancellor Prof Renu Vig under whose able stewardship and encouragement this event has been conceived and organized and add a word of appreciation for organizing team which worked to bring our ideas and ideals to fruition.

With best wishes

  
Prof Savita Bhatnagar



भारतीय राष्ट्रीय विज्ञान अकादमी

बहादुर शाह जफर मार्ग, नई दिल्ली-110002

INDIAN NATIONAL SCIENCE ACADEMY

Bahadur Shah Zafar Marg, New Delhi-110002

प्रोफेसर आशुतोष शर्मा, अध्यक्ष

Prof. Ashutosh Sharma, President

### **Message from Prof. Ashutosh Sharma, President, INSA**



It affords me a deep sense of happiness to be a part of CHASCON-2024, the seventeenth in a series of annual events organised to showcase the research and development activities of Panjab University and the region it serves. The theme for this year's Congress: "Indigenous Technologies for Viksit Bharat" deeply resonates not just with India's journey towards its rightful place as a Global leader in Science and Technology but also with the ethos and legacy of Panjab University which is one of the four oldest Universities of modern India and has made stellar contributions to the world of Indian Science.

As President of Indian National Science Academy, I specially deem it an honour to be invited to Panjab University which has been a nursery for Scientists, Science educators, Science Populisers and Science Entrepreneurs. Indeed, who can forget the contribution of great minds like Abdus Salaam, Hargobind Khorana, Ruchi Ram Sahni, S.S. Bhatnagar, Birbal Sahni, Satish Dhawan, Sir Ganga Ram, F.C. Kohli and M.S. Randhawa not just to the development of Science but to the development of India as a Nation and in fact to the well-being of the entire global community.

The Indian National Science Academy has an even deeper connect with Panjab University and the region of Punjab, with nine of its forty Presidents being associated with this University and/or the region whether as a student or a teacher or by virtue of being born in Punjab. It would appear that every fourth President of INSA has dwelt and been nurtured in these hallowed portals beginning with Sir Dr. R. N. Chopra as the earliest in 1939 and Dr. A.K. Sood as the latest till 2019. These apart, many among the Foundation Fellows of INSA hailed from Panjab University as did several of the Vice-Presidents.

It is a matter of deep joy and satisfaction for me to see the present crop of Scientists and Administrators at Panjab University taking the rich research legacy of this Institution forward in the garb of the Chandigarh Science Congress which is not only limited to the Campus and its affiliated colleges but includes other Institutions of Research and Higher Education in the region, thus promoting a culture of research and scientific co-operation. The concept of Shodh Samvaad which helps popularize scientific research and the demonstration of start-ups and patents which together symbolize the fruition of research efforts are particularly worthy of appreciation.

I congratulate Panjab University on having presented such a beautifully curated scientific banquet which I am sure will nurture and inspire many more scientific minds!

With best regards,

Ashutosh Sharma



### MESSAGE

I am glad that Panjab University, Chandigarh, is hosting the 17th Chandigarh Science Congress (A National Conference) from November 6-8, 2024, on the theme "Indigenous Technologies for Viksit Bharat."

The conference is organized with a view to providing a platform for young budding researchers from the Campus and CRIKC to share their research work and nurture a research culture at Panjab University, Chandigarh. An additional objective of the conference is to expose our students, young scientists, and budding researchers from various educational and research institutes of repute to present their recent research findings at the conference. This conference would lay a platform for interaction among young and brilliant researchers and talented student communities, accelerating scientific research. It will provide the ideal forum to discuss the latest findings, put them into context, and understand how they affect your practice daily. It will also help promote top-level research and globalize quality research in general.

I add my best wishes for a successful and fruitful conference and my thanks to all the organizers. I hope that you will very much enjoy it and benefit from it!

(Amitava Patra)



स्नातकोत्तर चिकित्सा शिक्षा एवं  
अनुसंधान संस्थान,  
चण्डीगढ़ 160 012 (भारत)  
आर्तं सेवा सर्वमद्रः शोधश्च



Postgraduate Institute of Medical Education &  
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**Prof. (Dr.) Vivek Lal**  
MD (Med), DM (Neuro)  
Director  
&  
Head, Department of Neurology



No. DPGI/3/24/1961

Date : 06-11-2024

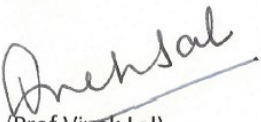


## MESSAGE

The CHASCON 2024 is being held at a time when our country is seeing a new resurgence in Science, Technology & Society. In this time CRIKC will play a crucial role through programmes like this.

I am happy to note that it's focusing on the theme "**Indigenous Technologies for Viksit Bharat**" the **17th CHASCON** aims to document and exhibit the contribution of research towards the building of a self-reliant India and the fruition of the "Amrit Kaal" in India's resurgence as a Global leader.

I wish Panjab University & CRIKC a success in organizing CHASCON 2024, and pledge full support from PGI.

  
(Prof Vivek Lal)



**Er. Pritpal Singh**  
Executive Director

## **Punjab State Council for Science & Technology**

MGSIPA Complex, Institutional Area  
Sector-26, Chandigarh-160019 (India)

**T-** 91-172-27792325

**E-** pritpal.singh8@punjab.gov.in

**W-** www.pscst.punjab.gov.in



### **MESSAGE**

I am happy to note that Panjab University is hosting 17th Chandigarh Science Congress (CHASCON-2024) on the theme "Indigenous Technologies for Viksit Bharat." The theme is of high relevance and perfectly aligns with India's journey toward self-reliance and vision of Amrit Kaal focused on technology-driven and knowledge-based economy paving way for global leadership.

India is committed to leverage legacy, harness homegrown technologies and embrace emerging technological innovations to address grand challenges of the country for inclusive and sustainable future. The Punjab State Council for Science & Technology, under aegis of Department of Science, Technology & Environment, Government of Punjab stands dedicated to the National Vision and Mission. The Council is taking up initiatives focused on promoting frugal/grassroot innovations, facilitating STI led opportunities for women empowerment, strengthening rural enterprises and green technologies for building resilient communities to transform Punjab into leading tech-enabled State.

I am confident that CHASCON-2024 will provide a stimulating forum for fruitful discussions, collaborative learning, and the cross-pollination of ideas among researchers, innovators, industry leaders and policymakers to accelerate technological progress in India.

Warm Regards,

  
(Pritpal Singh)



# MAHARAJA AGRASEN UNIVERSITY

NAAC Accredited

Ref. No: MAUHP/VC Sectt/Message/2024/946

Date: 04<sup>th</sup> Nov., 2024



## MESSAGE

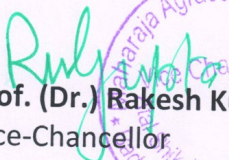
It is my pleasure to extend my warmest greetings and sincere appreciation to Panjab University, Chandigarh, for organizing the 17th Chandigarh Science Congress (CHASCON) - a distinguished National Conference from November 6-8, 2024, centered on the theme "Indigenous Technologies for Viksit Bharat."

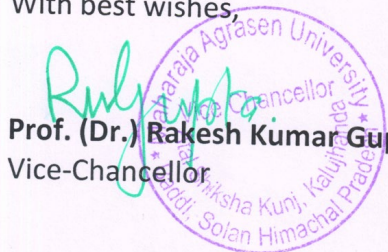
This theme, aligned with National Science Day 2024, aspires to highlight, celebrate, and elevate our homegrown innovations and technologies that have made substantial contributions to societal progress and enriched our national pride.

I am pleased to learn that delegates from across the nation will be gathering for CHASCON-2024. I firmly believe that this prestigious platform will offer invaluable opportunities for young researchers to engage in collaborative professional education and will have a remarkable avenue to showcase their work, advancing a culture of research and innovation at Panjab University Chandigarh.

My heartfelt congratulations to CRIKC for championing this outstanding initiative. I also extend my best wishes for the Conference's resounding success and am confident that CRIKC's unwavering dedication will significantly contribute to the advancement of our education system, both within India and abroad.

With best wishes,

  
Prof. (Dr.) Rakesh Kumar Gupta  
Vice-Chancellor





प्रो. (डॉ.) भोला राम गुर्जर  
निदेशक  
Prof (Dr) BR Gurjar  
Director

## राष्ट्रीय तकनीकी शिक्षक प्रशिक्षण एवं अनुसंधान संस्थान National Institute of Technical Teachers Training & Research

शिक्षा मंत्रालय, भारत सरकार का एक स्वायत्त संस्थान  
(Ministry of Education, Govt of India)

सेक्टर 26, चंडीगढ़ 160 019 (भारत)  
SECTOR 26, CHANDIGARH 160 019 (India)

दिनांक 01 नवंबर 2024



### MESSAGE

On behalf of the National Institute of Technical Teachers Training and Research (NITTTR), Chandigarh, I extend my heartfelt congratulations to Panjab University on organizing the 17th Chandigarh Science Congress (CHASCON-2024).

The theme of this year's event, "Indigenous Technologies for Viksit Bharat," aligns with NITTTR Chandigarh's mission of serving nation through promoting the quality technical education and self-reliance in technological advancements.

We are proud to collaborate and support CHASCON-2024, as it offers a unique platform to showcase the talent and ingenuity of our youth and inspire them to contribute towards a brighter future for our nation.

I wish all participants, organizers, and attendees a fruitful and enriching experience during the CHASCON-2024.

प्रो. (डॉ.) भोला राम गुर्जर  
निदेशक

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वेब साइट / Website: [www.nitttrchd.ac.in](http://www.nitttrchd.ac.in)



### MESSAGE

It is a privilege to contribute to the 17th Chandigarh Science Congress (CHASCON), a distinguished platform that celebrates the spirit of scientific discovery and highlights the significance of indigenous technologies for a self-reliant India. This year's theme, "Indigenous Technologies for Viksit Bharat," aligns with C-DAC Mohali's mission to develop impactful technology solutions that meet critical societal needs.

C-DAC Mohali has pioneered several projects that resonate with this vision. Among them, eSanjeevani, India's national telemedicine service developed by C-DAC, has transformed healthcare delivery across the nation. By connecting millions of patients with healthcare professionals in both urban and rural areas, eSanjeevani underscores the power of indigenous technology to bridge gaps and enhance accessibility to quality healthcare.

Our work also spans vital areas like artificial intelligence, health informatics, agriculture, and cybersecurity. In cybersecurity, our research focuses on developing advanced threat intelligence systems that proactively identify and address cyber threats, helping to secure digital infrastructures across various sectors, thereby bolstering the resilience of India's digital landscape.

C-DAC remains committed to innovation in emerging technologies that improve quality of life and create solutions that are accessible, reliable, and transformative. We believe CHASCON 2024 provides an invaluable platform for exchanging ideas, fostering collaboration, and inspiring the next generation of researchers to contribute to a resurgent and self-reliant India.

I extend my best wishes to the participants and organizers of CHASCON 2024 and look forward to the stimulating discussions that will shape the future of science and technology in our country.

Warm regards,  
V K Sharma  
Scientist 'G' & Centre Head  
C-DAC Mohali



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*Profiles of  
Invited  
Talks / Speakers*

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## SHWETA KHURANA

Sr. Director Asia Pacific & Japan  
Government Affairs Group  
Intel Corporation

### ABOUT

Shweta Khurana serves as Senior Director for Government Partnerships & Initiatives in the Asia-Pacific and Japan (APJ) region within Intel's Global Government Affairs group. She plays a critical role in Intel's efforts to drive digital transformation, focusing on programs that enhance digital literacy, AI skills, and readiness for future technology applications, particularly in emerging markets like India. Through partnerships with government entities, educational organizations, and community institutions, Khurana oversees initiatives aimed at making AI accessible and building technology proficiency across diverse demographics.

A significant part of her work includes Intel's "AI for Youth" program, which has reached over 113,000 young people in India by equipping them with AI knowledge and skills to apply in socially impactful projects. The program collaborates with educational bodies such as the Central Board of Secondary Education (CBSE) and the Ministry of Electronics and Information Technology, providing an AI curriculum that is available in multiple regional languages. Additionally, she has been involved in initiatives like the "AI for All" program, which offers a brief but inclusive introduction to AI concepts for individuals without a technical background, promoting AI literacy nationwide.

Khurana has also contributed to Intel's digital readiness programs globally. Her role extends to significant forums, including Intel's All.ai Summit, which explores AI's applications in healthcare and other sectors at a population scale, aiming to address major challenges and encourage the use of AI-driven solutions for societal benefit.



## PROF. VIPIN KUMAR

Chief Scientist and Former Director,  
National Innovation Foundation, India

### ABOUT

Dr. Vipin Kumar is a Chief Scientist and former Director at the National Innovation Foundation – India (NIF), an institution of the Department of Science and Technology (DST) in India. His research interests include incubation and promotion of inclusive and frugal innovations, intellectual property protection, business development, commercialization, and developing open-source technologies for employment generation. He has played a significant role in positioning grassroots innovations as a reality, ensuring demand supply equilibrium, and in situ incubation of innovations for entrepreneurship and inclusive development.

Dr. Kumar has established networks with scientific and technological institutions to add value to grassroots innovations. He developed a proposal for the Indian Council of Medical Research's NIF Task Force Project, which established a mechanism for new drug/formulation development based on traditional knowledge practices. He coordinated the NIF-ICMR task force, invited proposals from other institutions for clinical validation, and coordinated peer review and evaluation.

In 2015, NIFientreC was set up with the support of DST as Technology Business Incubator, providing direct and indirect employment to thousands of citizens. He has worked as a resource person in UNESCO's course on Innovation Management and has contributed to building social and inclusive innovation-based relationships between India and ASEAN Member States.

Dr. Kumar has published over 100 research and review papers in national and international journals and has helped coordinate the National Entrepreneurship Awards (NEA) of the Ministry of Skill Development and Entrepreneurship (MSDE). He has served as Chairperson/Member of various committees of the Union and State Governments and as Principal Investigator/Coordinator of various prestigious Institutions. His leadership has motivated common people to deliver innovative technologies to solve societal problems and empower India's STI journey through dependable institutionalizing of Innovations.



## PROF. VENKATESH RANGARAJAN

Professor & Head

Department of Nuclear Medicine & Molecular  
Imaging

TATA MEMORIAL CENTRE – Homi Bhabha  
National Institute (Deemed University)

### ABOUT

Professor Venkatesh Rangarajan is a prominent figure in the field of Nuclear Medicine, serving as a Professor and Department Head at Tata Memorial Centre in Mumbai, India. With over 30 years of experience, he specializes in nuclear oncology, PET/CT imaging, and dosimetry, making significant contributions to cancer imaging and diagnostics. Prof. Rangarajan has a strong research focus on hybrid imaging techniques and their applications in oncology, with numerous publications in areas like head and neck cancer, lung cancer, and pediatric thyroid cancer. He has collaborated on impactful studies, including those examining the diagnostic performance of FDG PET/CT in cancer follow-ups, a key area for advancing patient monitoring and treatment planning. His work has earned him multiple recognitions, including the Henri Becquerel Fellowship, awarded for his contributions to radiology and nuclear medicine. He has pioneered hybrid imaging methods, such as PET/CT, particularly valuable in oncology and pediatric cases. His research includes exploring the use of radiotracers for diagnosing various cancers, dosimetry, and image-guided therapy approaches. His extensive international training, particularly in the UK and the US, supports his authoritative work on theranostics and dosimetry in nuclear medicine, making significant contributions to clinical and academic advancements.



## DR. ASHISH GULIA

Director  
Homi Bhabha Cancer Hospital and Research  
Centre  
New Chandigarh, Punjab

### ABOUT

Dr. Ashish Gulia, a distinguished Oncologist, is the Director of the Homi Bhabha Cancer Hospital and Research Centre (HBCH&RC) in New Chandigarh, Punjab. This state-of-the-art facility, which opened in 2022 under the Tata Memorial Centre, plays a crucial role in offering advanced cancer care in northern India. Dr. Gulia oversees a team committed to comprehensive oncology services, including advanced diagnostic and therapeutic facilities such as CT scans, nuclear imaging, and a sophisticated operation theater complex. Under his leadership, HBCH&RC has adopted a patient-centric model, ensuring a significant portion of cancer treatments are either heavily subsidized or provided free of charge, making cancer care accessible to economically disadvantaged patients.

In his tenure, Dr. Gulia has emphasized collaborative healthcare initiatives, such as partnering with Himachal Pradesh for cashless cancer treatment programs, which help extend HBCH&RC's services to a wider population. His work contributes to the Tata Memorial Centre's goal of creating a regional network for accessible and advanced cancer treatment through its "hub-and-spoke" model. Under his leadership, the 300-bed hospital has become a regional center of excellence, offering advanced oncological services and support to economically disadvantaged patients through government schemes like Ayushman Bharat and local welfare funds. Dr. Gulia also emphasizes comprehensive patient support, with the hospital providing substantial discounts on chemotherapy medications, facilitating financial aid, and offering accommodations for patients and their families, ensuring holistic, patient-centered care.

Prior to joining HBCH&RC, Dr. Gulia held prominent roles at the Tata Memorial Hospital, specializing in orthopedic oncology, which has greatly influenced his approach to integrated cancer treatment. His current work at HBCH&RC aligns with a larger mission to build a nationwide network of cancer care, especially benefiting under-resourced populations.



## DR. SANJAY KUMAR BHADADA

Professor & Head, Department of  
Endocrinology, PGIMER, Chandigarh.

### ABOUT

Prof. Sanjay Kumar Bhadada (MD, DM (Endocrinology and Metabolism), FICP, FRCPI and MNAMS) is working as Professor in the department of Endocrinology, PGIMER, Chandigarh, premier medical institute of country, known for its research and patient care worldwide. He is the founder and current secretary of Punjab and Chandigarh chapter of RSSDI. He is an Ex National Executive and current Secretary of Indian Society for Bone and Mineral Research (ISBMR).

He is the regular speaker at annual conferences of RSSDI, Endocrine society of India (ESI) and ISBMR. He has more than 160 publications in high impact factor journals, speaks about his research aptitude. He has received prestigious awards like M N Sen Oration award by ICMR in 2013, PN Shah Oration award by Endocrine Society of India in 2010 & Prof. Survir Singh Visiting Professorship by Association of Physicians of India in 2011. He also delivered Sanofi Aventis senior lectureship at APICON and recently nominated for prestigious Prof. Shuvir singh oration award. He has research collaboration with international institutes like Henry Ford Hospital, Detroit, USA & Antwerp University, Belgium and national institutes like IIT Ropar, CDRI Lucknow, AIIMS New Delhi, Panjab University & IMTECH, Chandigarh. He is the Section Editor of the ESI manual of Endocrinology. His major field of interests is diabetes in young and bone and diabetes. He is core team member of simultaneous pancreas and kidney transplant program at PGIMER, Chandigarh. He was the organizing secretary of one of the best organized ESICON (year 2014) at PGIMER, Chandigarh.



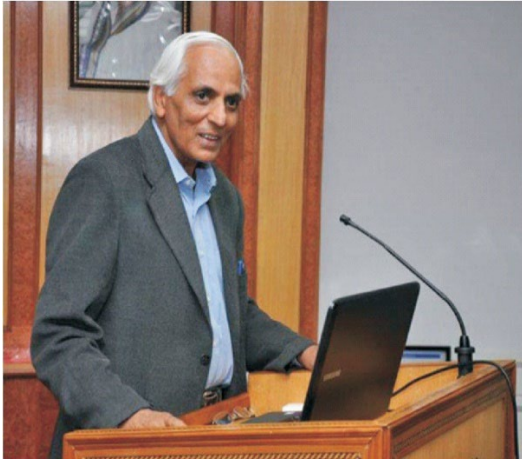
**PROF. SURESH GOSAVI**

Vice-Chancellor  
Savitribai Phule Pune University (SPPU)

## **ABOUT**

Professor Suresh Gosavi is a distinguished academic and researcher, currently serving as the Vice-Chancellor of Savitribai Phule Pune University (SPPU). With a robust background in physics, he has contributed significantly to the fields of micro-nano systems, nanotechnology, and materials science. His research specialties include lithography, plasma polymerization, and nano- and microfluidics, with applications in environmental and electronic sciences. Professor Gosavi completed his MSc and PhD at SPPU, where he has held various academic roles, including head of the Department of Environmental Science. His work is well-regarded both in India and internationally, as evidenced by his extensive list of publications and conference presentations across multiple disciplines, enhancing his reputation as a leader in advanced scientific research and academic administration.

Prof. Gosavi has an extensive background in nanotechnology, microelectronics, and advanced materials research. His academic journey began at the University of Pune (now SPPU), where he earned his MSc and PhD degrees. With over 209 publications in international and domestic journals, he is recognized for his work on nanomaterials, specifically in fields like lithography, plasma polymerization, and the synthesis and application of nanocomposites. His research interests also span micro- and nanofluidics, soft lithography, and photoimageable thick-film technology, showcasing his commitment to advancing both theoretical and practical aspects of materials science and electronic applications. In addition to his academic accomplishments, Prof. Gosavi has been an influential figure in the SPPU community. Before becoming Vice-Chancellor, he was a senior professor and head of the Environmental Science Department at SPPU, advocating for interdisciplinary approaches that integrate physics with environmental science to tackle pressing global issues.



## PROF. TEJ PAL SINGH

Distinguished SERB Fellow  
AIIMS, New Delhi

### ABOUT

Professor Tej Pal Singh is a distinguished Indian biophysicist renowned for his extensive research in structural biology, particularly in the areas of X-ray crystallography and drug discovery. He earned his Ph.D. from the Indian Institute of Science (IISc) in Bangalore and has since made significant contributions to understanding protein structures and developing peptide design for various therapeutic targets, including antibacterial agents and cancer treatments. Over his illustrious career, he has published over 430 research articles and has contributed more than 610 sets of protein structure coordinates to the Protein Data Bank (PDB).

Currently, he serves as a SERB Distinguished Fellow at the All-India Institute of Medical Sciences in New Delhi, where he established a Structural Biology and Drug Design Laboratory. He has also played a pivotal role in various academic committees and professional organizations, including serving as the Vice President of the Indian National Science Academy. Professor Singh's outstanding work has been recognized through numerous awards, including the prestigious G.N. Ramachandran Award for Excellence in Science.

Professor Tej Pal Singh has had a profound impact on the field of biophysics and structural biology through his innovative research on protein structures and drug design. After completing his Ph.D. at IISc Bangalore, he embarked on a notable academic journey that included international research stints, such as with the Max-Planck Institute for Biochemistry in Germany, where he worked on the structural determination of serine proteases.

His research interests encompass the design of peptides using a variety of amino acids, contributing significantly to the understanding of structure-function relationships in proteins and their applications in drug discovery. Notably, his work has led to advancements in targeted therapies for diseases, including cancer and bacterial infections, and he has mentored over 83 PhD students throughout his career.

Beyond his research, Professor Singh has held various leadership roles in scientific communities, including serving as the president of multiple organizations related to biophysics and drug design. He is recognized as a Fellow of several prestigious academies, reflecting his contributions to advancing science in India. His honors include the SASTRA-G.N. Ramachandran Award for Excellence in Science and the G.N. Ramachandran CSIR Gold Medal.



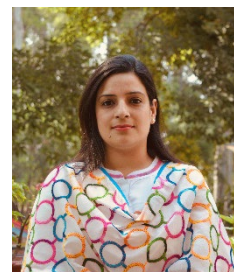
## MESSAGE FROM THE COORDINATORS



**Prof. Y.K. Rawal**  
Coordinator  
CHASCON 2024



**Prof. Sonal Singhal**  
Co-coordinator  
CHASCON 2024



**Prof. Sakshi Kaushal**  
Co-coordinator  
CHASCON 2024

It pleases us immensely to write these lines as an accompaniment to the Volume of Abstracts of CHASCON 2024. The Seventeenth Chandigarh Science Congress has invited an overwhelming response from the Science fraternity of the University, region and beyond. We have been fortunate this year to receive more than 1100 registrations from students, research scholars, faculty and practicing scientists for participation in the Congress. We look forward to enjoying more than 680 oral or poster presentations spread over ten different sections over the three days of the Congress.

The Congress this year is being organised as a National Conference on the theme “Indigenous Technologies for Viksit Bharat”. The theme echoes the resolve of the Nation to usher in the *Amrit Kaal* of its evolutionary history whereby India would once again be an assertive Global leader rather than a meek follower. The theme aims at deliberating ways and means of making India self-reliant in terms of both resources and technologies. As such it calls upon researchers to orient their research to culminate in the production of technologies that help India find solution to its problems.

The successful conduct of an event of this proportion flows from the thoughts and efforts put in by a multitude of minds and hands. We are profoundly grateful to our Honourable Vice Chancellor Prof Renu Vig for her blessings, patronage, unstinting support and the unwavering faith that she placed in the organizing team. Thanks are due to Director Research and Development Cell, Prof. Savita Bhatnagar, who despite her extremely busy schedule always made time for various deliberations required for the organisation of the Congress. Prof Harsh Nayyar with his foresight, pragmatic advice and constant guidance ensured the smooth conduct of this event. We are indeed grateful to him. I am personally grateful to my Co-Coordinators Prof Sonal Singhal and Prof Sakshi Kaushal for their constant support and hard work which made the conduct of the Congress a seamless effort. We are indebted to all our colleagues in various Committees and particularly those from the Departments of Chemistry and Zoology as well as our research scholars who worked consistently and diligently for many days to make this event a success. Worthy of appreciation are the efforts of Prof Navneet Kaur and her team in putting together this volume of abstracts which involved numerous consultations and long hours of work. Finally, we would like to acknowledge the support received from sister organisations under CRIKC as well as our sponsors.

We welcome you all to participate, interact and grow alongside CHASCON-2024!

(Prof. Y.K. Rawal)  
Coordinator  
CHASCON 2024

(Prof. Sonal Singhal)  
Co-coordinator  
CHASCON 2024

(Prof. Sakshi Kaushal)  
Co-coordinator  
CHASCON 2024

# SCIENTIFIC SECTIONS

## SCIENTIFIC SECTIONS –DEPARTMENTS AND COORDINATORS

Sr. No.	Section	Departments/Centers/ institutes	Section coordinators
1.	<b>Basic Medical Sciences</b>	Biochemistry, Biophysics, Biotechnology, Microbiology, Microbial Biotechnology, Stem Cell & Tissue Engineering, Human Genome, Systems Biology & Bioinformatics, Nuclear Medicine, Public Health	Dr. Tanzeer Kaur (chairpersonbiophysics@pu.ac.in) Dr. Pavita Ranawat (pranawat@pu.ac.in)
2.	<b>Chemical Sciences</b>	Chemistry	Prof. Sonal Singhal (chemdept@pu.ac.in) Dr. P. Natarajan (pnataraj@pu.ac.in)
3.	<b>Dental Sciences</b>	Dr. Harvansh Singh Judge Institute of Dental Sciences & Hospital	Dr. Vishakha Grover (vishakha_grover@rediffmail.com) Dr. Jyoti Sharma
4.	<b>Earth and Environmental Sciences</b>	Geology, Geography & Environment Studies	Dr. Rajeev Kumar (devs@pu.ac.in) Dr. Vishwa Bandhu Singh ( <a href="mailto:vishwa@pu.ac.in">vishwa@pu.ac.in</a> ) Dr. Mahesh Thakur
5.	<b>Engineering Sciences</b>	University Institute of Engineering & Technology (UIET) University Institute of Chemical Engineering and Technology (UICET), Sophisticated Analytical Instrumentation Facility (SAIF),	Prof. Mamta Juneja ( <a href="mailto:mamtajuneja@pu.ac.in">mamtajuneja@pu.ac.in</a> ) Dr. Gaurav Rattan ( <a href="mailto:grattan@pu.ac.in">grattan@pu.ac.in</a> ) Prof. Rajesh Madam (rajeshmadan@pu.ac.in) Dr. Sanjeev Gautam (sgautam@pu.ac.in)
6.	<b>Life Sciences</b>	Botany, Zoology, Anthropology, Forensic Science and Criminology	Prof. Kamaljit Singh ( <a href="mailto:chairman.botany@pu.ac.in">chairman.botany@pu.ac.in</a> ) ) Dr. Indu Sharma (indu2702@pu.ac.in)

7.	<b>Management Sciences</b>	University Institute of Applied Management Sciences (UIAMS), University Business School (UBS), University Institute of Hotel & Tourism Management (UIHTM), University Institute of Fashion Technology & Vocational Development (UIFT)	Prof. Monika Aggarwal ( <a href="mailto:monikaa@pu.ac.in">monikaa@pu.ac.in</a> ) Dr. Manu Sharma
8.	<b>Mathematical sciences</b>	Mathematics, Statistics, Computer Science and Applications	Prof. Suman Bala ( <a href="mailto:casmath@pu.ac.in">casmath@pu.ac.in</a> ) Dr. Charanjit ( <a href="mailto:charan@pu.ac.in">charan@pu.ac.in</a> )
9.	<b>Pharmaceutical Sciences</b>	University Institute of Pharmaceutical Sciences	Dr. Neelima Dhingra ( <a href="mailto:neelimad08@pu.ac.in">neelimad08@pu.ac.in</a> ) Dr. Amita Sarwal ( <a href="mailto:sarwalamita@pu.ac.in">sarwalamita@pu.ac.in</a> )
10.	<b>Physical Sciences</b>	Physics, Nanoscience & Nanotechnology, Medical Physics	Prof. Jadab Sharma ( <a href="mailto:jadabs@pu.ac.in">jadabs@pu.ac.in</a> ) Dr. Akash Katoch

# Basic Medical Sciences

- Biochemistry
- Biophysics
- Biotechnology
- Microbiology
- Microbial Biotechnology
- Stem Cell & Tissue Engineering
- Human Genome
- Systems Biology & Bioinformatics
- Nuclear Medicine
- Public Health

## **CO-ORDINATORS**

*Sectional President*

Dr. Tanzeer Kaur

9501004597

*Sectional Secretary*

Dr. Pavitra Ranawat

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# CHASCON 2024

## NATIONAL CONFERENCE ON “Indigenous Technologies for Viksit Bharat”

### SECTION: BASIC MEDICAL SCIENCES

Program (Thursday, November 07, 2024)

Venue: Department of Biophysics, BMS Block-II, Panjab University, Sector-25, Chandigarh

Sectional President Dr. Tanzeer Kaur 9501004597		Sectional Secretary Dr. Pavitra Ranawat 9876606706	
Time	Program		
09:00-09:45	Display of Posters by participants <i>Venue:</i> Ground Floor corridor of the BMS-II Department of Biophysics		
09:45-10:00	Inauguration of sectional Program <i>Venue:</i> Seminar Hall, Ground floor, BMS-II		
10:00-10:45	<b>Chair</b> – Prof. Prince Sharma, Department of Microbiology, PU, Chandigarh Lecture – I <b>Speaker:</b> Prof. (Dr.) Anjali Aggarwal Department of Anatomy, PGIMER, Chandigarh <i>“Bio-flavonoids: Natural compounds with promising therapeutic potential for pancreatic cancer”</i>		
10:45-11:30	<b>Chair</b> – Prof. Archana Bhatnagar, Department of Biochemistry, Panjab University, Chandigarh. Lecture – II <b>Speaker:</b> Prof. (Dr.) Inder Pal Singh Department of Natural Products, NIPER SAS Nagar Mohali, Chandigarh <i>“Development of wound healing herbal formulation”</i>		
11:30-12:00	Tea Break		
12:00-1:00	Oral Presentations (Faculty) <i>Venue:</i> Ground Floor Corridor, Department of Biophysics		
1:00-2:00	Lunch		
2:00-5:00	Oral presentations (UG/PG and Research Scholars) <i>Venue:</i> 1. Seminar Room, BMS-II, Department of Biophysics 2. Lecture Hall 1, Department of Biophysics, Second floor Poster Presentations (Research Scholar and Faculty) <i>Venue:</i> Ground Floor Corridor of the Department of Biophysics		
3:30-4:00	Evening Tea		

## KEY SPEAKERS

S.No.	Name of Speaker	Affiliating Institution	Title of Abstract
1.	Prof. Inder Pal Singh	HoD, Natural Products and In-Charge, National Institute of Pharmaceutical Education and Research (NIPER), Mohali.	Development of Wound Healing Herbal Formulation.
2.	Prof. Anjali Aggarwal	Professor & Head, Department of Anatomy, PGIMER, Chandigarh.	Bio-flavonoids: Natural compounds with promising therapeutic potential for pancreatic cancer.

# DEVELOPMENT OF WOUND HEALING HERBAL FORMULATION



## PROF. INDER PAL SINGH

HoD, Natural Products and In-Charge,  
National Institute of Pharmaceutical  
Education and Research (NIPER), Mohali.

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### ABSTRACT

Seabuckthorn (*Hippophae rhamnoides* L.), a member of the Elaeagnaceae family, is native to the temperate Himalayan regions and is revered for its dense concentration of bioactive compounds. Rich in vitamins, carotenoids, fatty acids, flavonoids, amino acids, organic acids, phytosterols, polyphenols, lipids, carbohydrates, folic acid, and terpenes, Seabuckthorn boasts high nutritional and therapeutic value. Known for its wide range of health benefits, it has demonstrated radioprotective, anticancer, wound healing, antiulcer, anti-inflammatory, immunomodulatory, antiviral, and cardiovascular-supportive properties. This study provides an in-depth analysis of Seabuckthorn fruit oil, employing quantitative nuclear magnetic resonance (qNMR) for assessing triacylglycerol (TAG) levels. Fatty acyl composition of TAGs was further analyzed using NMR, gas chromatography-mass spectrometry (GC-MS), and Fourier-transform infrared (FTIR) spectroscopy. Analysis of commercial Seabuckthorn oil samples revealed variances between labeled and actual content. The study also assessed nanoemulsion-loaded cream and gel formulations for wound healing efficacy. These formulations showed significant wound contraction with excellent acute dermal safety profiles, underscoring their therapeutic potential. Overall, this research highlights the need for precise labeling of Seabuckthorn oil products and showcases the wound healing promise of Seabuckthorn oil-based topical formulations, confirming their safety and efficacy for clinical applications.



# **BIO-FLAVONOIDS: NATURAL COMPOUNDS WITH PROMISING THERAPEUTIC POTENTIAL FOR PANCREATIC CANCER**



**PROF. ANJALI AGGARWAL**

Head, Department of Anatomy, PGIMER,  
Chandigarh.

## **ABSTRACT**

Pancreatic cancer is an aggressive malignancy of gastrointestinal tract characterized by poor response to chemotherapy and high rates of relapse. Therefore, it is of urgent need to develop alternative strategies for its treatment. Various natural compounds like flavonoids derived from vegetables, as well as fruits are reported to possess potent antioxidant and anti-cancerous properties and are less toxic than current chemotherapeutic drugs. We studied the anticancer properties of natural flavonoids such as, Fisetin and Morin against pancreatic cancer cells and observed that these compounds bring about significant reduction in cancer associated phenomenon such as epithelial-mesenchymal transition, stemness and invasiveness. These findings collectively suggest that Fisetin and Morin possesses within cancer stem cells. Flavonoids also possess senotherapeutic effect and can reduce the pool of senescent cancer cells; thereby reducing senescence associated secretory factors which play important role in cancer development and progression. Additionally, these compounds possess potential to reduce inflammation, a characteristic pathological feature of pancreatic cancer. This anti-inflammatory effect, coupled with the down-regulation of genes associated with tumorigenic signaling pathways, underscores Fisetin's potential as an anti-tumorigenic agent, particularly in the context of pancreatic cancer. We also observed that these flavonoids target the mitochondrial functions of proliferating pancreatic cancer cells and facilitate their apoptosis. These observations suggest that combining the bioflavonoids with standard chemotherapy for pancreatic cancer can potentiate the specificity of currently used chemotherapeutic agents.

ABSTRACTS OF  
ORAL  
PRESENTATIONS

<b>Basic Medical Sciences- Oral Presentations</b>			
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
1.	Dr. Tammanna Ravee Sahrawat	Centre for Systems Biology and Bioinformatics, Panjab University, Chandigarh.	An in-silico network systems biology approach to investigate molecular underpinnings of PCOS and female cancers.
<b>Faculty/Scientists from Colleges and Other Institutions</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
2.	Dr. Anu Priya Minhas	Biological Sciences, Indian Council of Medical Research, National Institute of Occupational Health, Ahmedabad.	Targeting <i>Aspergillus fumigatus</i> B-cell epitopes for improved ABPA diagnosis via in-silico approaches.
<b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
3.	Ms. Lipsy Goyal	Department of Biochemistry, Panjab University, Chandigarh.	Bone marrow suppression caused by radiation and burn combined injury in mice and its amelioration.
4.	Mr. Mayank Maan	Department of Biophysics, Panjab University, Chandigarh.	In vitro studies on synthetic peptides: Synergizing antimicrobial potency with biocompatibility.
5.	Ms. Nidhi Verma	Department of Biochemistry, Panjab University, Chandigarh.	To investigate the role of environmental factors in the pathogenesis of asthma exacerbations using a mouse model.
6.	Mr. Rohit Bansal	Department of Biochemistry, Panjab University, Chandigarh.	Pulmonary consequences of oxidative stress and mitochondrial dysfunction in a T2DM murine model.

7.	Ms. Shiwani Sharma	Department of Biophysics, Panjab University, Chandigarh.	A multi-faceted approach combining 3D QSAR, molecular docking, homology modelling, ADME and molecular dynamics for identifying characteristic features for effective HCN1 channel inhibition.
8.	Ms. Siloni Patial	Department of Microbiology, Panjab University, Chandigarh.	A Potential Prophylactic Approach for Atherosclerosis by Cholesterol Assimilating Probiotic Bacteria: An Experimental Study.

**Research Scholars from Colleges and other Institutions (JRF, SRF, Project Fellow and Post Docs)**

S.No.	Name of Participant	Affiliating Institution	Title of Abstract
9.	Mrs. Kirti Maheshwari	Institute of Integrated Learning in Management University, Gurugram.	Integrating indigenous mental health practices with scalable digital solutions: A pathway to enhancing adolescent care and public health in Bharat.

**UG/PG Students of Panjab University Campus and Regional Centres**

S.No.	Name of Participant	Affiliating Institution	Title of Abstract
10.	Ms. Ananya	Department of Biophysics, Panjab University, Chandigarh.	Deciphering the role of inhibitors of differentiation (ID) proteins to elucidate molecular mechanism of Parkinson's disease: Impact on alpha synuclein aggregation.
11.	Ms. Ayushi Sharma	Department of Biotechnology, Panjab University, Chandigarh.	The potential of using neem ( <i>Azadirachta indica</i> ) as an effective spermicide.
12.	Ms. Divya Kaushal	Centre for Systems Biology and Bioinformatics, Panjab University, Chandigarh.	Ana-Prot: A 3-D protein structure analysis tool.
13.	Ms. Hargunjeet Kaur	Centre for Systems Biology and Bioinformatics, Panjab University, Chandigarh.	OvaKG: A knowledge graph-based approach for identifying potential therapeutic compounds in ovarian disorders.

14.	Ms. Koema Bansal	Department of Biophysics, Panjab University, Chandigarh.	In-silico analysis of ferulic acid derivatives targeting alpha-synuclein to treat Parkinson's disease.
15.	Ms. Kritika Sharma	Centre for systems biology and bioinformatics, Panjab University, Chandigarh.	Advancing structural prediction: A comparative analysis of alpha-fold 2 and alpha-fold 3 in protein structure determination.
16.	Dr. Rezul Gilhotra	Centre for Public Health, Panjab University, Chandigarh.	Road traffic accidents- A public health concern (retrospective study).
17.	Dr. Riya Atri	Centre for Public Health, Panjab University, Chandigarh.	Assessing PM Surya Ghar: mufat bijli yojana- a pilot study in sector 15, Chandigarh.
18.	Ms. Simran Vohra	Department of Biotechnology, Panjab University, Chandigarh.	Rethinking technology: CRISPR as a beacon of humanity and hope.
19.	Ms. Vanita	Department of Biophysics, Panjab University, Chandigarh.	Titanium carbide MXene quantum dots: a quantum leap towards healing acute lung injury.

Abstract File	
S.No.	Title of Abstract
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>	
1.	<p><b>AN IN-SILICO NETWORK SYSTEMS BIOLOGY APPROACH TO INVESTIGATE MOLECULAR UNDERPINNINGS OF PCOS AND FEMALE CANCERS</b></p> <p><u>Tammanna Ravee Sahrawat</u> <i>Centre for Systems Biology and Bioinformatics, Panjab University, Chandigarh.</i></p> <p>Oxidative stress (OS) plays a significant role in tumour initiation and progression by causing changes in gene expression, cell proliferation, and apoptosis. In females, the reactive oxygen species (ROS) serve as key signal molecules in physiological processes for normal functioning of the female reproductive system and, concomitantly, have been implicated in pathological processes such as polycystic ovary syndrome (PCOS). Therefore, the present study was undertaken to identify the underlying factors common amongst polycystic ovary syndrome and female cancers of breast and ovary so as to discern the shared molecular factors and pathways that could act as potential therapeutic targets. An in-silico network systems biology approach was employed to identify the common DEGs, in which the three pairs of datasets for the control and disease conditions were retrieved from the GEO database and analysed using R-software, followed by building an interactome in STRING. Cytoscape plug-ins based on different algorithms were used to identify and validate the hub genes, followed by their functional enrichment using the KEGG database. The hub genes identified belong to the cytochrome and neutrophil cytosol factor families, which associate with NADPH oxidases of NOX family that synthesize ROS. It was therefore concluded the molecular association amongst PCOS, breast, and ovarian cancers is due to altered OS in PCOS, which results in higher risk factors for cancer pathogenesis and metastasis. The hub genes identified in the present study can be further explored as therapeutic targets to alleviate the pathophysiology of PCOS and prevent the initiation of female cancers.</p>
<b>Faculty/Scientists from Colleges and Other Institutions</b>	
2.	<p><b>TARGETING <i>Aspergillus fumigatus</i> B-CELL EPITOPES FOR IMPROVED ABPA DIAGNOSIS VIA IN SILICO APPROACHES</b></p> <p>Diksha Agrawal<sup>1</sup>, Monika Sharma<sup>2</sup>, Ruchi Sachdeva<sup>3</sup>, Pragya Priyadarshini<sup>4</sup>, <u>Anu Priya Minhas</u><sup>5</sup> <i><sup>1</sup>Department of School of Life Science, Devi Ahilya Vishwavidyalaya <sup>2</sup>Plaksha University, <sup>3</sup>Department of Bioinformatics, Goswami Ganesh Dutta Sanatan Dharma College, <sup>4</sup>Postdoctoral Associate, Fox Chase Cancer Centre, Philadelphia, USA., <sup>5</sup>Biological sciences, Indian Council of Medical Research National Institute of Occupational Health.</i></p>

	<p>This study aimed to enhance diagnostic precision for Allergic Bronchopulmonary Aspergillosis (ABPA) by predicting <i>Aspergillus fumigatus</i>-specific B-cell epitopes using in silico methods and validating them through molecular docking. Sequences of Asp f1, f2, f3, and f4 were analysed using IEDB-AR for B-cell epitope prediction, followed by structural modelling with MODELLER and docking with HADDOCK. PyMOL and PDBe PISA were used to visualize the interactions. Key findings include the identification of Ig-E specific epitopes in Asp f1 and Asp f2, with strong Ig-E interactions observed in molecular docking. These interactions, particularly at key residues like LYS43 in Asp f1 and multiple residues in Asp f2, provide valuable insights for improving ABPA diagnosis. Future research could focus on validating these findings in clinical settings and exploring their potential for developing personalized immunotherapies and preventive strategies, addressing the limitations of current serological methods.</p>
<p><b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b></p>	
<p>3.</p>	<p><b>BONE MARROW SUPPRESSION CAUSED BY RADIATION AND BURN COMBINED INJURY IN MICE AND ITS AMELIORATION</b></p> <p><u>Lipsy Goyal</u>, Amarjit S. Naura, Anshoo Gautam  <i>Department of Biochemistry, Panjab University, Chandigarh.</i></p> <p>Combined scenario occurs when exposure of gamma radiations at a dose that is sufficient to cause injury is combined simultaneously or successively with burn injury. Earlier reports showed that almost 60–70% irradiated population were often subjected to combined injuries in nuclear incidents/accidents. However, the mechanism is not fairly understood and no treatment is available against combined injury. The work was designed to understand the bone marrow alterations caused after radiation and burn combined injury and its recovery by an antioxidant using mouse model. To evaluate the bone marrow alterations, C57BL/6 male mice were irradiated with a dose of 5 Gy, using a <math>\gamma</math>-irradiator (dose rate: 1.05 Gy/min) and given 4-10% of whole-body burn. Further, in combined injury animals, an antioxidant was orally gauged at the dose of 100 mg/kg body weight for 10 days. Bone marrow histology was performed and further scoring was done. Total cell count was taken. ROS and GSH levels were evaluated. Combined injury results in significant decrease in the cellularity of bone marrow cells, while antioxidants had shown a recovery in the cell count. Alterations in adipocyte and megakaryocyte cell count were observed. Changes in GSH as well as ROS were observed in the combined injury. Histological analysis had shown a compromised bone marrow cell count due to combined injury while the antioxidant group had shown an improvement in recovery of the suppressed bone marrow. Results showed suppression in bone marrow which can be recovered by repeated dosing.</p>

4.	<p><b>IN VITRO STUDIES ON SYNTHETIC PEPTIDES: SYNERGIZING ANTIMICROBIAL POTENCY WITH BIOCOMPATIBILITY</b></p> <p><u>Mayank Maan</u>, Avneet Saini <i>Department of Biophysics, Panjab University, Chandigarh.</i></p> <p>The increasing threat of multidrug-resistant (MDR) bacteria necessitates the development of novel antimicrobial agents. This study investigates the antimicrobial activity, stability, and biocompatibility of three synthetic antimicrobial peptides. Minimum inhibitory concentration (MIC) assays were performed against a range of Gram-positive and Gram-negative bacteria, including MDR and clinical isolates, demonstrating potent activity across all strains. Notable antimicrobial activity against clinical isolates and MDR strains was seen with MICs demonstrated to be lower as 1 <math>\mu</math>M. To assess stability, the antimicrobial efficacy of all the peptides was evaluated in the presence of trypsin, physiological salt concentrations, and serum, alongside time-kill kinetics to determine the bactericidal action over time. Haemolysis and cell viability assays were conducted to evaluate cytotoxicity, showing low toxicity toward mammalian cells, indicating excellent biocompatibility. Membrane activity was examined using field emission scanning electron microscopy, which revealed significant bactericidal effects through membrane disruption. Furthermore, circular dichroism spectroscopy was used to determine the peptides' secondary structure, with structure-activity relationship analysis highlighting the role of conformation in their antimicrobial mechanisms. This comprehensive in vitro characterization of synthetic peptides provides strong evidence of their potential as effective antimicrobial agents with high stability and low toxicity, paving the way for future studies in antimicrobial, antibiofilm, and therapeutic applications.</p>
5.	<p><b>TO INVESTIGATE THE ROLE OF ENVIRONMENTAL FACTORS IN THE PATHOGENESIS OF ASTHMA EXACERBATIONS USING A MOUSE MODEL</b></p> <p><u>Nidhi Verma</u>, Ayushi Sandhu, Amarjit S. Naura <i>Department of Biochemistry, Panjab University, Chandigarh.</i></p> <p>Asthma is a heterogeneous disease involving periodic airway obstruction, wheezing, inflammation, and airway hyperreactivity (AHR), leading to different phenotypes. Several environmental factors of both biological (such as respiratory viral infections) as well as non-biological origin (particulate matter/diesel exhaust particles/toxic gases) are known to aggravate symptoms and increase emergency visits and hospital admissions in asthmatics. However, exact molecular mechanism behind such exacerbations is not clearly known. The present piece of work was designed with an aim to understand the underlying mechanism behind viral mediated asthma exacerbation by utilizing ovalbumin (OVA) based mouse model of allergic asthma. Female BALB/c mice were sensitized and challenged with OVA to induce allergic asthma followed by intranasal exposure to poly(I:C)/PBS to mimic viral mediated asthma exacerbation. Dexamethasone, a steroidal class of drug was administered intraperitoneal prior to either OVA challenge or poly(I:C) exposure. Assessment of</p>



	<p>bronchoalveolar lavage fluid (BALF) and airway hyperresponsiveness (AHR), clearly show enhanced inflammatory response and deterioration of lung function following poly (I:C) exposure in allergic mice. Differential analysis of inflammatory cells revealed infiltration of eosinophils primarily in OVA-exposed mice, while poly(I:C) seems to promote increase in the neutrophils number. Interestingly, Dexamethasone ameliorated the allergic asthma but failed to cause much effect on poly(I:C) mediated recruitment of neutrophils in lungs as well as AHR. Overall, our findings suggest that poly(I:C) treatment in OVA-exposed mice seems to switch inflammatory response from eosinophils to neutrophils, which may make the condition non-responsive to dexamethasone.</p>
6.	<p><b>PULMONARY CONSEQUENCES OF OXIDATIVE STRESS AND MITOCHONDRIAL DYSFUNCTION IN A T2DM MURINE MODEL</b></p> <p><u>Rohit Bansal</u>, Akhil, Preety Kumari, Amarjit Singh Naura, Archana Bhatnagar <i>Department of Biochemistry, Panjab University, Chandigarh.</i></p> <p>Background: Type 2 diabetes mellitus (T2DM) is a metabolic disorder characterized by chronic hyperglycemia, impacting multiple organs including the heart, brain, liver, kidneys, muscles, and eyes. The lungs are also affected, leading to potential respiratory complications. This study investigates pulmonary function and mitochondrial distress in a T2DM model. Methodology: A type 2 diabetic model was established using C57BL/6 male mice, fed a High-Fat Diet (HFD) for 8 weeks. In the 9th week, Streptozotocin was administered intraperitoneally to induce diabetes. One-week post-injection, an Oral Glucose Tolerance Test confirmed the model. Lung function was assessed via plethysmography, and mice were dissected for analysis of oxidative stress and mitochondrial function in lung tissue and mitochondrial lysate, respectively. Hematoxylin and Eosin (H&amp;E) staining was conducted on lung samples. Results: Lung function significantly deteriorated in the T2DM group, with increased airway obstruction compared to both HFD and control groups. Specific parameters, including specific airway conductance (SAW) and effective pulmonary flow (EF50), showed marked decreases. Alterations in antioxidant activity and catalase levels were noted in the T2DM group. Additionally, Mitochondrial Complex II activity was also significantly reduced. The Pulmonary Organ Index indicated a reduction in lung tissue organ weight, and H&amp;E staining revealed an accumulation of immune cells in the lung tissue of T2DM mice. Conclusion: These results suggest that T2DM has detrimental effects on lung health, potentially increasing the risk of respiratory complications. Further investigation is warranted to explore the underlying mechanisms and therapeutic implications.</p>
7.	<p><b>A MULTI-FACETED APPROACH COMBINING 3D QSAR, MOLECULAR DOCKING, HOMOLGY MODELLING, ADME AND MOLECULAR DYNAMICS FOR IDENTIFYING CHARACTERISTIC FEATURES FOR EFFECTIVE HCN1 CHANNEL INHIBITION</b></p> <p><u>Shiwani Sharma</u><sup>1</sup>, Priyanka Rana<sup>2</sup>, Neelima Dhingra<sup>2</sup>, Tanzeer Kaur<sup>1</sup> <sup>1</sup><i>Department of Biophysics, Panjab University, Chandigarh,</i> <sup>2</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p>

	<p>Neuropathic pain (NP) manifests through symptoms like heightened pain sensitivity (hyperalgesia), pain from normally non-painful stimuli (allodynia), and spontaneous pain. Hyperpolarization-activated cyclic nucleotide-gated (HCN) channels play a pivotal role in this condition by contributing to neuronal hyperexcitability, which underlies the development of NP. Among the four HCN channel isoforms, HCN1 is predominantly expressed in the dorsal root ganglion, and is integral to the pathophysiology of NP. Developing inhibitors that specifically target HCN1 offers a promising therapeutic approach, mitigating NP while reducing the risk of interfering with other HCN isoforms. The main objective of this study is to identify and evaluate chemical properties of scaffolds with higher specificity for the HCN1 channel. Findings from 3D-QSAR studies demonstrated that hydrophobic interactions and hydrogen bond donor groups contribute to increased specificity toward HCN1. Further investigation into the molecular interactions between scaffolds and the HCN1 open pore that was generated through homology modelling followed by docking studies to assess scaffold binding leading to identification of key residues critical for scaffold-pore interactions. To assess drug-likeness, ADME predictions showed that the compounds exhibited good oral bioavailability and solubility. Molecular dynamics simulations further confirmed the stability of lead molecules A7 and A9 during their interactions with HCN1, suggesting their potential as promising drug candidates. These collective findings highlight key structural features necessary for the selective inhibition of the HCN1 channel, thereby providing a foundation for the rational design and development of novel HCN1 specific inhibitors for the management of NP.</p>
8.	<p><b>A POTENTIAL PROPHYLACTIC APPROACH FOR ATHEROSCLEROSIS BY CHOLESTEROL ASSIMILATING PROBIOTIC BACTERIA: AN EXPERIMENTAL STUDY</b></p> <p><u>Siloni Patial, Geeta Shukla</u>  <i>Department of Microbiology, Panjab University, Chandigarh.</i></p> <p>Cardiovascular diseases, largely driven by the progression of atherosclerosis, remains a leading global health challenge. However, current statin therapies often have some side effects i.e., myalgia, liver problems, neuropathy, when used for long term, prompting a growing interest in alternative approach like probiotics, which offer potential benefits in modulating risk factors. Therefore, the objective of study was to assess the cholesterol assimilating ability of indigenous lactic acid bacteria in-vitro vis-à-vis in atherosclerotic animal model induced via high-cholesterol diet. Among the screened isolates, <i>Lactobacillus plantarum</i> A5 had the maximum cholesterol assimilating potential in normal De Man, Rogosa, and Sharpe media (54.10%), simulated gastric conditions (23.28%) and intestinal conditions (50.42%). Interestingly, cholesterol assimilation was significantly enhanced in the presence of both 1% and 2% of prebiotic isomaltose. More specifically, feeding of high-cholesterol-diet (HCD) to Sprague Dawley rats for 12 weeks led to successful development of atherosclerotic model as significant increase in the body weights, body mass index, obesity, altered lipid profile, decreased glucose tolerance, and fasting sugars together with hepatic steatosis, atheromatic artery, and adipocyte hypertrophy was observed. Intriguingly, simultaneous supplementation of <i>L. plantarum</i> A5 to HCD animals for 12 weeks attenuated the gain in body weight, adiposity, serum lipid</p>

	<p>levels, glucose tolerance, and hepatic function, while both <i>L. plantarum</i> A5 and <i>L. pentosus</i> GSSK2 reduced oxidative stress markers and enhanced antioxidant levels in liver and arterial tissues. Moreover, histological observations also revealed that administration of <i>L. plantarum</i> A5 HCD animals improved the hepatic steatosis.</p>
<p><b>Research Scholars from Colleges and other Institutions (JRF, SRF, Project Fellow and Post Docs)</b></p>	
<p>9.</p>	<p><b>INTEGRATING INDIGENOUS MENTAL HEALTH PRACTICES WITH SCALABLE DIGITAL SOLUTIONS: A PATHWAY TO ENHANCING ADOLESCENT CARE AND PUBLIC HEALTH IN BHARAT</b></p> <p><u>Kirti Maheshwari</u>, Sujata Shahi <i>Institute of Integrated Learning in Management University, Gurugram.</i></p> <p>India faces an urgent need to address adolescent mental health, as rising rates of anxiety, depression, and stress strain the nation’s youth. The country's limited mental health resources and low specialist-to-patient ratio makes it difficult to meet the growing demand for care, highlighting the need for scalable digital solutions. Although digital mental health interventions have made strides in expanding access, most interventions have been adapted from high income countries and lack the cultural sensitivity required for long-term effectiveness. This study addresses this gap by proposing the integration of indigenous mental health practices—rooted in storytelling, folk wisdom, mindfulness, and community-based care—into digital platforms, offering a culturally relevant approach to improving adolescent mental health outcomes in Bharat. The paper focuses on three key areas of digital mental health solutions: remote access to specialists, local capacity building, and patient-directed interventions. It explores how digital solutions in each area can be enhanced through the integration of India’s indigenous knowledge systems, providing a roadmap for culturally sensitive and sustainable care. Utilizing frameworks such as Cultural Competency Models and Community-Based Participatory Research, the paper outlines ethical and practical pathways for this integration. By merging modern healthcare technology with India's rich cultural heritage, the approach aims to create adolescent mental health care that is effective, accessible, and relatable. The paper concludes with recommendations for innovations and policy frameworks to ensure that mental health care in Bharat is both technologically advanced and culturally grounded.</p>
<p><b>UG/PG Students of Panjab University Campus and Regional Centres</b></p>	
<p>10.</p>	<p><b>DECIPHERING THE ROLE OF INHIBITORS OF DIFFERENTIATION (ID) PROTEINS TO ELUCIDATE MOLECULAR MECHANISM OF PARKINSON’S DISEASE: IMPACT ON ALPHA SYNUCLEIN AGGREGATION</b></p> <p><u>Ananya</u>, Tanzeer Kaur <i>Department of Biophysics, Panjab University, Chandigarh.</i></p> <p>Inhibitors of differentiation (ID) proteins is a family of polypeptides, having a helix-loop-helix domain, that function as transcription regulators. They lack the basic amino acids</p>

	<p>necessary to interact with DNA and instead heterodimerize with the basic helix-loop-helix transcription factors inhibiting their binding to the DNA preventing differentiation. Humans express four ID proteins – ID1, ID2, ID3 and ID4. The 4 ID proteins have conserved HLH domain but differ in sequence outside of it. Studies have established that each ID protein are involved in unique biological functions and pathways. Experimentally, it has been observed that ID2 deficient mice express features of Parkinson’s disease such as decrease of dopaminergic neurons in olfactory regions, reduced expression of dopamine transporter (DAT). Additionally, it has been observed that ID1 and ID3 expression is induced by suppression of dopamine release. We check to see if the ID family of proteins interact with <math>\alpha</math>-synuclein, as it is the key hallmark for Parkinson’s disease. ID proteins were docked against <math>\alpha</math>-synuclein (PDB ID: 6UFR) using HDock server for protein-protein docking. Results were analysed using PDB Sum to check for specific residues.</p>
11.	<p><b>THE POTENTIAL OF USING NEEM (<i>Azadirachta indica</i>) AS AN EFFECTIVE SPERMICIDE</b></p> <p><u>Ayushi Sharma</u>  <i>Department of Biotechnology, Panjab University, Chandigarh.</i></p> <p>India’s rapidly growing population, especially in rural areas, faces significant challenges in managing birth rates due to limited access to contraceptives and cultural resistance. Many women avoid modern contraceptives due to side effects, high costs, and societal barriers, which highlights the need for safer, affordable, and culturally acceptable alternatives. Neem (<i>Azadirachta indica</i>), a plant with long-standing medicinal use, shows great promise as a natural contraceptive. Various neem extracts, including seed oil and leaf formulations, have shown strong spermicidal and antifertility effects in laboratory and animal studies. Azadirachtin, a key compound in neem, has demonstrated the ability to immobilize sperm, preventing fertilization. Neem-based spermicidal formulations, such as Praneem, have been found effective in rats, monkeys, and human sperm, achieving complete immobilization at specific concentrations within seconds, as observed through studies using methods like the Sander-Cramer test, with reversible effects that do not cause long-term harm to reproductive health. Additionally, combining neem with other agents like Sapindus saponins or quinine hydrochloride enhances its contraceptive power, while reducing the required dose and limiting side effects. Neem’s low toxicity and minimal disruption of hormones make it a compelling alternative to synthetic contraceptives. Its affordability, availability, and historical use in traditional medicine further position neem as a promising solution for improving contraceptive uptake in India. Overall, neem represents an effective, natural, and safe contraceptive option that aligns with the need for more accessible and culturally accepted family planning methods.</p>
12.	<p><b>ANAPROT: A 3-D PROTEIN STRUCTURE ANALYSIS TOOL</b></p> <p><u>Divya Kaushal</u><sup>1</sup>, Harshita Dogra<sup>1</sup>, Sudiksha<sup>2</sup>, Varinder Kumar<sup>3</sup>  <sup>1</sup>Centre for Systems Biology and Bioinformatics, Panjab University, Chandigarh <sup>2</sup>Department of Biotechnology, Thapar Institute of Engineering and</p>

	<p><i>Technology, Patiala, <sup>3</sup>Department of Bioinformatics, Goswami Ganesh Dutta Sanatan Dharma College, Chandigarh.</i></p> <p>Proteins are biological macromolecules composed of amino acid subunits. These amino acids are attached covalently to one another forming long chains called polypeptides, which fold into specific three-dimensional structures. The function of a protein depends on its structure. Therefore, the structural analysis of proteins becomes paramount in understanding how proteins function. To ease this task, Ana Prot, a 3-D protein structure analysis tool was developed. The tool takes PDB file as input and can be used for generating Ramachandran Plots, Hydropathy Plots, extracting secondary structure information, computing Solvent Accessible Surface Area (SASA), protein superposition, B-Factor Plots, Contact Maps and calculating physicochemical characteristics of a protein. It is developed using Python and Kivy. Kivy is a python library which is used for designing GUI (Graphical User Interface). Various libraries of Python like ProDy, BioPython, Matplotlib, Pandas etc. are also used for performing calculations required for structural analysis of proteins. A JavaScript library called 3Dmol is also used to visualize the 3-dimensional structures of proteins. Ana Prot can be downloaded as a desktop application for use.</p>
13	<p><b>OVAKG: A KNOWLEDGE GRAPH BASED APPROACH FOR IDENTIFYING POTENTIAL THERAPEUTIC COMPOUNDS IN OVARIAN DISORDERS</b></p> <p><u>Hargunjeet Kaur</u><sup>1</sup>, Parthiban Srinivasan<sup>2</sup>, Anish Muralidharan<sup>3</sup>, Dhanush Pandian<sup>4</sup>, Sidharth K S<sup>5</sup></p> <p><sup>1</sup>Centre for Systems Biology and Bioinformatics Panjab University Chandigarh, <sup>2</sup>Centre for AI in Medicine Vinayaka Missions Research Foundation Aarupadai Veedu Medical College and Hospital Puducherry, <sup>3</sup>Sathyabama Institute of Science and Technology Chennai, <sup>4</sup>Rajalakshmi Engineering College Tamil Nadu, <sup>5</sup>Cochin University of Science and Technology Kerala.</p> <p>Ovarian disorders affect the normal functioning of the ovaries, which are part of the female reproductive system. These conditions can impact hormone production, ovulation, and overall reproductive health. OvaKG is built to graphically visualise data regarding specific disease, gene, compounds, drugs etc present in bioinformatics databases as a one combined knowledge graph. The data was manually extracted from various databases such as UniProt, GenBank, STRING etc and was stored in DBeaver, a SQL client software in the form of a Relational database. These entries were loaded into NEO4J AuraDB, a graph database management system. Each entry was loaded as a separate node and connected via relationships. The example of the nodes would be disease name, gene, drugs interacting with a protein, pathways and gene ontologies. OvaKG serves as a way to query the knowledge graph for one particular disease at a time and identify new drugs or compounds for the disease. The case study in our research work includes querying the graph database for ovarian cancer. Ovarian cancer was searched in the KG and there were 8 drugs identified. Dronabinol, one of the identified drug was cross checked in literature, and it is indeed a drug approved for ovarian cancer. We further use OvaKG to identify new compounds that can be used for treatment and better understand genes and the pathways they occur in. OvaKG provides a cleaner visualisation with no redundancy or data clutter.</p>

14.	<p><b>IN-SILICO ANALYSIS OF FERULIC ACID DERIVATIVES TARGETING ALPHA-SYNUCLEIN TO TREAT PARKINSON'S DISEASE</b></p> <p><u>Koema Bansal</u><sup>1</sup>, Shiwani Sharma<sup>1</sup>, Neelima Dhingra<sup>2</sup>, Tanzeer Kaur<sup>1</sup>  <sup>1</sup><i>Department of Biophysics, Panjab University, Chandigarh,</i> <sup>2</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Parkinson's disease (PD) is a progressive neurodegenerative condition characterized by the accumulation of <math>\alpha</math>-synuclein (<math>\alpha</math>Syn) aggregates within cells, forming Lewy bodies and Lewy neurites. Spread of <math>\alpha</math>Syn pathology in the brain plays a crucial role in the onset and progression of clinical phenotypes. Current medications for PD such as Levodopa only serve to delay its clinical progression and alleviate symptoms, without addressing the root cause. Consequently, more targeted medications are needed that focus on designing small molecules directly targeting the aggregation pathway of <math>\alpha</math>Syn. Ferulic acid (FA), a common phenolic acid, exhibits neuroprotective effects pertaining to its potent anti-oxidative and anti-inflammatory qualities. It can remain in the bloodstream longer and cross the blood-brain barrier. However, the clinical application of FA faces challenges such as poor solubility, instability, and rapid metabolism limiting its bioavailability. To address these issues, a series of FA derivatives were designed, and molecular docking studies were conducted to gain insight about the interaction of these compounds with pathological <math>\alpha</math>Syn (6UFR), which is prone to aggregation. The derivatives that showed the best binding affinity were tested for their ability to be translated as a drug using ADME studies. This work provided a list of novel molecules that have the potential to be used as therapeutics for the treatment of PD.</p>
15.	<p><b>ADVANCING STRUCTURAL PREDICTION: A COMPARATIVE ANALYSIS OF ALPHAFOLD 2 AND ALPHAFOLD 3 IN PROTEIN STRUCTURE DETERMINATION</b></p> <p><u>Kritika Sharma</u>, Anjali Verma, Manseerat Dhindsa  <i>Centre for Systems Biology and Bioinformatics, Panjab University, Chandigarh.</i></p> <p>This study conducts a comparative analysis of Alphafold 2 and Alphafold 3 to evaluate advancements in protein structure prediction capabilities. We systematically analyse the underlying algorithms, architectural innovations, and training methodologies that differentiate the two versions. Performance benchmarking on diverse protein datasets allows for the assessment of improvements in accuracy, speed, and generalization to novel protein sequences. Our findings reveal that Alphafold 3 significantly enhances predictive power, particularly in complex and multi-chain protein structures. The implications of these advancements for structural biology, drug discovery, and computational biology are discussed, emphasizing Alphafold 3's potential to reshape our understanding of protein interactions and functions. This analysis aims to provide insights into the evolution of Ai-driven methods which enhanced the protein prediction accuracy and advancement in structural biology.</p>

16.	<p><b>ROAD TRAFFIC ACCIDENTS- A PUBLIC HEALTH CONCERN (RETROSPECTIVE STUDY)</b></p> <p><u>Rezul Gilhotra</u><sup>1</sup>, Riya Atri<sup>1</sup>, Bhart Nagpal<sup>2</sup></p> <p><sup>1</sup>Centre for Public Health, Panjab University, Chandigarh, <sup>2</sup>Sr. Project Officer of Haryana State, Centre of Excellence for Road Safety, Indian Institute of Technology, Madras.</p> <p>Road Traffic Accidents- A Public Health Concern (Retrospective Study) Presenting Author: Dr. Rezul Gilhotra Affiliation: Centre for public health, Panjab university, Chandigarh Author 2: Dr. Riya Atri Author 3: Er. Bhart Nagpal, Sr. project officer (Haryana State), Centre of Excellence for Road Safety, IIT Madras. Introduction: Road traffic accidents (<i>RTAs</i>) present a significant public health concern globally, with substantial implications for morbidity and mortality. Aim: This retrospective study aims to analyse the incidence and causes of <i>RTAs</i> in the Panchkula district for the year 2023. Methodology: Data were collected from local traffic records – Haryana Police website (open source) and via Panchkula Traffic police contact, focusing on the circumstances surrounding these incidents. Results overview: The findings reveal that rough driving and over speeding accounted for a staggering 93.53% of all accidents, highlighting a critical area for intervention. Other contributing factors included overtaking (5.6%); accidents resulting from individuals falling from vehicles (0.43%) and wrong-side driving constituted a minimal 0.43%. Conclusion: These results underscore the urgent need for targeted public health strategies and traffic safety measures to address the predominant causes of <i>RTAs</i> in the region. Enhanced driver education, stricter enforcement of traffic regulations, and community awareness campaigns are recommended to mitigate this pressing public health issue.</p>
17.	<p><b>ACCESSING PM SURYA GHAR: MUFAT BIJLI YOJANA- A PILOT STUDY IN SECTOR 15, CHANDIGARH</b></p> <p><u>Riya Atri</u>, Rezul Gilhotra</p> <p>Centre for Public Health, Panjab University, Chandigarh.</p> <p>Accessing PM Surya Ghar: Mufat Bijli Yojana- A Pilot Study in Sector 15, Chandigarh Presenting Author: Dr. Riya Atri Affiliation: Centre for Public Health, Panjab University, Chandigarh Author 2: Dr. Rezul Gilhotra Introduction: The "<i>PM Surya Ghar Mufat Bijli Yojana</i>," highlighted in the 2024 budget, aims to provide free solar power systems to every household. This initiative reflects the government's commitment to enhancing energy access and promoting sustainability. Aims and Objectives: This paper presents a pilot study on the "<i>PM Surya Ghar: Mufat Bijli Yojana</i>" in Sector 15 of Chandigarh, focusing on the accessibility and impact of this initiative aimed at providing free solar power to households. The study explores the implementation processes, beneficiary demographics, and the socio-economic effects of the program within the community. Methodology: Utilizing a mixed-methods approach, we collected quantitative data through surveys and qualitative insights from interviews with beneficiaries and local officials. The study also highlights challenges faced during implementation, including awareness gaps and logistical</p>

	<p>issues. Result: To be displayed in the conference. Conclusion: Through this analysis, we aim to provide valuable recommendations for optimizing the program's reach and effectiveness, contributing to broader discussions on renewable energy initiatives in urban contexts. Keywords: PM Surya Ghar, Mufat Bijli Yojana, solar energy, Chandigarh, pilot study, energy accessibility.</p>
18.	<p><b>RETHINKING TECHNOLOGY: CRISPR AS A BEACON OF HUMANITY AND HOPE</b></p> <p><u>Simran Vohra</u>  <i>Department of Biotechnology, Panjab University, Chandigarh.</i></p> <p>When we think of technology, we often perceive it as anti-human, exploiting nature for benefits. However, there is a different narrative—one of hope, compassion and humanity. CRISPR technology stands as a testament to human ingenuity, transforming lives affected by genetic disorders. For millions, genetic disorders mean a life of suffering, stigma and lost hope. CRISPR has a transformative potential of precisely editing the mutated genes causing disorders like Sickle cell anaemia, Muscular dystrophy and Huntington’s disease. CRISPR can restore gene function in patient-derived cells reversing disease progression. CRISPR’s potential extends to cancer treatment, inherited diseases, neurological and immunological disorders. CRISPR’s promise is more than technological, it’s human. It’s about reconnecting individuals with their aspirations, their loved ones and themselves. By merging cutting edge science with compassion, we can convert hopelessness into purpose and rewrite the narrative of genetic disorders. We will summarise the most significant achievements of CRISPR/Cas technology to rare diseases and take a glimpse at a path full of hope and happiness aged by virtue of this technology.</p>
19.	<p><b>TITANIUM CARBIDE MXENE QUANTUM DOTS: A QUANTUM LEAP TOWARDS HEALING ACUTE LUNG INJURY</b></p> <p><u>Vanita</u>, Naveen Kaushal  <i>Department of Biophysics, Panjab University, Chandigarh.</i></p> <p>Acute Lung Injury (ALI) is a severe pulmonary condition marked by inflammation, alveolar fluid accumulation, and impaired gas exchange, often progressing to acute respiratory distress syndrome (ARDS). ALI pathogenesis is closely linked to reactive oxygen species (ROS) mediated oxidative stress (OS), and inflammatory mediators, exacerbating lung tissue damage. Despite advancements in supportive care, current treatments for ALI remain suboptimal, creating an urgent need for novel therapeutic interventions. Nanotherapeutics seems to be a rational approach to target ALI due to their specificity and efficacy. Currently, Titanium Carbide MXene Quantum Dots (MQDs) were evaluated as a potential treatment for ALI due to their reported antioxidant and anti-inflammatory properties. MQDs showed low toxicity, excellent colloidal stability and a particle size of around 8 nm as measured using EDAX, Zeta potential and HR-TEM. In vitro ABTS and DPPH-based assays confirmed the concentration-dependent antioxidant activity of MQDs. In vivo biodistribution studies showed substantial accumulation of</p>



	<p>MQDs in the lungs and intestines, peaking at four hours post-injection. Based on the toxicity studies and anti-inflammatory potential of MQDs using the carrageenan-induced paw edema model a dose of 1.5 mg/kg was used to assess their ameliorative potential in the HCl-induced ALI mouse model. Both pre and Posttreatment with MQDs improved pulmonary functions, reduced lung damage, and maintained the tissue architecture, with pre-treatment showing slightly better results. These beneficial effects of MQDs were found to be mediated through redox modulation and lowered oxidative stress, highlighting them as promising therapy after further research to optimize safety and clinical use.</p>
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ABSTRACTS OF  
POSTER  
PRESENTATIONS

<b>Basic Medical Sciences- Poster Presentations</b>			
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
1.	Dr. Shashi Chaudhary	National Centre for Human Genome Studies and Research, Panjab University, Chandigarh.	Genetic mutation spectrum of Gaucher disease in Indian population.
<b>Faculty/Scientist from Colleges and Other Institutions</b>			
2.	Dr. Neena Puri	Department of Industrial Microbiology, Guru Nanak Khalsa College, Yamunanagar, Haryana.	Role of sodium hypochlorite as irrigant and antibacterial agent in root canal treatment
<b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b>			
3.	Mr. Abhishek Sharma	Centre for Systems Biology and Bioinformatics, Panjab University, Chandigarh.	Metagenomic analysis of microbiome in neurological health: insights through bioinformatics tools and systems biology approaches.
4.	Mr. Hitesh Kumar	Department of Biochemistry, Panjab University, Chandigarh.	Micro-RNA profiling in serum for early detection of colorectal cancer.
5.	Ms. Ikshika Sharely	Department of Biophysics, Panjab University, Chandigarh.	The evolution of 2-D nanomaterials in biosensing technologies: Insights from the last decade.
6.	Ms. Jyoti	Department of Microbiology, Panjab University, Chandigarh.	Development and characterization of nano-biofertilizers from rice straw for sustainable agriculture.
7.	Ms.Komal Sharma	Department of Botany, Panjab University, Chandigarh.	In vitro protocorm formation and seedling development, in a commercially important and endangered orchid, <i>Coelogyne ovalis</i> (Lindl.).
8.	Ms. Neha Rani Bhagat	Department of Microbiology, Panjab University, Chandigarh.	Functional diversity of gut microbes in high-and low-altitude adapted chickens ( <i>Gallus gallus domesticus</i> ).

9.	Mr. Parminder Singh	Centre for Systems Biology and Bioinformatics, Panjab University, Chandigarh.	Identifying therapeutic targets in glioblastoma and glioblastoma stem cells: An in-silico strategy.
10.	Ms. Priya Gill	Department of Biotechnology, Panjab University, Chandigarh.	Genomic insights into multidrug-resistant environmental isolate <i>Acinetobacter schindleri</i> .
11.	Ms. Shivani Sharma	Department of Biophysics, Panjab University, Chandigarh.	Powering an antimicrobial approach with mesoporous silica nanoparticles as drug delivery agents against bacterial infections.
12.	Ms. Tanvi Sharma	Department of Biophysics, Panjab University, Chandigarh.	Harnessing short-chain fatty acids to combat high-fat diet-induced metabolic syndrome: Insights into metabolic and cardiovascular protection.
13.	Ms. Venus	Department of Biophysics, Panjab University, Chandigarh.	To evaluate the chemo-preventive potential of hydroethanolic <i>Murraya koeingii</i> leaves extract (HEMKLE) in chemically induced breast cancer in rats.
<b>Research Scholars from Colleges and other Institutions (JRF, SRF, Project Fellow and Post Docs)</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
14.	Ms. Diksha Ranga	Centre for Medical biotechnology, Maharshi Dayanand University, Rohtak.	In-silico evaluation of pncA SNPs and their impact on Pyrazinamide efficacy in <i>Mycobacterium tuberculosis</i> .
15.	Ms. Kanupriya Agrwal	National Agri Food Biotechnology Institute, Mohali, Punjab.	Improving wheat iron content through endosperm-targeted expression of vacuolar iron transporter-like protein tavl15.
<b>UG/PG Students of Panjab University Campus and Regional Centres</b>			

<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
16.	Mr. Abdul Saboor	Sector-25, Panjab University, Chandigarh.	Unravelling the genetic overlap: An in-silico comparison of differentially expressed genes in type 2 diabetes mellitus (t2dm) and obesity.
17.	Mr. Abhishek	Centre For Stem Cell Tissue Engineering and Biomedical Excellence, Panjab University, Chandigarh.	Comparative study to examine the effects of pre- conditioned and non-conditioned mesenchymal stem cell's secretomes on depression model of neuro-2a cell line.
18.	Mr. Arnesh Saxena	Centre For Systems Biology and Bioinformatics, Panjab University, Chandigarh.	Association of diabetes nephropathy and hepatocellular carcinoma: An in-silico network biology approach.
19	Babanpreet Kaur	Centre for Systems Biology and Bioinformatics, Panjab University	Metagenomic Analysis of Microbial Communities from Diverse Soil Ecosystems: Unraveling Functional and Taxonomic Diversity.
20.	Dr. Chetna Sharma	Centre for Public Health, Panjab University Chandigarh.	Harnessing green hydrogen: India's path to sustainable energy.
21.	Ms. Devanshi	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Synergy of gold nanoparticles and photothermal therapy in wound healing.
22.	Ms. Divya Sharma	Sector-25, Panjab University, Chandigarh.	Unravelling the genetic overlap: An in-silico comparison of differentially expressed genes in type 2 diabetes mellitus and obesity.
23.	Ms. Garima Kakkar	Department of Biotechnology, Panjab University, Chandigarh.	The theranostic potential of green nanotechnology-enabled gold nanoparticles in cancer: A paradigm-shift on diagnosis and treatment.
24.	Ms. Jhanvi Rajput	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Investigating the degradation of carbamazepine (CBZ) in soil using sediment microbial fuel cells (SMFCs) and assessing the potential for bioremediation of CBZ-contaminated soil.

25.	Ms. Kanika Thakur	Institute of Forensic Science and Criminology, Panjab University, Chandigarh.	Identification of differentially expressed genes as potential therapeutic targets for the treatment of pemphigus: A network system biology approach.
26.	Ms. Kirti Sharma	Department of Biophysics, Panjab University, Chandigarh	Titanium Carbide (Ti <sub>3</sub> C <sub>2</sub> ) Quantum Dots Ameliorate Colonic Inflammation by Redox modulation in Experimental Colitis.
27.	<u>Kriti Panchal</u>	Centre for Systems Biology, Panjab University, Chandigarh.	Unravelling Alzheimer's Disease Pathology: A Multi-Omics and Network-Based Approach for Precision Biomarker Identification.
28.	Mr. Kunal Verma	Department of Biophysics, Panjab University, Chandigarh.	Advances in biomaterial-based implants: Innovations and future prospects in orthopaedic and dental applications.
29.	Ms. Malhaar Sidhu	Centre For Stem Cell Tissue Engineering and Biomedical Excellence, Panjab University, Chandigarh.	Unravelling anxiety: Molecular mechanisms, iPSC models, and organoid technologies for personalized neuropsychiatric treatment.
30.	Ms. Navjyot Kaur Dyal	Centre for Public Health, Panjab University, Chandigarh	Integrating indigenous agricultural practices for sustainable nutrition and food security in India: Advancing towards zero hunger.
31.	Ms. Navya Jain	Centre For Stem Cell Tissue Engineering and Biomedical Excellence, Panjab University, Chandigarh.	Cellulose-based scaffolds: A new way to heal bones using stem cells and drug delivery.
32.	Ms. Pallak Bahl	Department of Biotechnology, Panjab University	Therapeutic Potential of Viral Vectors Glioblastoma Multiforme.
33.	Mr. Paras Arora	Centre of Stem Cell Tissue Engineering and Biomedical Excellence, Panjab University, Chandigarh.	Therapeutic advancements in neural stem cells.

34.	Dr. Pihu Vashisht	Centre for Public Health, Panjab University Chandigarh.	Leveraging artificial intelligence in mental health treatment: Opportunities and challenges.
35.	Ms. Ras Preeti Sharma	Centre for Systems Biology and Bioinformatics, Panjab University, Chandigarh.	Identification of shared hub genes and key pathways in atopic dermatitis and inflammatory bowel disease: A bioinformatics approach.
36.	Mr. Ravi	Centre for Public Health, Panjab University, Chandigarh.	Cross-sectional study on indigenous Indian methods for prevention from dengue and malaria among students of Panjab University, Chandigarh.
37.	Mr. Ravi Sabharwal	Department of Bioinformatics, Goswami Ganesh Dutt Sanatan Dharama College, Chandigarh.	Mapping genetic variants: A comprehensive analysis of non-synonymous SNPs and protein-protein interaction networks in acute myeloid leukaemia.
38.	Ms. Riya Badhwar	SEC-14, Panjab University, Chandigarh.	Chemistry.
39.	Ms. Sheenam	SEC-25, Panjab University, Chandigarh.	Unravelling the genetic overlap: An in-silico comparison of differentially expressed genes in type 2 diabetes mellitus (t2dm) and obesity.
40.	Ms. Suhani Dange	Centre for Systems Biology and Bioinformatics, Panjab University, Chandigarh.	Investigating multi-target pharmacology of fenugreek.
41.	Mr. Sushant	Centre for Systems Biology and Bioinformatics, Panjab University, Chandigarh.	Investigation of molecular association of non-alcoholic fatty liver disease and gallbladder cancer: A computational biology approach.
42.	Ms. Tanvi	Department of Biotechnology, Panjab University, Chandigarh.	Genetic engineering of <i>Euglena gracilis</i> : Advancing industrial bioeconomy and sustainable development goals.
43.	Ms. Tanvi Mongia	Department of Biotechnology, Panjab University, Chandigarh.	Micro perforation based smart label to guide freshness of pasteurized milk packet.

44.	Ms. Vartika Barnawa	Department of Biotechnology, Panjab University, Chandigarh.	Crisis of antimicrobial resistance.
45.	Mr. Vibhas Mittra	Department of Pharmaceutical Sciences, Panjab University, Chandigarh.	Exploring the possibilities of artificial intelligence in parkinson disease treatment.
46.	Ms. Yavneet	Sector-14, Panjab University, Chandigarh.	Chemistry and it's basics.

**UG/PG Students from Colleges and Other Institutions**

<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
47.	Mr. Jashandeep Singh Brar	Department of Biotechnology, Goswami Ganesh Dutta Sanatan Dharma College, Chandigarh.	Neuroinflammation: A central mechanism in psychiatric and neurodegenerative disorders – insights, biomarkers, and therapeutic targets.
48.	Ms. Maitri Goel	Department of Dairy Microbiology, College of Dairy and Food Science Technology, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab.	Gut enzyme modulatory potential of goat milk protein hydrolysates.
49.	Ms. S. Tejesvi Sharma	Goswami Ganesh Dutt Sanatan Dharama College, Chandigarh.	Phytoplankton in carbon cycling and climate impact.



Abstract File	
S.No.	Abstract
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>	
1.	<p><b>GENETIC MUTATION SPECTRUM OF GAUCHER DISEASE IN INDIAN POPULATION</b></p> <p><u>Shashi Chaudhary</u>  <i>National Centre for Human Genome Studies and Research, Panjab University, Chandigarh.</i></p> <p>The overall prevalence of gaucher disease (GD) in the Indian population is low. But when it affects a family member, the lifelong expensive treatment, if feasible, leads to major disturbance and upheaval. Causation of GD requires two mutant alleles, one from the father and one from the mother such that the child inherits both mutated alleles, therefore no copy of a functional allele is present in the child. As the disease is recessive, mostly parents are carriers for the mutant allele and they do not manifest the disease, hence unaware about their carrier status. Investigation into the family is possible only when a child is born with the disease and at this stage the only options available are enzyme replacement therapy (ERT) or substrate reduction therapy (SRT) which are expensive &amp; lifelong treatments, not easily affordable by all parents. Diagnosis ensues enormous stress and trauma to the family. Avoidance to such a situation becomes a possibility with increased awareness in the population about the disease, possibility of screening the mutation/ carrier status of individuals (such that marriage of two carriers is avoided or at least they are aware of the future possibilities) and availability of genetic counselling. This necessitates a well-maintained, regularly updated database of mutations identified in the Indian population. This work collates all the mutation information present in the published literature from India, from past till date, and deduces the frequency &amp; diversity of these mutations in the Indian GD cases to help formulate policy for such rare disease.</p>
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>	
2.	<p><b>ROLE OF SODIUM HYPOCHLORITE AS IRRIGANT AND ANTIBACTERIAL AGENT IN ROOT CANAL TREATMENT</b></p> <p><u>Neena Puri</u><sup>1</sup>, Naveen Gupta<sup>2</sup>  <sup>1</sup><i>Department of Industrial Microbiology, Guru Nanak Khalasa College, Yamunanagar, Haryana,</i> <sup>2</sup><i>Department of Microbiology, Panjab University, Chandigarh</i></p> <p>Pulp chamber and root canal of untreated non vital tooth is filled with mass of necrotic pulp remnants and tissue fluid. Essential to endodontic success is the careful removal of these remnants, microbe and chemical fillings from the root canal. Chemo mechanical preparation is of paramount importance in successful endodontic treatment. Irrigation serves as physical flush to remove debris as well as the antibactericidal agent, tissue, solvent and lubricant It is generally believed that the significant cause of root canal failure is the persistence of microbes in the apical part of root filled tooth. The objective of this</p>

	<p>study was to analyse and compare antibacterial effect of traditional agent 3% and 5% sodium hypochlorite against different bacteria. The technique employed for assessment was disc method. Findings of the study reflected that 3% sodium hypochlorite is not effective against <i>Pseudomonas aeruginosa</i>, and its inhibition was in the order <i>Bacillus subtilis</i> &gt; <i>Staphylococcus aureus</i> &gt; <i>Enterococcus faecalis</i> &gt; <i>Escherichia coli</i>. On the other hand 5% concentration is more effective than 3% concentration of the antibacterial compound.</p>
<p><b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b></p>	
<p>3.</p>	<p><b>METAGENOMIC ANALYSIS OF MICROBIOME IN NEUROLOGICAL HEALTH: INSIGHTS THROUGH BIOINFORMATICS TOOLS AND SYSTEMS BIOLOGY APPROACHES</b></p> <p><u>Abhishek Sharma</u>, Ashok Kumar  <i>Centre for Systems Biology and Bioinformatics, Panjab University, Chandigarh.</i></p> <p>Metagenomic analysis offers transformative insights into the role of the microbiome in neurological health. The Microbiota-Gut-brain axis plays a pivotal role in regulating neurological functions, with disruptions associated with neurological disorders. Metagenomic allows comprehensive profiling of microbial communities to elucidate their influence on neuro-physiological processes via immune modulation, neurotransmitter production, and metabolic pathways such as short-chain fatty acids (SCFAs) and sphingolipid metabolism. We employed state-of-the-art tools such as PATRIC, Kraken, and Krona for taxonomic profiling and diversity, followed by microbial pathway analysis using KEGG and HUMAnN2 pipelines. Systems biology tools like Cytoscape were utilized to map microbial-host interactions and explore key microbial signals in relation to neurological outcomes. This analysis demonstrates the potential of microbiome modulation as a therapeutic avenue for conditions of Parkinson’s disease. Open-source bioinformatics tools enable scalable Metagenomic investigations, providing valuable insights into microbial influence on brain function. This study explores how open-source bioinformatics tools, systems biology approaches, and established pipelines facilitate understanding of microbiome interactions with the nervous system, and findings highlight the importance of microbial diversity.</p>
<p>4.</p>	<p><b>MICRORNA PROFILING IN SERUM FOR EARLY DETECTION OF COLORECTAL CANCER</b></p> <p><u>Hitesh Kumar</u>, Navneet Agnihotri  <i>Department of Biochemistry, Panjab University, Chandigarh.</i></p> <p>Colorectal cancer (CRC) is a significant global health concern and is the third leading cause of cancer-related mortality. This rise is particularly seen among individuals under 50 years, especially in countries with high Socio-Demographic Index (SDI) and there is an urgent need to upgrade our screening protocols. Conventional detection methods, such as imaging and stool-based tests, often lack the necessary sensitivity and specificity for</p>

	<p>early-stage diagnosis. MicroRNAs (miRNAs) are small non-coding RNAs that are essential regulators of gene expression and have been implicated in the development and progression of CRC. This study investigates the role of miRNAs in CRC, utilizing comprehensive serum datasets sourced from the NIH-GEO database. We performed differential expression analysis to identify significant miRNAs and selected common miRNAs across the datasets. Gene target prediction analyses were conducted and overlapping target genes were selected, leading to an understanding of the miRNA-gene regulatory network. To elucidate the biological significance of these interactions, we carried out pathway enrichment analysis and Gene Ontology (GO) assessments of overlapping genes. Additionally, we performed miRNA-gene interaction analyses and survival analyses to assess the prognostic potential of the selected miRNAs and overlapping genes. Our analysis identified several miRNAs whose elevated expression significantly correlates with disease-free survival (DFS) and overall survival (OS) in CRC. The target genes of these miRNAs are linked to critical signalling pathways, including mTOR, TGF-<math>\beta</math>, and Wnt, underscoring the essential role of miRNAs in CRC pathology and their potential as biomarkers and therapeutic targets for effective colorectal cancer management.</p>
5.	<p><b>THE EVOLUTION OF 2D NANOMATERIALS IN BIOSENSING TECHNOLOGIES: INSIGHTS FROM THE LAST DECADE</b></p> <p><u>Ikshika Sharely</u>, Avneet Saini  <i>Department of Biophysics, Panjab University, Chandigarh.</i></p> <p>The exponential growth of two-dimensional (2D) nanomaterials since the discovery of graphene in 2004 has established them as ideal candidates for enhanced biomedical applications specifically in the domain of biosensing technologies. In addition to graphene, several 2D nanomaterials, such as transition metal dichalcogenides (TMDCs), MXenes, black phosphorus, and boron nitride, have attracted significant interest owing to their structural variety and distinctive characteristics. Their unique characteristics in terms of structure, electronics, and optics, such as large surface area, adjustable band gaps, and excellent charge carrier mobility, greatly improve the sensitivity and specificity of biosensing platforms. Furthermore, the adaptability of these materials facilitates the creation of innovative biosensing platforms that incorporate optical, electrochemical, and fluorescence detection methods, enhancing the precision and sensitivity of diagnostics. Therefore, this review provides an updated overview of recent progress in the field of 2D nanomaterial-based biosensing, focusing on materials such as graphene, transition metal dichalcogenides (TMDCs), MXenes, black phosphorus and many others. Furthermore, it aims to provides insight into the most recent advancements by clarifying the correlation between these fundamental material characteristics and their ability to detect biological signals. It emphasizes the increasing possibilities of 2D nanomaterials in creating advanced biosensors for biomedical purposes, such as disease diagnostics and molecular detection.</p>

6.	<p><b>DEVELOPMENT AND CHARACTERIZATION OF NANO-BIOFERTILIZERS FROM RICE STRAW FOR SUSTAINABLE AGRICULTURE</b></p> <p><u>Jyoti Yadav</u><sup>1</sup>, Sanjeev Kumar Soni<sup>1</sup>, Raman Soni<sup>2</sup>, Deepak Kumar Rahi<sup>1</sup>  <sup>1</sup> Department of Microbiology, Panjab University, Chandigarh, <sup>2</sup> Department of Biotechnology, DAV College, Sector10, Chandigarh.</p> <p>This study focuses on converting rice straw, a common agro-waste in India, into nano-biofertilizers using a combination of plant growth-promoting rhizobacteria (PGPR) and metal nanoparticles. Rice straw was autoclaved to release phenolic compounds that acted as reducing agents for nanoparticle synthesis. Following enzymatic hydrolysis, the sugars released served as substrates for the growth of beneficial microorganisms, including <i>Klebsiella pneumoniae</i> KMB 407, <i>Micrococcus luteus</i> AS 17, and <i>Brevundimonas naejangsanensis</i> A-407, which exhibit nitrogen-fixation, potassium solubilization, phosphate solubilization, and Indole-3-Acetic Acid (IAA) production. Individual nano-biofertilizers were formulated using various metal salts such as FeCl<sub>3</sub>, FeSO<sub>4</sub>, and ZnSO<sub>4</sub>, and characterized by Dynamic Light Scattering (DLS), revealing hydrodynamic diameters ranging from 302 nm to 538 nm. UV-visible spectroscopy analysis revealed a peak between 280-350 nm, confirming the presence of nanoparticles. Various parameters, including solid-to-liquid ratio, pH, and metal salt concentration, were optimized to maximize microbial activity and nanoparticle synthesis. The optimized formulation, containing a mixture of all eleven metal salts and the PGPR consortium (<i>Klebsiella pneumoniae</i>, <i>Micrococcus luteus</i>, <i>Brevundimonas naejangsanensis</i>), exhibited a hydrodynamic diameter of 220 nm and a Zeta Potential of -17 mV, indicating moderate colloidal stability. HRTEM confirmed particle sizes ranging from 18.2 nm to 103.3 nm, with uniform distribution. Microbial counts reached a concentration of <math>2.58 \times 10^{14}</math> CFU/mL within five days. This formulation presents a dual solution to agricultural waste management and sustainable farming by enhancing nutrient delivery and crop productivity. Future work will involve field trials to evaluate its efficacy in agricultural applications.</p>
7.	<p><b>IN VITRO PROTOCOL FORMATION AND SEEDLING DEVELOPMENT, IN A COMMERCIALY IMPORTANT AND ENDANGERED ORCHID, <i>Coelogyne ovalis</i> LINDL.</b></p> <p><u>Komal Sharma</u><sup>1</sup>, Promila Pathak<sup>1</sup>, Jagtar Singh<sup>2</sup>  <sup>1</sup>Department of Botany, Panjab University, Chandigarh, <sup>2</sup> Department of Biotechnology, Panjab University, Chandigarh.</p> <p>The Orchidaceae family, which makes about 10% of all flowering plants worldwide. Many orchids are in danger of going extinct so conservation measures are required. In vitro seed culture is the key tool for their rapid mass propagation and conservation. In this connection, presently, the immature seeds of <i>Coelogyne ovalis</i>, were collected from Mandal village (Uttarakhand, 1500-1700 m). The species is both floriculturally and medicinally important. Before inoculation the seeds were given a treatment of 4°C, for two days and were cultured on Mitra medium with and without plant growth regulators</p>

	<p>(Auxins and Cytokinins) using various combinations and concentrations. The nutrient medium enriched with KN (0.5 mg l<sup>-1</sup>) was proved the best for overall morphogenetics changes during seedling development. Hence, we developed a protocol for commercially important and endangered orchids for propagation and conservation.</p>
8.	<p><b>FUNCTIONAL DIVERSITY OF GUT MICROBES IN HIGH-AND LOW-ALTITUDE-ADAPTED CHICKENS (<i>Gallus gallus domesticus</i>)</b></p> <p><u>Neha Rani Bhagat</u><sup>1</sup>, Vijay K Bharti<sup>2</sup>, Geeta Shukla<sup>1</sup>, Praveen Rishi<sup>1</sup>, O P Chaurasia<sup>2</sup>  <sup>1</sup> <i>Department of Microbiology, Panjab University, Chandigarh.</i>  <sup>2</sup> <i>Defence Institute of High-Altitude Research, Defence Research and Development Organisation, Ladakh.</i></p> <p>Recently, the diverse benefits of gut microbiota in broiler chickens have garnered considerable attention due to their potential role in enhancing host health and performance. However, the gut microbiota and their functional potential in chickens reared at high altitudes remain underexplored. This study aimed to investigate the functional diversity of gut microbes in high-altitude (HACH) and low-altitude (LACH) chickens using the Biolog™ EcoPlates. This assay evaluates the utilization of 31 carbon substrates to characterize microbial metabolism. The results revealed significant differences (p&lt;0.05) in substrate utilization between HACH and LACH chickens, with polymers, carbohydrates, carboxylic acids, and amine-based substrates being utilized differently. Notably, gut microbes from LACH demonstrated a broader range of substrate utilization than HACH. Since the gut microbes of HACH utilized a limited number of substrates, a 16S rRNA-based PICRUST bioinformatic analysis was conducted in high-altitude chickens. This analysis revealed an enrichment of pathways related to carbohydrate metabolism, nucleotide metabolism, energy metabolism, amino acid biosynthesis, fatty acid metabolism, and ROS defense mechanisms. Overall, the study highlights significant differences in substrate utilization, microbial diversity, and metabolic activity between HACH and LACH chickens, reflecting the impact of altitude on gut microbiota function.</p>
9.	<p><b>IDENTIFYING THERAPEUTIC TARGETS IN GLIOBLASTOMA AND GLIOBLASTOMA STEM CELLS: AN IN-SILICO STRATEGY</b></p> <p><u>Parminder Singh</u>, Ashok Kumar, Nilambra Dogra  <i>Centre for Systems Biology and Bioinformatics, Panjab University, Chandigarh.</i></p> <p>Glioblastoma (GBM) is the most lethal variant of glioma, characterized by its aggressive nature and poor survival rates, generally between 15-18 months following diagnosis. Recent studies have highlighted the significance of glioma stem cells (GSCs) in conferring resistance to standard therapies and in facilitating tumour recurrence, leading to a transition towards targeted therapy strategies. Our research employs an extensive in silico analysis to identify possible therapeutic targets in both GBM and GSCs, with the objective of developing new treatment options. By employing public databases including the Gene Expression Omnibus (GEO) and The Cancer Genome Atlas (TCGA), we examined differentially expressed genes (DEGs) in GBM and GSC datasets to pinpoint genes</p>

	<p>significantly influencing patient survival. Target genes were meticulously analysed for their expression at both mRNA and protein levels in GBM compared to control samples, with further validation via evaluation of cancer dependence scores. This study emphasizes the efficacy of in silico approaches in identifying survival-related genes in GBM and GSCs, serving as a critical step towards the creation of tailored medicines that may improve patient outcomes in this complex oncological context.</p>
10.	<p><b>GENOMIC INSIGHTS INTO MULTIDRUG-RESISTANT ENVIRONMENTAL ISOLATE <i>Acinetobacter schindleri</i></b></p> <p><u>Priya Gill</u><sup>1</sup>, Prince Sharma<sup>2</sup>, Neena Capalash<sup>1</sup>  <sup>1</sup><i>Department of Biotechnology, Panjab University, Chandigarh;</i> <sup>2</sup><i>Department of Microbiology, Panjab University, Chandigarh.</i></p> <p><i>Acinetobacter schindleri</i> is an opportunistic pathogen that is increasingly associated with multidrug resistance, especially in clinical and environmental settings. Its capacity to pick up resistance genes via mobile genetic elements and horizontal gene transfer presents a serious threat to public health. The present study showcases a multidrug-resistant strain of <i>A. schindleri</i> that was isolated from a water sample in close proximity of a pharmaceutical unit in Dera Bassi, India. Whole-genome sequencing revealed genes associated with antibiotic resistance, mobile genetic elements (MGEs), and horizontal gene transfer (HGT). Key antimicrobial resistance genes identified include sul2, APH (3")-Ib, APH (6)-Id, qacJ, and OXA-537, conferring resistance to sulfonamides, aminoglycosides, quaternary ammonium compounds, hydrogen peroxide, heavy metals and <math>\beta</math>-lactam antibiotics. The genomic analysis also revealed multiple mobile genetic elements (MGEs), including insertion sequences such as IS17 and ISAha3, associated with the Resistance Nodulation-Cell Division (RND) family efflux pump. Additionally, IS1007, and ISAba37 were identified, contributing to antibiotic resistance. ISAha3, commonly found in <i>Acinetobacter</i> species, particularly <i>A. haemolyticus</i>, can modulate the expression of nearby genes, thereby enhancing resistance to <math>\beta</math>-lactams, aminoglycosides, and carbapenems. ISAba37, frequently observed in <i>Acinetobacter baumannii</i>, inserts into regulatory regions of resistance genes, such as blaOXA-23, driving carbapenem resistance by upregulating carbapenemase production. The discovery of resistance genes linked to antibiotics and heavy metals suggests efflux mechanisms and horizontal gene transfer drive the co-selection and spread of resistance. Environmental reservoirs, such as water bodies and industrial sites, play a critical role in this dissemination, making them key targets for controlling resistance.</p>
11.	<p><b>POWERING AN ANTIMICROBIAL APPROACH WITH MESOPOROUS SILICA NANOPARTICLES AS DRUG DELIVERY AGENTS AGAINST BACTERIAL INFECTIONS</b></p> <p><u>Shivani Sharma</u>, Simran Preet  <i>Department of Biophysics, Panjab University, Chandigarh.</i></p> <p>The escalating global crisis of multidrug resistant (MDR) bacterial infection has been a</p>

	<p>major threat to human health worldwide leading to high mortality in patients and economic loss. The majority of nosocomial infection occurring globally is due to drug-resistant ESKAPE bacteria such as <i>Enterococcus faecium</i>, <i>Staphylococcus aureus</i>, <i>Klebsiella pneumonia</i>, <i>Acinetobacter baumannii</i>, <i>Pseudomonas aeruginosa</i> and <i>Enterobacter</i> species. This problem is growing worse, demanding an urgent need to exploit novel antimicrobial agents instead of traditional antibiotic therapies. Therefore, Antimicrobial peptides (AMPs) provide a new alternative to antibiotics. AMPs are the small molecular peptides that play a vital role in the innate immunity of the host against a broad range of microorganisms, including bacteria, fungi, parasites and viruses. In addition, for sustained and triggered AMP release, it would therefore be advantageous to combine AMPs with delivery systems. In recent years, mesoporous silica nanoparticles (MSNs) have attracted extensively attention as drug carriers in various fields of medical research due to their unique properties, including porous structures (2–50 nm) with tunable pore size, high drug loading capacity and large surface area with high biocompatibility. MSNs ensure drug protection from degradation, and control of drug release over time. Therefore, strategy of delivering AMP with the use of nanotechnological approach is introduced in context to combat drug resistant bacterial infections.</p>
12.	<p><b>HARNESSING SHORT-CHAIN FATTY ACIDS TO COMBAT HIGH-FAT DIET-INDUCED METABOLIC SYNDROME: INSIGHTS INTO METABOLIC AND CARDIOVASCULAR PROTECTION</b></p> <p><u>Tanvi Sharma</u>, Naveen Kaushal, Pavitra Ranawat  <i>Department of Biophysics, Panjab University, Chandigarh.</i></p> <p>Metabolic Syndrome (MetS) is a complex condition driven by high-calorie diets, sedentary lifestyles, and genetic predispositions, leading to obesity, insulin resistance, dyslipidemia, and chronic inflammation. High-fat diet (HFD)-induced metabolic irregularities significantly increase the risk of cardiovascular diseases (CVD), emphasizing the strong connection between MetS and CVDs. Recent research highlighting the role of gut microbiome in regulating host metabolism places microbial metabolites produced in the gut by fermentation of dietary fibres known as Short-Chain Fatty Acids (SCFAs) as effective agents in mitigating MetS-associated cardiovascular complications. Thus, the current study evaluated the effects of SCFA supplementation on HFD-induced MetS, focusing on metabolic, cardiovascular, and histological outcomes. Results revealed that SCFA supplementation significantly reduced MetS hallmarks, including body weight gain, improved insulin sensitivity, and hypertension. SCFAs also modulated lipid profiles by reducing triglycerides, total cholesterol, and LDL while partially restoring HDL levels. Moreover, SCFA treatment alleviated oxidative stress and improved liver and kidney function, indicating systemic protective effects. Notably, the morphological and histological analysis of the heart and aorta showed significant improvements. SCFA supplementation reduced hypertension, mitigated lipid deposition in the aorta, and improved tissue architecture, as evidenced by reduced fibrosis and inflammation in both heart and aortic tissues. In conclusion, these findings suggest SCFAs as a promising dietary intervention to combat HFD-induced MetS and cardiovascular risks by improving metabolic function, reducing oxidative stress, and preserving heart and</p>

	<p>vascular health. Therefore, SCFAs can be leveraged as a dietary intervention to combat MetS and its associated risks, laying the foundation for future clinical exploration.</p>
13.	<p><b>TO EVALUATE THE CHEMOPREVENTIVE POTENTIAL OF HYDROETHANOLIC <i>Murraya koenigii</i> LEAVES EXTRACT (HEMKLE) IN CHEMICALLY INDUCED BREAST CANCER IN RATS</b></p> <p><u>Venus</u>, Sarvnarinder Kaur  <i>Department of Biophysics, Panjab University, Chandigarh.</i></p> <p>Breast cancer is one of the most prevalent diseases worldwide. Several risk factors of breast cancer include sex, age, geographical location, race, family history, inherited alterations in genes and polyromantic hydrocarbons (PAH's) like DMBA. PAH's are the substances belong to the category enduring environmental contaminants that are commonly found in air, water and soil. The primary sources of atmospheric PAH's are vehicular emissions, coal-burning plants etc. Hence, are ubiquitously present in the atmosphere. The primary therapeutic modalities for breast cancer include surgical interventions, radiation therapy, hormone therapy etc. But these have severe side effects on the individual who is suffering. Therefore, administration of herbal drugs like <i>Murraya koenigii</i> (MK) has the potential to enhance the effectiveness of the therapies by preventing their side effects. MK has anti cancerous, anti-oxidant, anti-bacterial properties. Thus, the present study was aimed to evaluate the chemo preventive potential of Hydroethanolic <i>Murraya koenigii</i> leaves extract (HEMKLE) against chemically induced breast cancer. Phytochemical analysis of HEMKLE was done using LC-MS which revealed that it contains tannins, alkaloids, carbazoles etc. For the in-vivo study the rats were divided into four groups: Group I (Control), Group II(DMBA), Group III(HEMKLE), Group IV(HEMKLE+DMBA). The sub-cutaneous injection of DMBA (50mg/Kg) was injected in group II and IV and shown a significant formation of tumour. The blood chemistry test (LFT and RFT) and histopathological studies revealed that HEMKLE has chemo-preventive potential in DMBA induced breast cancer.</p>
<p><b>Research Scholars from Colleges and other Institutions (JRF, SRF, Project Fellow and Post Docs)</b></p>	
14.	<p><b>IN-SILICO EVALUATION OF PNCA SNPS AND THEIR IMPACT ON PYRAZINAMIDE EFFICACY IN <i>Mycobacterium tuberculosis</i></b></p> <p><u>Diksha Ranga</u><sup>1</sup>, Amita Suneja Dang<sup>1</sup>, Ajit Kumar<sup>2</sup>  <sup>1</sup>Centre for Medical Biotechnology, Maharshi Dayanand University, Rohtak, <sup>2</sup>Centre for Bioinformatics, Maharshi Dayanand University, Rohtak.</p> <p>Pyrazinamide (PZA) is a critical frontline drug in tuberculosis (TB) treatment, but its effectiveness is threatened by emerging resistance. This study investigates the genetic basis of PZA resistance in <i>Mycobacterium tuberculosis</i> (MTB), focusing on mutations in the pncA gene. We analysed 107 single nucleotide polymorphisms (SNPs) in pncA, sourced from the World Health Organization's catalogue of mutations associated with drug resistance. Molecular docking studies were performed to elucidate how these</p>



	<p>mutations affect the binding between PZA and its target protein, pncA. Our findings revealed that the wild-type pncA had a binding energy of -4.52 kcal/mol against PZA, while mutant models showed binding energies ranging from -3.88 kcal/mol (F13S) to -5.15 kcal/mol (G97R). Several mutations demonstrated significantly reduced binding affinity compared to the wild type, including F13S (-3.88 kcal/mol), C148R (-3.96 kcal/mol), and Q10R (-3.89 kcal/mol), suggesting their role in decreased drug efficacy and resistance development. Interestingly, the G97R mutation exhibited a lower binding energy (-5.15 kcal/mol) than the wild type, suggesting increased binding affinity and potentially indicating that this specific mutation may not contribute to drug resistance through altered binding. From the above findings it can be concluded that the SNPs having binding energy greater than the wild type target proteins have lower binding affinity and may contribute to resistance in MTB against the respective drugs. These SNPs should be taken into account while developing next-generations drugs for MTB which may contribute to discover a novel therapy for multi-drugs resistant TB.</p>
15.	<p><b>IMPROVING WHEAT IRON CONTENT THROUGH ENDOSPERM-TARGETED EXPRESSION OF VACUOLAR IRON TRANSPORTER-LIKE PROTEIN TAVTL5</b></p> <p><u>Kanupriya Agrwal</u><sup>1</sup>, Ajay K Pandey<sup>2</sup>  <sup>1</sup>National Agri Food Biotechnology Institute, Mohali, Punjab, <sup>2</sup>Department of Biotechnology, Panjab University, Chandigarh.</p> <p>Enhancing iron content in major cereal crops including wheat can help combating the iron deficiency in humans. In an attempt to generate iron rich grains researchers have attempted to characterize novel iron transporters that could help in either mobilizing or sequestering iron in cell-organelle and in the specific tissue. The current study we have characterized homologs of the vacuolar iron transporters referred to as, vacuolar iron transporter like proteins (VTL). VTL belong to a larger family of transporters and as many as 13 genes were identified. Based on the preliminary characterization one of the candidates TaVTL5 was shown to be differentially regulated and show potential for its localization to the transmembrane domains. At the functional level TaVTL5, was able to rescue the growth of a yeast mutant for ccc1p mutant. Next, TaVTL5 overexpression was directed by fusing it with the wheat endosperm specific promoter. Transgenic wheat was generated using Agrobacterium mediated transformation using immature wheat embryo. The transgenic lines (3 independent lines) show high expression of TaVTL5 at the protein level as confirmed by immunostaining of the HA tagged VTL5. High iron loading in the grains was observed in these lines as reflected in our ICPMS studies as observed at two different stages of grain development. In the mature grains 1.8-2.2 folds increase in iron was observed. These transgenic lines are further characterized for the mechanistic insight of how VTL5 may enhance high iron loading in grains.</p>

**UG/PG Students of Panjab University Campus and Regional Centres**

**16. UNRAVELLING THE GENETIC OVERLAP: AN IN-SILICO COMPARISON OF DIFFERENTIALLY EXPRESSED GENES IN TYPE 2 DIABETES MELLITUS (T2DM) AND OBESITY**

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Type 2 diabetes mellitus (T2DM) and obesity are intricately linked metabolic disorders, with obesity being a primary risk factor for T2DM onset. Characterized by insulin resistance and hyperglycemia, T2DM often co-occurs with obesity, defined by excessive fat accumulation. This *in silico* study investigated differentially expressed genes associated with T2DM and obesity using publicly available Genome-Wide Association Study datasets. Normalized data were analysed using Gene Ontology to elucidate enriched biological processes and pathways. Protein-protein interactions were visualized using STRING networks, highlighting key regulatory networks in T2DM and obesity pathophysiology. Our analysis revealed overlapping differentially expressed genes between T2DM and obesity, implicating GPCR and glucose homeostasis pathways. These findings underscore the importance of understanding the genetic and molecular connections between these disorders for effective prevention and treatment strategies. Keywords: Type 2 Diabetes Mellitus, Obesity, Differentially Expressed Genes, In Silico Analysis, Genome-Wide Association Studies, Gene Ontology, Protein-Protein Interactions.

**17. COMPARATIVE STUDY TO EXAMINE THE EFFECTS OF PRE-CONDITIONED AND NON-CONDITIONED MESENCHYMAL STEM CELLS' SECRETOMES ON DEPRESSION MODEL OF NEURO-2A CELL LINE**

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Globally, the prevalence of mental illnesses has risen in recent times (Zeidan J et al., 2022). These spikes in mental illnesses are possibly due to the lack of exercise, disturbed work-life balance, etc. The two most prevalent mental illnesses that significantly strain public health systems are anxiety and depression (Buselli R et al., 2021). Psychotherapy and antidepressants work well to reduce depressive symptoms. Nonetheless, adverse effects were recorded by over half of the individuals using these drugs (Moabedi M et al., 2023). An estimated 350 million people worldwide (Li M et al., 2016). Based on recent figures, 3.3% of Indians claimed to have depressive illnesses, while about 40% reported multi-morbidity (Pati S et al., 2015; Lépine JP et al., 2011). Among the array of stem cells used for regenerative medicine, mesenchymal stem cells (MSCs) have emerged as leaders. It has been found that compared to traditional stem cell-based therapies, the use of cell-free therapies in regenerative medicine has more advantages. So, the current study aims to examine how the secretome profile changes and its effect on the depression model of

	<p>the Neuro-2a cell line with Mesenchymal Stem Cells' secretome and Engineered Mesenchymal Stem Cells' Secretome.</p>
<p>18.</p>	<p><b>ASSOCIATION OF DIABETES NEPHROPATHY AND HEPATOCELLULAR CARCINOMA: AN IN-SILICO NETWORK BIOLOGY APPROACH</b></p> <p><u>Arnesh Saxena</u>, Tammanna Ravee Sahrawat  <i>Centre for Systems Biology and Bioinformatics, Panjab University, Chandigarh.</i></p> <p>Diabetic nephropathy (DN) and Hepatocellular carcinoma (HCC) are two major diseases with substantial morbidity and mortality worldwide. DN is a leading cause of end-stage renal disease and is associated with metabolic dysregulation, while HCC is the most common primary liver cancer, often developing due to chronic liver disease. Morbidity studies have reported an association between DN and HCC, but there are no reports on its molecular association for which the present in-silico network biology study was undertaken. In this study, microarray datasets for both diseases were retrieved from Gene Expression Omnibus (GEO) and 67 common DEGs were identified using Bioconductor Packages for R language. A protein-protein interaction network of DEGs was constructed and analysed in Cytoscape, using MCODE to identify the top 10 hub genes that were further validated using CytoHubba. The hub genes identified mainly belong to the Apolipoprotein (APO) family, which plays a crucial role in lipid transport and processing and was substantiated by KEGG enrichment analysis from which pathways related to lipid and other metabolic processes were identified. Apolipoproteins, are reported to be dysregulated for both diabetic complications and cancer progression and therefore emerge as potential prognostic and diagnostic biomarkers in both DN and HCC. The discovery of multiple APO family genes as top hub genes highlights the critical role of lipid metabolism and possibly oxidative stress in the pathology of DN and HCC, indicating thus shared molecular mechanisms that can offer promising avenues for therapeutic strategies and biomarker identification.</p>
<p>19.</p>	<p><b>METAGENOMIC ANALYSIS OF MICROBIAL COMMUNITIES FROM DIVERSE SOIL ECOSYSTEMS: UNRAVELING FUNCTIONAL AND TAXONOMIC DIVERSITY.</b></p> <p><u>Babanpreet Kaur</u>  <i>Centre for Systems Biology and Bioinformatics, Panjab University</i></p> <p>Soil ecosystems harbor diverse microbial communities that are essential for nutrient cycling, biogeochemical processes, and maintaining ecosystem resilience. However, environmental stressors such as pollution, low temperature, and high salinity can significantly alter microbial diversity and functionality. This study aims to conduct a comprehensive metagenomic analysis of microbial communities from distinct soil ecosystems, leveraging publicly available datasets and open-source software tools to characterize their taxonomic and functional diversity, as well as to identify key genetic elements associated with these diverse environments. Metagenomic data were processed using FastQC for quality control, followed by taxonomic profiling with Kraken2 and visualization with Krona . Functional gene annotation was performed using Prokka, while</p>

	<p>ResFinder and VirFinder were utilized to detect resistance genes and virulence genes, respectively. Our findings are expected to enhance the understanding of microbial diversity and functional capabilities, providing insights into how these communities contribute to ecosystem resilience and health</p>
20.	<p><b>HARNESSING GREEN HYDROGEN: INDIA'S PATH TO SUSTAINABLE ENERGY</b></p> <p><u>Chetna Sharma</u> <i>Centre for Public Health, Panjab University, Chandigarh.</i></p> <p>India is at a critical juncture in its energy transition, and harnessing green hydrogen presents a transformative opportunity for sustainable development. Produced through the electrolysis of water using renewable energy sources, green hydrogen can significantly reduce carbon emissions and enhance energy security. This study explores India's strategic initiatives and policy frameworks aimed at promoting green hydrogen production and utilisation. Key factors driving this movement include the country's vast renewable energy potential, ongoing technological advancements, and increasing global demand for clean energy solutions. The review also addresses the challenges faced in infrastructure development, cost competitiveness, and public awareness. By fostering innovation and collaboration across sectors, India can leverage green hydrogen to decarbonize industries, power transportation, and contribute to its ambitious climate targets. Ultimately, green hydrogen represents a vital component in India's vision for a sustainable and resilient energy future.</p>
21.	<p><b>SYNERGY OF GOLD NANOPARTICLES AND PHOTOTHERMAL THERAPY IN WOUND HEALING</b></p> <p><u>Devanshi</u><sup>1</sup>, Poonam Sagar<sup>2</sup>, Sunaina Kaul<sup>2</sup>, Nitin Singhal<sup>2</sup> <sup>1</sup><i>University Institute of Engineering and Technology, Panjab University, Chandigarh,</i> <sup>2</sup><i>National Agri Food Biotechnology Institute, Mohali, Punjab.</i></p> <p>Wound healing is a complex process involving stepwise sequence of cellular and molecular interactions in order to repair the injured tissue. Trauma or accidental injuries, surgical injuries, burn, infections or chronic diseases are major factors that lead to wound. Various wound treatments that have been used are pharmacotherapy, cellular therapy, extracorporeal shock wave therapy, negative pressure wound therapy, electrical stimulation therapy, and light therapy. Among the innovative approaches gold nanoparticles have emerged as a promising tool in wound healing. The major advantages in wound healing that are observed using AuNPs are improved healing rate, reduced inflammation and better stimulation of new skin cells. Furthermore, they carry lower risk of side effects compared to traditional methods. Use of gold nanoparticles in synergy with photothermal therapy applied along with nanoparticle treatment accelerates the healing process. Thus, the combination of the two technologies is a highly effective strategy for treating wounds.</p>

22.	<p><b>UNRAVELLING THE GENETIC OVERLAP: AN IN-SILICO COMPARISON OF DIFFERENTIALLY EXPRESSED GENES IN TYPE 2 DIABETES MELLITUS (T2DM) AND OBESITY</b></p> <p><u>Divya Sharma</u>, Abdul Saboor, Sheenam, Archana Bhatnagar <i>Department of Biochemistry, Panjab University, Chandigarh.</i></p> <p>Type 2 diabetes and obesity are intricately linked metabolic disorders, with obesity being a primary risk factor for T2DM onset. Characterized by insulin resistance and hyperglycemia, T2DM often co-occurs with obesity, defined by excessive fat accumulation. This <i>in silico</i> study investigated differentially expressed genes associated with T2DM and obesity using publicly available Genome-Wide Association Study datasets. Normalized data were analyzed using Gene Ontology to elucidate enriched biological processes and pathways. Protein-protein interactions were visualized using STRING networks, highlighting key regulatory networks in T2DM and obesity pathophysiology. Our analysis revealed overlapping differentially expressed genes between T2DM and obesity, implicating GPCR and glucose homeostasis pathways. These findings underscore the importance of understanding the genetic and molecular connections between these disorders for effective prevention and treatment strategies. Keywords: Type 2 Diabetes Mellitus, Obesity, Differentially Expressed Genes, In Silico Analysis, Genome-Wide Association Studies, Gene Ontology, Protein-Protein Interactions.</p>
23.	<p><b>THE THERANOSTIC POTENTIAL OF GREEN NANOTECHNOLOGY-ENABLED GOLD NANOPARTICLES IN CANCER: A PARADIGM SHIFT ON DIAGNOSIS AND TREATMENT</b></p> <p><u>Garima Kakkar</u><sup>1</sup>, Preeti Sakore<sup>2</sup>, Sankhya Bhattacharya<sup>2</sup>, Sateesh Belemkar<sup>3</sup>, Bhupendra G. Prajapati<sup>4</sup>, Gehen M. Elossaily<sup>5</sup> <sup>1</sup><i>Department of Biotechnology, Panjab University, Chandigarh,</i> <sup>2</sup><i>Shri Vile Parle Kelavani Mandal's Narsee Monjee Institute of Management Studies, Mumbai,</i> <sup>3</sup><i>Shri Vile Parle Kelavani Mandal's Narsee Monjee Institute of Management Studies, Mumbai,</i> <sup>4</sup><i>Ganpat University, Kherva,</i> <sup>5</sup><i>Almaarefa University, Saudi Arabia.</i></p> <p>Nanotechnology has significantly advanced cancer diagnostics and therapeutics, offering innovative tools for treatment. This study focuses on gold nanoparticles (AuNPs) synthesized using green methods and their potential as multifunctional theranostic agents in cancer care. Eco-friendly AuNPs, produced through green nanotechnology, present an environmentally sustainable approach by utilizing biocompatible materials. Their unique physicochemical properties make them ideal for combining diagnostic and therapeutic applications in cancer treatment. AuNPs' optical properties, such as surface plasmon resonance (SPR), can be finely tuned to enhance imaging contrast in techniques like optical coherence tomography, surface-enhanced Raman scattering, and photoacoustic imaging. The SPR effect also increases the efficacy of photothermal therapy (PTT), converting near-infrared light into localized heat to induce hyperthermia in cancer cells.</p>

	<p>This allows for precise ablation of cancerous tissue with minimal damage to surrounding healthy cells. Furthermore, AuNPs support real-time, multimodal imaging systems, enhancing both diagnostic and therapeutic roles. The study highlights recent advancements in the green synthesis of AuNPs, particularly since 2020, and explores their potential applications in cancer research. Various approaches to functionalizing AuNPs with ligands, drugs, and imaging agents are discussed to improve therapeutic outcomes. Additionally, regulatory considerations and toxicity evaluations necessary for clinical application are examined.</p>
24.	<p><b>INVESTIGATING THE DEGRADATION OF CARBAMAZEPINE (CBZ) IN SOIL USING SEDIMENT MICROBIAL FUEL CELLS (SMFCs) AND ASSESSING THE POTENTIAL FOR BIOREMEDIATION OF CBZ-CONTAMINATED SOIL</b></p> <p><u>Jhanvi Rajput</u> <i>Panjab University, Chandigarh.</i></p> <p>The improper disposal of pharmaceutical waste poses significant environmental concerns, particularly due to the persistence of pharmaceutically activated compounds in soil, leading to adverse effects on ecosystems. One such problematic compound is carbamazepine (CBZ), which is known for its resistance to degradation in conventional systems. CBZ accumulates in soil, further exacerbating the issue. However, recent studies have shown promise in using microbial fuel cells (MFCs), specifically Sediment Microbial Fuel Cells (SMFCs), for bioremediating CBZ-contaminated soil while generating bioenergy as a byproduct. This study focuses on the bioremediation of CBZ-contaminated soil using SMFCs, aiming to remove the harmful compound while simultaneously producing bioenergy. The novel application of SMFCs for CBZ bioremediation contributes to the advancement of knowledge in the field. By using sediment as a microbial source and harnessing the generation of bioelectricity, this study presents an innovative approach to addressing CBZ contamination in soil. Comprehensive soil analyses were conducted before and after the treatment to assess changes in soil properties and microbial communities. These analyses provide valuable insights into the overall impact of SMFC implementation. The study demonstrates the potential of SMFCs as an environmentally friendly and sustainable method for CBZ bioremediation in soil. The integration of CBZ breakdown and bioenergy generation showcases the viability of SMFCs as a novel and efficient solution for pharmaceutical-contaminated soil. The findings of this study pave the way for further research and development, including large-scale field studies, to evaluate the performance of SMFCs in real-world soil conditions.</p>
25.	<p><b>IDENTIFICATION OF DIFFERENTIALLY EXPRESSED GENES AS POTENTIAL THERAPEUTIC TARGETS FOR THE TREATMENT OF PEMPHIGUS: A NETWORK SYSTEM BIOLOGY APPROACH</b></p> <p><u>Kanika Thakur<sup>1</sup></u>, Isha Goyal<sup>2</sup> <sup>1</sup><i>Institute of Forensic Science and Criminology, Panjab University, Chandigarh,</i> <sup>2</sup><i>Department of Bioinformatics, Goswami Ganesh Dutt Sanatan Dharama College, Chandigarh.</i></p>

	<p>Pemphigus is a rare, chronic, autoimmune blistering condition affecting the skin and mucous membranes. It is a benign disorder that is treatable and may even be cured, but it may persist as a localized illness for years. The incidence varies globally, with a global prevalence of 0.1-0.5 patients per 100,000 population per year. The disease affects all racial groups, and can occur at any age, even in early childhood. The overall mortality rate is believed to be around 13.1%. This present study aims to carry out characterization of Differentially Expressed Genes (DEGs) present in the patients affected by pemphigus using bio-conductor packages and other databases/tools. Thus, our study aimed to find the therapeutic targets which were described as DEGs, for Pemphigus. We used system biology approach combining different bioinformatics databases for retrieval of data, enrichment and network analysis. From the set of DEGs, we selected top 6 hub genes (CD2 enhances the activation and multiplication of autoreactive T cells essential for the autoimmune response and blister development, CD28 is a crucial costimulatory molecule that supplies a 2nd signal for complete T cell activation, T cell development and activation depend on CD3D, part of T cell receptor complex, CXCL10 has been linked to pathophysiology as it triggers the release matrix metalloproteinase-9), due to their significance in the disease causing and pathophysiology as per in the literature. Hence, this approach aims to produce a better understanding to the disease causing and to finding the potential therapeutic targets.</p>
26.	<p><b>TITANIUM CARBIDE (Ti<sub>3</sub>C<sub>2</sub>) QUANTUM DOTS AMELIORATE COLONIC INFLAMMATION BY REDOX MODULATION IN EXPERIMENTAL COLITIS</b></p> <p><u>Kirti Sharma</u>, Naveen Kaushal  <i>Department of Biophysics, Panjab University, Chandigarh.</i></p> <p>Ulcerative Colitis (UC) is a subtype of Inflammatory Bowel Disease (IBD) with unknown etiology. It is characterized by chronic inflammation condition of the colon. Currently available treatments, such as 5-aminosalicylic acid (5-ASA) and corticosteroids, pose significant limitations, side effects and inconsistent effectiveness. In this regard, Nanotechnology, presents a potential alternative. Currently, the redox modulatory and antioxidant therapeutic efficacy of Titanium Carbide (Ti<sub>2</sub>C<sub>3</sub>) MXene Quantum Dots (MQDs) was examined in DNBS-induced experimental model of colitis in mice. Biophysical characterization of MQDs using UV-visible spectroscopy, zeta potential analysis, and (HR-TEM) indicated uniform spherical morphology with size of 8nm and surface charge of -20meV. These MQDs showed enhanced in vitro free radical scavenging activity as evaluated using DPPH and ABTS assays. In vivo experiments in DNBS-induced colitis model, demonstrated that intraperitoneal administration of MQDs effectively reduced colonic inflammation, improved stool consistency, and lessened intestinal bleeding. Further MQDs improved classical indicators of colitis such as body weights, colon length, and disease activity index (DAI) in a redox sensitive manner as studied by measuring various oxidative stress markers. Biodistribution and toxicity studies indicated their maximum availability in Intestine after administration with no adverse effects as measured by Liver and Renal function markers. In conclusion, although MQDs may offer a viable therapeutic alternative for targeting inflammatory pathologies such as UC. However, detailed research is required to refine MQD formulations for potential clinical use.</p>

27.	<p><b>UNRAVELLING ALZHEIMER'S DISEASE PATHOLOGY: A MULTI-OMICS AND NETWORK-BASED APPROACH FOR PRECISION BIOMARKER IDENTIFICATION</b></p> <p><u>Kriti panchal</u>, Anuj, Yashti Maddan  <i>Centre for systems biology, UIEAST Panjab university, sector 25, Chandigarh.</i></p> <p>Alzheimer's disease (AD) is a multi-factorial neurodegenerative disorder characterized by cognitive decline, driven by processes such as amyloid-beta aggregation, tau hyperphosphorylation, and neuroinflammation. This study employs NCBI GEO database for multi-omics data retrieval and bioinformatics tools utilizing R Studio for differential gene expression analysis and Cytoscape for network analysis, to identify biomarkers associated with AD pathology. Initial findings reveal strong associations between key biomarkers and disease advancement, supporting the development of early, targeted therapeutic strategies. Our results demonstrate the value of systems biology approaches in unravelling the complex molecular networks underlying AD, paving the way for precision medicine tailored to individual patients.</p>
28.	<p><b>ADVANCES IN BIOMATERIAL-BASED IMPLANTS: INNOVATIONS AND FUTURE PROSPECTS IN ORTHOPAEDIC AND DENTAL APPLICATIONS</b></p> <p><u>Kunal Verma</u>, Shubhi Joshi, Avneet Saini  <i>Department of Biophysics, Panjab University, Chandigarh.</i></p> <p>Recent advancements in biomaterial implants have significantly transformed orthopaedic and dental applications, enhancing patient outcomes and recovery times. Common materials, such as titanium, polyethylene, and ceramics, have demonstrated excellent biocompatibility and mechanical properties. Titanium is favoured for its strength and osseointegration capabilities in orthopaedic and dental implants, while bioactive ceramics, like hydroxyapatite, promote bone growth and healing. Additionally, biodegradable polymers are emerging as promising alternatives, offering temporary support while gradually being replaced by natural tissue. Thus, this review aims to provide latest advancements in biomaterials designed to interact with biological tissues more effectively in order to prevent toxicity, inflammation, and immunological reactions. The future of biomedical implants is poised for revolutionary innovations, including the development of smart biomaterials that sense physiological changes; antimicrobial coatings that can inhibit bacterial colonization and reduce the risk of infection; incorporation of different bioactive on these scaffolds might enhance bioactivity aiding improved tissue integration. In addition, approaches such as 3D bioprinting and patient-specific implant design are transforming the way in which customization is accomplished. This is expected to have the potential for revolutionizing an area of research leading to better implant functionality in medical use.</p>
29.	<p><b>UNRAVELING ANXIETY: MOLECULAR MECHANISMS, IPSC MODELS, AND ORGANOID TECHNOLOGIES FOR PERSONALIZED NEUROPSYCHIATRIC TREATMENT</b></p>



	<p><u>Malhaar Sidhu</u>, Abhishek, Anuj Gupta  <i>Centre for Stem Cell Tissue Engineering and Biomedical Excellence, Panjab University, Chandigarh.</i></p> <p>Anxiety disorders can negatively affect a person's functionality and enjoyment of life, as well as their physical health. Longitudinal studies have shown that stress increases the risk of age-related somatic disorders such as coronary heart disease, diabetes, and disability, as well as total mortality. Major problem in psychiatric research even today is the lack of and data on the molecular mechanisms of such psychiatric disorders. This review focuses on the current research ongoing to enhance the neuropsychiatric research with more of personalized treatment with the involvement of stem cells, particularly induced pluripotent stem cells (iPSCs) models and the development of organoids with the implementation of 3D bioprinting. Also, by identifying the proteins which get altered during stress and anxiety, for instance, the levels of glyoxalase which declines in high-anxiety cases can also make a contribution in understanding and devising the drugs specific of target proteins.</p>
30.	<p><b>INTEGRATING INDIGENOUS AGRICULTURAL PRACTICES FOR SUSTAINABLE NUTRITION AND FOOD SECURITY IN INDIA: ADVANCING TOWARDS ZERO HUNGER</b></p> <p><u>Navjyot Kaur Dyal</u>, Manoj Kumar, Komal Sehgal  <i>Centre for Public Health, Panjab University, Chandigarh.</i></p> <p>This research underscores the critical role of indigenous agricultural practices in enhancing food security, nutrition, and sustainable food systems, directly aligning with the United Nations SDG of Zero Hunger. To combat malnutrition and address micronutrient deficiencies in urban populations we look at centuries of traditional knowledge which have been historically employed by rural and tribal populations to facilitate the cultivation of highly nutritious, drought-resistant crops such as millets (Ragi, Bajra, Jowar) and pulses. Through systematic review we collated existing case studies from sustainability organisations across India, focusing on successful sustainable agriculture practices influenced by indigenous technologies. These practices align with global efforts advocating for the right to nutritious, affordable, safe, and sustainable food, contributing to reducing diet-related diseases like diabetes and obesity. Indigenous techniques like mixed cropping, agroforestry, and seed preservation, have been proven to build climate-resilient agricultural systems, ensuring food security in the face of climate change. Therefore, integrating these traditional practices with modern agricultural innovations and national policies is critical for advancing Zero Hunger. Furthermore, to effectively address food security, industry stakeholders, researchers, and policymakers must engage with indigenous knowledge holders, fostering collaborative, bottom-up approaches to sustainable agriculture and food systems. These Indigenous methods emphasize self-sufficiency, biodiversity and soil conservation, thus, fostering resilient systems that reduce reliance on chemical inputs and promote ecological balance. Therefore, by valuing indigenous knowledge and aligning it with national strategies, India</p>

	<p>can make significant strides toward achieving the SDG of Zero Hunger and ensuring food and nutritional security for all.</p>
31.	<p><b>CELLULOSE-BASED SCAFFOLDS: A NEW WAY TO HEAL BONES USING STEM CELLS AND DRUG DELIVERY</b></p> <p><u>Navya Jain</u>  <i>Centre for Stem Cell Tissue Engineering and Biomedical Excellence, Panjab University, Chandigarh.</i></p> <p>Healing large bone injuries can be challenging because our bodies sometimes can't fully repair them on their own. Traditional treatments, like bone grafts and metal implants, often come with issues like infections or failing to bond properly with natural bone. To offer a better solution, scientists are exploring tissue engineering—using advanced materials to help the body heal more effectively. In this research, scientists use cellulose, a natural and biodegradable material found in plants, to create special structures called scaffolds. These scaffolds are designed to mimic real bone, making them safe and supportive for the body. But they do even more—they can deliver drugs and help stem cells grow right at the injury site. Stem cells are incredibly powerful because they can turn into different types of cells, including bone cells. By combining stem cells with cellulose scaffolds, bones can heal faster and more completely. The scaffold acts like a guide, helping the stem cells form new bone tissue in the damaged area. Plus, these scaffolds can carry medications like growth factors and antibiotics, boosting healing and reducing complications. In this presentation, we'll explain how these cellulose scaffolds, along with stem cells and targeted drug delivery, could offer a more effective and less invasive option for patients with serious bone injuries.</p>
32.	<p><b>THERAPEUTIC POTENTIAL OF VIRAL VECTORS GLIOMASTOMA MULTIFORME</b></p> <p><u>Pallak Bahl</u>  <i>Department of Biotechnology, Panjab University, Chandigarh.</i></p> <p>Glioblastoma multiforme, a highly aggressive brain tumor in adults, remains devastating despite standard treatments, including chemotherapy, radiation, surgery. To improve the effectivity, researchers have been looking for innovative therapies leveraging molecular biology advancements. Gene therapy offers potential, utilizing viral vectors to deliver therapeutic genetic material to tumor cells, triggering an anti-tumor response. Viral vectors have a great potential for modifications, and genetic transfer capabilities making them valuable tools.</p>
33.	<p><b>THERAPEUTIC ADVANCEMENTS IN NEURAL STEM CELLS</b></p> <p><u>Paras Arora</u></p>

	<p><i>Centre of Stem Cell Tissue Engineering and Biomedical Excellence, Panjab University, Chandigarh.</i></p> <p>Neural stem cells are important because they can differentiate into various types of brain and nerve cells, making them valuable for regenerative medicine, disease modelling, and drug testing. They help researchers understand brain development, repair mechanisms after injury, and the progression of neurodegenerative diseases, offering potential treatments for conditions like Parkinson's, Alzheimer's, and spinal cord injuries. The ability of neural stem cells for self-renewal and multi-lineage differentiation into neurons, astrocytes, and oligodendrocytes—the three major CNS lineages—has been convincingly demonstrated for more than 20 years of intensive research. Neural stem cell (NSC) lines have therapeutic potential in treating neurological disorders by regenerating damaged neurons and glial cells. They are promising for conditions like Parkinson's, Alzheimer's, spinal cord injuries, and stroke. NSCs can also be used in gene therapy and personalized medicine, offering a targeted approach for neurodegenerative diseases and chronic pain management. In Parkinson's disease it affects mainly the midbrain dopamine neurons. A first-ever ES cell-based study was conducted on 6OHDA lesioned rats, an animal model of Parkinson's disease. The study involved the transplantation of a small number of mostly undifferentiated mouse ES cells that were isolated following short-term differentiation in EB cultures but still efficiency and efficacy has not been achieved to that extend. There was evidence of spontaneous differentiation into many neurons exhibiting midbrain dopamine properties. However, because of the high rate of tumour formation, the clinical relevance of this approach is rather limited.</p>
34.	<p><b>LEVERAGING ARTIFICIAL INTELLIGENCE IN MENTAL HEALTH TREATMENT: OPPORTUNITIES AND CHALLENGE</b></p> <p><u>Pihu Vashisht</u>, Manoj Kumar Sharma, Komal Sehgal <i>Centre for Public Health, Panjab University, Chandigarh.</i></p> <p>The integration of artificial intelligence (AI) in mental health treatment presents a transformative opportunity to enhance therapeutic outcomes, streamline diagnostics, and personalize care. This study explores the potential applications of AI technologies in mental health settings and evaluates their effectiveness, accessibility, and ethical implications. Methodology: A systematic review of existing literature was conducted, analysing over 100 peer-reviewed articles published between 2010 and 2023. The review focused on various AI applications, including chatbots, predictive analytics, and machine learning algorithms used in diagnosis and treatment. Additionally, qualitative interviews with 20 mental health professionals were conducted to gather insights on the practical implications of AI in clinical settings. Results: The analysis revealed that AI technologies can significantly improve early diagnosis and intervention strategies, particularly for anxiety and depression. Chatbots and virtual therapists showed promise in increasing accessibility to care, especially in underserved populations. However, concerns regarding data privacy, ethical considerations, and the potential for bias in AI algorithms were highlighted by professionals interviewed. While AI holds great potential to revolutionize mental health treatment, careful consideration of ethical implications and ongoing</p>

	<p>collaboration between technologists and mental health professionals is essential. Future research should focus on developing robust frameworks for AI implementation that prioritize patient safety, privacy, and efficacy, ensuring that technological advancements enhance rather than replace human care in mental health.</p>
35.	<p><b>IDENTIFICATION OF SHARED HUB GENES AND KEY PATHWAYS IN ATOPIC DERMATITIS AND INFLAMMATORY BOWEL DISEASE: A BIOINFORMATICS APPROACH</b></p> <p><u>Ras Preeti Sharma</u>, Tammanna Ravee Sahrawat <i>Centre for Systems Biology and Bioinformatics, Panjab University, Chandigarh.</i></p> <p>Atopic dermatitis (AD) represents a chronic inflammatory skin disorder often associated with intense itching, redness, and eczema that predominantly affects children but may persist into adulthood. The condition results from a complex interplay of genetic, environmental, and immunological factors, leading to impaired skin barrier function and heightened sensitivity to allergens and irritants. In parallel, inflammatory bowel disease (IBD), which includes Crohn’s disease and ulcerative colitis, is a serious chronic condition primarily targeting the gastrointestinal tract. Patients experience debilitating symptoms such as abdominal pain, diarrhoea, and rectal bleeding, largely due to an abnormal immune response to changes in gut microbiota. Recent studies have shown that patients with AD are at a higher risk of developing IBD, with clinical data showing a risk elevation of up to 36% in adults. Given this context, the current study aims to investigate the association between AD and IBD through a bioinformatics approach using microarray data. Differentially expressed genes (DEGs) were analysed using GEO2R and 102 DEGs common between AD and IBD were obtained. Protein-protein interactions were studied using the STRING database followed by the identification of 8 hub genes using Cluster Maker that were further validated using Network Analyzer. Molecular pathway enrichment was carried out using Express Analyst and the hub genes were found to be involved in Chemokine signalling and IL-17 pathways that are known to be associated with immune response. It is therefore concluded that immune dysregulation is a common perturbation observed during both AD and IBD for which therapeutic strategies may be designed.</p>
36.	<p><b>CROSS-SECTIONAL STUDY ON INDIGENOUS INDIAN METHODS FOR PREVENTION FROM DENGUE AND MALARIA AMONG STUDENTS OF PANJAB UNIVERSITY, CHANDIGARH</b></p> <p><u>Ravi</u> <i>Centre for Public Health, Panjab University, Chandigarh.</i></p> <p>Dengue and malaria are significant public health concerns in India. Indigenous Indian methods, such as Ayurvedic practices and traditional remedies, are widely used for prevention. Objectives: To assess the knowledge, attitude, and practices (KAP) of students regarding indigenous Indian methods for preventing dengue and malaria. Methodology: Study is being conducted on Undergraduate, Post Graduate and Research Scholars of</p>

	<p>Panjab University, Chandigarh. It is a convenient sampling non-random cross-sectional study. Data will be statistically analysed with MS EXCEL and SPSS 20. Data Collection is under process and expected outcomes as shown by initial data is despite a significant proportion of students being aware of indigenous Indian methods for dengue and malaria prevention, a notable gap exists between knowledge and practice. Conclusion: Indigenous Indian methods are widely recognized but underutilized among Panjab University students. Integrating these methods into public health campaigns and education programs may enhance prevention efforts.</p>
37.	<p><b>MAPPING GENETIC VARIANTS: A COMPREHENSIVE ANALYSIS OF NON-SYNONYMOUS SNPS AND PROTEIN-PROTEIN INTERACTION NETWORKS IN ACUTE MYELOID LEUKEMIA</b></p> <p><u>Ravi Sabharwal</u><sup>1</sup>, Nidhi Kumari<sup>1</sup>, Rishika Gautam<sup>1</sup>, Kshitiz Sharma<sup>2</sup>, Chahat Aggarwal<sup>1</sup>  <sup>1</sup><i>Department of Bioinformatics, Goswami Ganesh Dutt Sanatan Dharama College, Chandigarh</i> <sup>2</sup> <i>TaskUs India Pvt. Ltd, Mohali, Punjab.</i></p> <p>Acute Myeloid Leukemia (AML) originates from diverse precursor cells, posing significant challenges for diagnosis and treatment. Its incidence in India varies by age and gender, highlighting the need for genomic analyses. Oncogenic mutations in hematopoietic stem cells are believed to drive its pathogenesis. Data acquisition utilised paired-end FASTQ files from the "PRJNA289401" WES dataset via the SRA Run Selector. The Galaxy platform enabled data analysis, including quality control, alignment, and variant calling. Functional annotation, PPI network analysis, and GO enrichment were performed using wANNOVAR, STRING, and Enrichr databases. FastQC generated sequence quality graphs and statistics, detecting 5,110 variants from the VCF files. wANNOVAR refined this to 3,373 single nucleotide variants (SNVs). Further filtering and removal of duplicates identified 2,047 unique genes. Cytoscape visualised the PPI network, with STRING analysis showing 177 nodes and 8,542 edges. CytoHubba pinpointed the top 10 hub genes. Key hub genes, including RRM2, DLGAP5, and AURKB, were identified, emphasizing their role across multiple pathways, with existing literature supporting their significance. RRM2 regulates the mitotic cell cycle, DLGAP5 influences chromatid segregation and microtubule organization in mitosis. Overexpression of AURKB is linked to AML, regulating cell cycle and spindle assembly processes. Disrupted cell cycle regulation in AML leads to enhanced proliferation and promotes genomic instability. This investigation underscores the relevance of advanced genomic techniques in delineating the molecular underpinnings of AML.</p>
38.	<p><b>CHEMISTRY</b></p> <p><u>Riya Badhwar</u>, Yavneet  <i>Panjab University, Chandigarh.</i></p> <p>Studying chemistry, the science of matter and its transformations, serves as the bedrock of the world around us. From the air we breathe, to the food we consume, chemistry intricately weaves its principles into every facet of our lives.</p>

39.	<p><b>UNRAVELLING THE GENETIC OVERLAP: AN IN SILICO COMPARISON OF DIFFERENTIALLY EXPRESSED GENES IN TYPE 2 DIABETES MELLITUS (T2DM) AND OBESITY.</b></p> <p><u>Sheenam</u>, Divya Sharm<sup>1</sup>, Abdul Saboor, Archana Bhatnagar <i>Department of Biochemistry, Panjab University, Chandigarh</i></p> <p>Type 2 diabetes mellitus (T2DM) and obesity are intricately linked metabolic disorders, with obesity being a primary risk factor for T2DM onset. Characterized by insulin resistance and hyperglycemia, T2DM often co-occurs with obesity, defined by excessive fat accumulation. This in silico study investigated differentially expressed genes associated with T2DM and obesity using publicly available Genome-Wide Association Study datasets. Normalized data were analyzed using Gene Ontology to elucidate enriched biological processes and pathways. Protein-protein interactions were visualized using STRING networks, highlighting key regulatory networks in T2DM and obesity pathophysiology. Our analysis revealed overlapping differentially expressed genes between T2DM and obesity, implicating GPCR and glucose homeostasis pathways. These findings underscore the importance of understanding the genetic and molecular connections between these disorders for effective prevention and treatment strategies. Keywords: Type 2 Diabetes Mellitus, Obesity, Differentially Expressed Genes, In Silico Analysis, Genome-Wide Association Studies, Gene Ontology, Protein-Protein Interactions. All the three authors have equal contribution in the study.</p>
40.	<p><b>INVESTIGATING MULTI-TARGET PHARMACOLOGY OF FENUGREEK</b></p> <p><u>Suhani Dange</u>, Tammanna Ravee Sahrawat <i>Centre for Systems Biology and Bioinformatics, Panjab University, Chandigarh.</i></p> <p>Lung cancer is the leading cause of global cancer incidence and mortality with non-small cell cancer (NSCLC) being the most common subtype. The toxic effects of the chemotherapeutic drugs available for treatment result in a low survival rate while medicinal plants targeting multiple areas can be used more safely and effectively. The active constituents of Fenugreek, an ancient herb is reported to be useful in the prevention and treatment of cancer. However, how the fenugreek-derived, chemical compounds are involved in treating lung cancer remains unclear and therefore the present study based on multi-target network pharmacology and molecular docking approaches was undertaken. Active compounds from fenugreek and key lung cancer-related targets were identified through network pharmacology analysis. Pathway enrichment analysis revealed that the anti-lung cancer effect of fenugreek was regulated by the pathways involved in cancer progression, including central carbon metabolism, specifically associated with non-small cell lung cancer pathway. Molecular docking suggests multi-targeting effect of actives from fenugreek via regulation of the genes involved in various signalling pathways. These compounds and genes may be key factors of fenugreek in treating lung cancer. Our study identified the active constituents and potential signalling pathways involved in the anti-</p>

	<p>lung cancer effect of fenugreek. These findings provide a theoretical basis for understanding the mechanism of the anti-lung cancer effect of fenugreek through multiple targets to support combinatorial therapies.</p>
41.	<p><b>INVESTIGATION OF MOLECULAR ASSOCIATION OF NONALCOHOLIC FATTY LIVER DISEASE AND GALLBLADDER CANCER: A COMPUTATIONAL BIOLOGY APPROACH</b></p> <p><u>Sushant</u>, Tammanna Ravee Sahrawat  <i>Centre for Systems Biology and Bioinformatics, Panjab University, Chandigarh.</i></p> <p>Non-alcoholic fatty liver disease (NAFLD) results from excess accumulation of fat in patient's liver and appears in two forms i.e., Non-alcoholic fatty liver (NAFL) and Non-alcoholic steatohepatitis (NASH), one form leading to the other. In NAFL, fat accumulation occurs without significant inflammation or damage while NASH involves liver inflammation and damage, leading to fibrosis and potentially cirrhosis. Gallbladder cancer (GBC) is a lethal cancer characterized by malignant growth in the gallbladder that develops silently, being detected at an advanced stage and is associated with risk factors like chronic gallstones, inflammation, and metabolic disorders such as NAFLD. A number of epidemiological studies indicate association between NAFLD and GBC, but there are no reports about their molecular association. Therefore, present study was undertaken to identify the common molecular signatures of NAFLD and GBC which could be further used to develop therapeutic interventions. A computational biology approach was used to identify common DEGs from RNA-seq datasets of NAFLD-NASH and GBC using GEO2R. Protein-protein interaction network analysis was performed using Cytoscape-plugin Cytocluster followed by validation using Network Analyzer. Functional enrichment analysis of genes using Enrichr revealed that identified genes were involved in cell cycle, progesterone-mediated oocyte maturation and oocyte meiosis, suggesting that cell proliferation and hormonal regulation may link NAFLD with higher risk of GBC. This study provides meaningful insights about the molecular association between NAFLD and GBC for design of better preventive strategies.</p>
42.	<p><b>GENETIC ENGINEERING OF <i>Euglena gracilis</i>: ADVANCING INDUSTRIAL BIOECONOMY AND SUSTAINABLE DEVELOPMENT GOALS</b></p> <p><u>Tanvi</u>, Simran Vohra, Manvi Sharma  <i>Department of Biotechnology, Panjab University, Chandigarh.</i></p> <p>Imagine a world where the tiniest of life forms, a unicellular organism, could emerge as the "unsung heroes" of our environmental crisis. <i>Euglena</i>, a remarkable, microalgae, shimmering under the Sun, not just as a mere spec in the Petri dish but as a beacon of hope for the sustainable future, as it addresses SDGs 6, 7, 12 &amp; 13. This review showcases its exceptional biodiesel yield, waste water treatment efficiency and carbon sequestration potential. <i>E. gracilis</i> has garnered attention for its ability to produce high value biomaterials such as paramylon and wax esters that cannot be biosynthesized by any other microalgae. These products find use in several applications and contribute to the "5F of</p>

	<p>biomass". Recent advancements in genetic engineering, particularly CRISPR-Cas9 technology, have unlocked new frontiers in optimizing <i>E. gracilis</i> strains for higher yields and enhanced industrial efficiency. In embracing <i>Euglena</i>, we take a bold step towards sustainable tomorrow.</p>
43.	<p><b>MICRO PERFORATION BASED SMART LABEL TO GUIDE FRESHNESS OF PASTEURIZED MILK PACKET</b></p> <p><u>Tanvi Mongia</u> <i>Department of Biotechnology, Panjab University, Chandigarh.</i></p> <p>Primary objective of dairy industries includes maintaining the quality of milk and milk-based products. It is difficult to predict the shelf life of perishable products like milk based on expiry date because it is difficult to surveil and control the temperature of food products during transportation and storage. Milk losses due to poor management of milk storage can be prevented with real-time monitoring of the quality with the help of smart packaging. TTI is becoming popular in the realm of smart packaging because of its cost-effectiveness, efficiency, user-friendly design and readability. A micro-perforation-based TTI label integrated with an activation paper, a micro-perforated membrane layer and an indicator matrix was developed. The developed external TTI label will be activated at the time of implementation or whenever required by applying an activation liquid of optimized concentration and volume for specific storage conditions. This low-cost indicator can be attached to the top of the pasteurized milk packet to provide information regarding time and temperature. Various end-user sectors' adoption of developed TTI can enhance the value of their products, boost their brand's reputation, and increase consumer attraction. authors, Subhash V. Pawde, Sachin R. Chaudhari, Rajeshwar S. Matche.</p>
44.	<p><b>CRISIS OF ANTIMICROBIAL RESISTANCE</b></p> <p><u>Vartika Barnawa</u><sup>1</sup>, Chinmayee A. Nadgir<sup>2</sup> <i><sup>1</sup>Department of Biotechnology, <sup>2</sup>Department of Physiology, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences, Maharashtra.</i></p> <p>Antibiotic resistance has become a significant challenge for the medical community, heavily impacting the ability to manage diseases. The overuse of antibiotics and irresponsible prescribing by doctors are key factors contributing to the rise of antibiotic resistance in the population. This article highlights the major causes of antibiotic resistance, including overuse, antibiotic resistance genes, and the widespread use of antibiotics in agriculture. It also addresses the difficulties antibiotic resistance creates in treating diseases such as tuberculosis, COVID-19, and infections caused by vancomycin-resistant enterococci. A case study is presented, demonstrating the threat antibiotic resistance poses to tuberculosis treatment, along with its effects on managing COVID-19 patient care. The article further explores strategies to combat antibiotic resistance, both at an international and individual level. One promising method involves the recent discovery of modified proteins produced in the body, which are being used in treatments to reduce antibiotic usage, ultimately helping to minimize overuse and combat resistance.</p>



45.	<p><b>EXPLORING THE POSSIBILITIES OF ARTIFICIAL INTELLIGENCE IN PARKINSON DISEASE TREATMENT</b></p> <p><u>Vibhas Mittra</u>  <i>University of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Artificial intelligence is revolutionizing the treatment of Parkinsons disease by speeding up the identification of potential new drugs, detecting the disease at an early stage, and tracking its progression. AI based strategies have been developed to massively accelerate the search for new treatments for Parkinsons disease, which could mean that new treatments reach clinical trials and patients more quickly.</p>
46.	<p><b>CHEMISTRY AND IT'S BASICS</b></p> <p><u>Yavneet, Riya Badhwar</u>  <i>Panjab University, Chandigarh.</i></p> <p>Studying chemistry, the science of matter and its transformations serves as the bedrock of the world around us. From the air we breathe to the food we consume, chemistry intricately weaves its principles into every facet of our lives. Chemistry plays a very important role in our daily life too.</p>
<p><b>UG/PG Students from Colleges and Other Institutions</b></p>	
47.	<p><b>NEUROINFLAMMATION: A CENTRAL MECHANISM IN PSYCHIATRIC AND NEURODEGENERATIVE DISORDERS – INSIGHTS, BIOMARKERS, AND THERAPEUTIC TARGETS</b></p> <p><u>Jashandeep Singh Brar</u>  <i>Department of Biotechnology, Goswami Ganesh Dutt Sanatan Dharama College, Chandigarh.</i></p> <p>Neuroinflammation is increasingly recognized as a critical factor in the pathogenesis of various psychiatric and neurodegenerative disorders, including Alzheimer’s disease, schizophrenia, depression, and addiction. This compilation of research explores the underlying mechanisms and clinical implications of neuroinflammation, emphasizing its role in the activation of microglial cells and the release of pro-inflammatory cytokines such as interleukin-1<math>\beta</math>, IL-6, and tumour necrosis factor-<math>\alpha</math>. Chronic neuroinflammation can lead to neuronal degeneration and impaired brain function, which manifest as abnormal thoughts, perceptions, and behaviours. Key findings reveal that neuroinflammatory processes are modulated by genetic, environmental, and lifestyle factors, with stress, diet, and early-life adversity contributing to heightened immune responses. Positron emission tomography (PET) imaging has shown promise in visualizing neuroinflammation, particularly through the 18 kDa translocator protein</p>

	<p>(TSPO), which exhibits condition-specific expression patterns in major depressive disorder, schizophrenia, and other psychiatric conditions. This poster highlights the bidirectional relationship between neuroinflammation and psychiatric disorders, exploring novel biomarkers and therapeutic targets such as the kynurenine pathway, monoamine oxidase, cyclooxygenase, and purinergic P2X7 receptors. Additionally, it discusses the potential of anti-inflammatory treatments, including COX-2 inhibitors, as adjunct therapies in managing neuroinflammation-associated mental health conditions. By examining neuroinflammation through diverse lenses—ranging from molecular mechanisms to lifestyle interventions—this work aims to provide a comprehensive overview of its role in both the onset and progression of neuropsychiatric and neurodegenerative diseases, offering insights into future diagnostic and therapeutic strategies.</p>
48.	<p><b>GUT ENZYME MODULATORY POTENTIAL OF GOAT MILK PROTEIN HYDROLYSATES</b></p> <p><u>Maitri Goel</u>, Payal Pudke Udelaal, Vikas Sangwan, Manvesh Kumar Sihag, Harsh Panwar  <i>Department of Dairy Microbiology, College of Dairy and Food Science Technology, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab.</i></p> <p>An effective strategy to reduce post-prandial hyperglycaemia is to modulate gut enzymes having role in carbohydrate metabolism and insulin secretion. Alpha-glucosidase enzymes are primarily responsible for carbohydrate metabolism to glucose, and hence are primary target for maintaining glucose homeostasis and type 2 diabetes. Commercially available alpha-glucosidase inhibitors like voglibose, miglitol, and acarbose often result in side effects. Lactic acid bacteria are gaining interest as potential anti-diabetic agents, with one of the mechanisms through production of bioactive peptides. This study investigated lactobacilli for hydrolysis of goat milk proteins for generation of bioactive peptides with gut hormone modulatory potential. <i>Lacticaseibacillus zae</i> IF5, <i>L. plantarum</i> GM6, <i>Limosilactobacillus fermentum</i> D10, <i>Mammaliococcus sciuri</i> S4, <i>Streptococcus infantarius</i> R4, <i>Enterococcus faecalis</i> G12, <i>L. fermentum</i>, and <i>L. acidophilus</i> were allowed to ferment goat milk and the neutralized fermentates were screened for their alpha-glucosidase inhibition potential in vitro. The outcomes showed that the goat milk peptides might suppress the activity of alpha-glucosidase by 23–100 percent. <i>L. plantarum</i> GM6 showed the most encouraging inhibition of alpha-glucosidase.</p>
49.	<p><b>PHYTOPLANKTON IN CARBON CYCLING AND CLIMATE IMPACT</b></p> <p><u>S Tejesvi Sharma</u>  <i>Goswami Ganesh Dutt Sanatan Dharama College, Panjab University, Chandigarh.</i></p> <p>Phytoplankton are tiny organisms that help regulate CO<sub>2</sub> levels in water by absorbing it, playing a key role in balancing carbon in lakes, rivers, and oceans. They have a noticeable effect in 20-40% of temperate lakes and rivers. Climate change affects them by speeding up bloom cycles, changing species mixes, and making it harder for them to get nutrients</p>

	<p>in warmer regions. Grazing by small animals like zooplankton also reduces their size and amount. These changes impact the stability and health of ecosystems, making it important to understand how phytoplankton respond to environmental shifts.</p>
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# Chemical Sciences

- Chemistry

## **CO-ORDINATORS**

*Sectional President*

**Prof. Sonal Singhal**

**9872118810**

*Sectional Secretaries*

**Dr. Palani Natarajan & Dr. Savita Chaudhary**

**9478687738 & 8699844984**

# CHASCON 2024

## NATIONAL CONFERENCE ON “Indigenous Technologies for Viksit Bharat” SECTION: CHEMICAL SCIENCES

Program (Thursday, November 07, 2024)

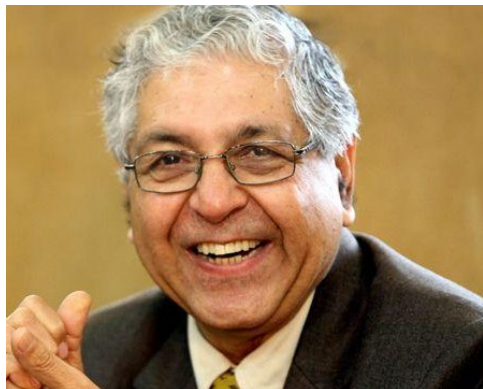
Venue: Seminar Hall, Department of Chemistry, Panjab University, Sector-14,  
Chandigarh

Sectional President Prof. Sonal Singhal 9872118810		Sectional Secretaries Dr. Palani Natarajan & Dr. Savita Chaudhary 9478687738 & 8699844984	
Time	Program		
<b>09:15-10:00</b>	Poster Presentation <i>Venue:</i> Corridor, Department of Chemistry, Panjab University, Chandigarh		
<b>10:00-10:15</b>	Inauguration of Sectional Program		
<b>10:15-11:00</b>	<b>Session Chair:</b> Prof. K. K. Bhasin <b>Speaker:</b> Prof. Arun Kumar Grover Former Vice-Chancellor, Panjab University, Chandigarh <i>“Initiation and evolution of science education and research from Lahore to PU Chandigarh campus : An overview ”</i>		
<b>11:00-11:30</b>	Tea Break		
<b>11:30-1:00</b>	<b>Session Chair:</b> Prof. Naveet Kaur (Senior)		
<b>11:30-12:10</b>	<b>Speaker:</b> Prof. Abhay Tulshiram Sangamwar Department of Pharmaceutics NIPER, SAS Nagar, Punjab <i>“Integrative Salt Selection: Perspectives of Disproportionation and Microenvironmental pH Modulation ”</i>		
<b>12:10-12:30</b>	<b>Speaker:</b> Dr. Raghubir Singh Assistant Professor, Department of Chemistry, DAV, Chandigarh <i>“Zirconia Functionalized Zinc Metal Organic Framework as For Conversion of 5-Hydroxymethylfurfural to Levulinic acid”</i>		
<b>12:30-1:00</b> 15 min./person	Oral Presentations (UG/PG students)		
<b>1:00-2:00</b>	Lunch		
<b>2:00-3:30</b> 15 min./person	Oral Presentations (Research Scholars) <b>Judges:</b> Dr. Ramesh Kataria, Dr. Shweta Rana and Dr. Gurpreet Kaur		
<b>3:30- 4:00</b>	Tea break		
<b>4:00-5:00</b> 15 min./person	Oral Presentations (Research Scholars) <b>Judges:</b> Dr. Ramesh Kataria, Dr. Shweta Rana and Dr. Gurpreet Kaur		

## KEY SPEAKERS

<b>S.No.</b>	<b>Name of Speaker</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
1.	Prof. Arun Kumar Grover	Former Vice-Chancellor, Panjab University, Chandigarh.	Initiation And Evolution Of Science Education And Research From Lahore To Pu Chandigarh Campus: An Overview.
2.	Prof Abhay T Sangamwar	Professor, Department of Pharmaceutics, National Institute of Pharmaceutical Education and Research (NIPER), Mohali.	Integrative Salt Selection: Perspectives of Disproportionation and Microenvironmental pH Modulation.

# INITIATION AND EVOLUTION OF SCIENCE EDUCATION AND RESEARCH FROM LAHORE TO PU CHANDIGARH CAMPUS: AN OVERVIEW



PROF. ARUN KUMAR GROVER

Former Vice Chancellor (2012-18),  
Panjab University, Chandigarh

## ABSTRACT

Professor Bawa Kartar Singh Oration of Chemistry Department is an apt occasion to reflect back at the evolution of higher education and research in North West of India. The nomenclature Guru Dutt Vidyarthi Hall for the Chemistry Department reminisces for us the initiation of teaching science subjects to Guruditta Mal and his contemporaries, like, Ruchi Ram, Hans Raj, Lajpat Rai by John Campbell Oman, an Indologist and the first Professor of Natural Sciences (1877-97) at Government College Lahore (GCL). Guru Dutt and Ruchi Ram Sahni (RRS) were appointed as faculty in GCL in 1886 and 1887, respectively after the completion of MA degree in Science. No one else completed MA in science after them at Lahore till the end of nineteenth century. The Indian Universities Act (1904) was got promulgated by the Viceroy Lord Curzon for the then five universities of India, it enjoined them to appoint teachers and promote research.

The three would be luminaries, Gopal Singh Chowla, Shiv Ram Kashyap and Dr. Kartar Singh Bawa got inducted as faculty in Mathematics, Biology and Chemistry at GCL. Another young Chemistry faculty Mr. B H Wilsdon was entrusted the task of putting together a proposal for Honours School system of teaching in colleges of Panjab University Lahore (PUL), which its Syndicate approved in 1919. The Syndicate also sanctioned the induction of a dozen faculty members in different subjects on behalf of PU. Shiv Ram Kashyap and Dewan Anand Kumar were amongst the first set of such teachers appointed. RRS and Wilsdon had advocated that research be made an essential requirement for Master's degree. PUL sanctioned the creation of University Laboratories in Zoology, Botany and Chemistry. Dr. S S Bhatnagar was inducted as the first Director of University Chemical Laboratory in 1924, and the legendary Dr. Sarvadaman Chowla was inducted as Professor of Mathematics in 1936.

In quarter of a century, Lahore had emerged as a major centre for scientific research in pre-independent India. Birbal Sahni, A C Joshi, P N Mehra, M S Randhawa, Vishwa Nath, G P Sharma, H R Gupta, F C Aulakh, R P Bambah,, Brahm Prakash, HG Khorana, Nitya Anand, Sukh Dev, R C Paul, O P Vig, K S Gaiind, M R Sahni, B M Anand, Yash Pal, Satish Dhawan, Darbari Seth, F C Kohli, S S Anand, P N Chuttani, et al had studied at Lahore. In independent India, it took another twenty five years for PU at Chandigarh to find its rightful place as premier research university of the nation. I shall present a comprehension of this narrative, whose telltale signs can be witnessed by a walk through the campus.

# INTEGRATIVE SALT SELECTION: PERSPECTIVES OF DISPROPORTIONATION AND MICROENVIRONMENTAL PH MODULATION



PROF. ABHAY T SANGAMWAR

Professor, Department of Pharmaceutics,  
National Institute of Pharmaceutical  
Education and Research (NIPER), Mohali.

## ABSTRACT

The increasing structural complexity and molecular weight of new drug molecules come with significant hurdles for product development, specifically the solubility and dissolution properties. Approximately 40% of marketed drugs and a majority (>70%) of new molecular entities (NME) are categorized as BCS class II or class IV compounds with poor solubility that lead to low or erratic bioavailability. Researchers apply various formulation technologies to overcome challenges resulting from low solubilities and unpredictable dissolution. These approaches include micronization, nanosuspension, cyclodextrin complexation, or amorphous solid dispersions. If the drug molecule has an ionizable group, forming a salt is the most straightforward and cost-effective strategy for solubility enhancement due to the ease of integration into API synthesis and drug product manufacturing.

Despite the apparent simplicity, choosing salt as the pharmaceutical product is a convoluted exercise that requires thorough assessments and continuous optimization. Most drug molecules are weak electrolytes (acids or bases). If the  $pK_a$  differential ( $\Delta pK_a$ ) is greater than 2, the acid–base reaction is chemically possible. However, the salt formation does not necessarily lead to crystalline solids with suitable physical characteristics (e.g., stability, hygroscopicity). Depending on the dosage, researchers could be further constrained by the toxicity and permissible daily exposure (PDE) of acid or base cofomers. These considerations usually translate to a limited set of counterion options for the drug substance.

The most critical liability of using salts as the API is their propensity of disproportionation, where the ionized species (salt) reverts to the neutral molecule due to pH changes encountered in the gastrointestinal tract. Disproportionation may compromise the formulation performance and defeat the purpose of using salt as the product. The negative impact is often manifested in the form of decreased dissolution and reduced bioavailability, both of which add to the development burden to further optimize the formulation.



ABSTRACTS OF  
ORAL  
PRESENTATIONS

<b>Chemical sciences - Oral presentation</b>			
<b>Faculty/Scientists from collages and other institutions</b>			
1.	Dr Raghubir Singh	DAV College, Chandigarh.	Zirconia functionalized zinc metal organic framework as for conversion of 5-hydroxymethylfurfural to levulinic acid.
<b>Research scholars of Panjab university campus and regional centres (JRF, SRF, Project Fellow and post docs)</b>			
2.	Ms. Abhivyakti	Department of Chemistry, Panjab University, Chandigarh.	Fabrication of defect-rich s-scheme heterostructure for enhanced detection and removal of persistent organic pollutants from aqueous medium.
3.	Ms. Ankita Garg	Department of Chemistry, Panjab University, Chandigarh.	Exploring environmental and biological impacts of novel isoindoline-1,3-dione and sulfonamide substituted Schiff bases employing experimental and theoretical studies.
4.	Ms. Diksha Aggarwal	Department of Chemistry, Panjab University, Chandigarh.	Dual-responsive <i>Psidium guajava</i> and cerium-MOF based platform: a novel probe for the synchronous adsorptive removal and fluorescence detection of tetracycline antibiotics.
5.	Ms. Harpreet Kaur	Department of Chemistry, Panjab University, Chandigarh.	Acid-treated fallen leaves of <i>Ficus elastica</i> as an efficient biosorbent for removal of methylene blue.
6.	Mr. Mayank Khera	Department of Chemistry, Panjab University, Chandigarh.	First principle characterization of noncovalent interactions in enantioselective oxetane ring opening via SPHENOL based chiral phosphoric acid catalyst.
7.	Ms. Neha Garg	Department of Chemistry, Panjab University, Chandigarh.	Synthesis of microgel templated Se-nanoparticles and their efficiency for photocatalytic degradation of victoria blue dye.
8.	Ms. Nishajain	Department of Chemistry, Panjab University, Chandigarh.	A CTAB encapsulated 1,8-naphthalimide Schiff base for the sensing of anthrax biomarker dipicolinic acid and bovine serum albumin.

9.	Ms. Prerna	Department of Chemistry, Panjab University, Chandigarh.	Enhanced visible light degradation of hazardous organic contaminants and antibacterial activity using sulphur-doped exfoliated GCN photocatalysts.
10.	Ms. Shikha Aery	Department of Chemistry, Panjab University, Chandigarh.	Designing microgel-stabilized pickering liquid crystal-in-water emulsions for optical sensing of chemical and biological analytes.
11.	Ms. Sonam	Department of Chemistry, Panjab University, Chandigarh.	New insights into the N <sub>2</sub> O reduction by CO over pristine and doped molybdenum phosphide (001) surfaces: A DFT outlook.
<b>UG/PG Students of Panjab University Campus and Regional Centres</b>			
12.	Ms. Aastha	Department of Chemistry, Panjab University, Chandigarh.	Enhancing aqueous electrolytes in Al-air batteries through hydrogen-bond network modification with high-donor solvent additives.
13.	Mr. Arshdeep Kaur Sahi	Department of Environmental Studies, Panjab University, Chandigarh.	Recycling waste aluminium foil to bio-acceptable nano photocatalyst.

**Abstract File****Faculty/Scientists from Colleges and Other Institutions****1. ZIRCONIA FUNCTIONALIZED ZINC METAL ORGANIC FRAMEWORK AS FOR CONVERSION OF 5-HYDROXYMETHYLFURFURAL TO LEVULINIC ACID**

Raghubir Singh<sup>1</sup>, Varinder Kaur<sup>2</sup>, Sahil Sharma<sup>1</sup>

<sup>1</sup>*DAV College Chandigarh*, <sup>2</sup>*Panjab University, Chandigarh*.

In this study, a Zinc metal-organic framework (Zn-MOF) was synthesized and post-functionalized with zirconia to create ZrO/Zn MOF, which provides active sites for the photocatalytic conversion of 5-hydroxymethylfurfural (5-HMF) into levulinic acid (LA) via acid-catalyzed hydrolysis. The ZrO/Zn MOF was prepared through a solvothermal process followed by coprecipitation, and its structure was characterized using FTIR, TGA, BET, SEM, TEM, XPS, and PXRD techniques. The photocatalytic reaction, performed in water at room temperature, achieved a product yield of over 99% in just 120 minutes using ZrO/Zn MOF as the catalyst. The formation of the product was confirmed through NMR spectroscopy and High-Performance Liquid Chromatography (HPLC-PDA). Reaction kinetics and the underlying mechanism were further elucidated using DFT studies. The catalyst demonstrated remarkable efficiency, stability, and reusability without any oligomerization over multiple cycles, making it a promising option for the sustainable production of valuable chemicals from renewable biomass sources.

**Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)****2. FABRICATION OF DEFECT-RICH S-SCHEME HETEROSTRUCTURE FOR ENHANCED DETECTION AND REMOVAL OF PERSISTENT ORGANIC POLLUTANTS FROM AQUEOUS MEDIUM**

Abhivyakti, Sonal Singhal

*Department of Chemistry, Panjab University, Chandigarh.*

In the field of improving the optoelectronic characteristics of transition metal oxides, strategies such as heteroatom doping, heterojunction formation, and defect engineering are widely utilized. Therefore, it is crucial to develop a synthetic methodology that effectively integrates these approaches to produce durable and multifunctional materials. To achieve this objective, a bi-functional N-doped Co<sub>3</sub>O<sub>4</sub>/ZnO/NiO S-scheme heterostructure was carefully synthesized through the calcination of a tri-metallic zeolitic imidazolate framework (Co/Zn/Ni-ZIF). The high-temperature calcination process at 600 °C not only facilitated the formation of oxygen vacancies within the semiconductor lattice but also resulted in the uniform mixing of metal oxides. X-ray photoelectron spectroscopy (XPS) analyses confirmed the presence of nitrogen substitution defects and zinc-broken bonds in the heterostructure. To further investigate the optoelectronic properties of the materials,

	<p>ultraviolet-visible diffuse reflectance spectroscopy (UV-vis DRS) was employed for an in-depth evaluation. The resulting heterostructure demonstrated a significant enhancement in the photocatalytic degradation of doxorubicin (90%) and chlorpyrifos (80.5%) within just 120 minutes of visible light exposure, achieved without the need for co-oxidants. Additionally, a detailed mechanistic pathway for photocatalytic degradation, centered on the generation of reactive oxygen species, has been thoroughly elucidated. Beyond its photocatalytic capabilities, the fluorescence properties of the bi-functional nanomaterial were utilized for the selective fluorescence sensing of doxorubicin, Cr6+, and chlorpyrifos. The proposed sensor exhibited an exceptionally low detection limit, with values of 0.60 <math>\mu\text{M}</math> for doxorubicin, 5.01 <math>\mu\text{M}</math> for Cr6+, and 15.4 <math>\mu\text{M}</math> for chlorpyrifos. The reliability of the proposed sensor was further substantiated through comprehensive analysis of real samples.</p>
3.	<p><b>EXPLORING ENVIRONMENTAL AND BIOLOGICAL IMPACTS OF NOVEL ISOINDOLINE-1,3-DIONE AND SULFONAMIDE SUBSTITUTED SCHIFF BASES EMPLOYING EXPERIMENTAL AND THEORETICAL STUDIES</b></p> <p><u>Ankita Garg</u><sup>1</sup>, Anjali Vijeata<sup>1</sup>, Ganga Ram Chaudhary<sup>1</sup>, Ahmad Umar<sup>2</sup>, Savita Chaudhary<sup>1</sup>, Aman Bhalla<sup>1</sup></p> <p><sup>1</sup><i>Department of Chemistry, Panjab University,</i> <sup>2</sup><i>Department of Chemistry, Najran University, Kingdom of Saudi Arabia.</i></p> <p>In this study, we present two complementary research efforts focusing on novel isoindoline-1,3-dione and sulfonamide Schiff base compounds with significant applications in both biological and environmental arena. Firstly, we explored a novel isoindoline-1,3-dione substituted fluorophore, 2-[1-benzyl-2-(4-methoxy-phenylimino)-ethyl]-isoindole-1,3-dione (L), designed for dual-channel sensory recognition of Fe<sup>3+</sup> and Ru<sup>3+</sup>. The fluorophore demonstrates turn-off fluorescence metal ions behaviour with detection limits of 0.65 <math>\mu\text{M}</math> for Fe<sup>3+</sup> and 0.26 <math>\mu\text{M}</math> for Ru<sup>3+</sup> metal ions. The ‘naked eye’ detection method using paper strips offering a fast, economical, and straightforward approach for on-site trace detection of Fe<sup>3+</sup> and Ru<sup>3+</sup> metal ions. Secondly, we investigated the antimicrobial potency and protein binding interactions of sulfonamide-substituted Schiff bases, including their efficacy in antimicrobial activity and interaction with Bovine Serum Albumin (BSA). The experimental findings are supported by theoretical modelling to understand the binding mechanisms and antimicrobial properties better. The integrated approach of combining experimental and theoretical methods in these studies offers a comprehensive understanding of these novel Schiff’s bases capabilities, providing new avenues for the development of advanced sensors and antimicrobial agents with enhanced selectivity and sensitivity. The results will be discussed in detail, highlighting their implications for future research and practical applications.</p>
4.	<p><b>DUAL-RESPONSIVE PSIDIUM GUAJAVA AND CERIUM-MOF BASED PLATFORM: A NOVEL PROBE FOR THE SYNCHRONOUS ADSORPTIVE REMOVAL AND FLUORESCENCE DETECTION OF TETRACYCLINE ANTIBIOTICS</b></p>

Diksha Aggarwal, Sonal Singhal

*Department of Chemistry, Panjab University, Chandigarh.*

The apprehensions regarding water adulteration caused by tetracycline antibiotics have prompted efforts to develop efficient adsorbents that are low-cost, have a high adsorption capacity, are sustainable and are easily recyclable and reusable. In this vein, the present study, which is motivated by the prodigious union of MOF and biobased materials, as enunciated in literature reports, demonstrates the development of a novel dual-responsive Guava leaf powder (*Psidium Guajava*) and Cerium-MOF-based bio-composite for the simultaneous adsorption and fluorescence detection of tetracycline antibiotics (TCs). The successful fabrication, enhanced surface roughness, outstanding thermal stability and high surface area of the designed composite were revealed by its favorable characterization. The fabricated Ce-MOF/0.5-GLP composite exhibited exceptional adsorption potential for the removal of TCs within a very brief initial time duration. It also exhibited high adsorption capacities, with values of 81.30, 75.18 and 63.69 mg g<sup>-1</sup> for DC, MC, and TC, respectively. Concurrently, the bio-based Ce-MOF/0.5-GLP composite that was fabricated was employed for the selective fluorescence detection of TCs. The sensor exhibited excellent selectivity and sensitivity for the detection of TCs, with low detection limit values of 94.3 nM, 71.4 nM and 74.2 nM for DC, MC and TC, respectively. The composite that has been developed is a practical and realistic approach to the management of TCs through detection and removal, as evidenced by the aforementioned findings.

5. **ACID-TREATED FALLEN LEAVES OF FICUS ELASTICA AS AN EFFICIENT BIOSORBENT FOR REMOVAL OF METHYLENE BLUE**

Harpreet Kaur<sup>1</sup>, Uday Karanbir Singh<sup>2</sup>, Richa Rastogi<sup>2</sup>, Pushpinder Kaur<sup>3</sup>

*<sup>1</sup>Department of Chemistry Panjab University Chandigarh, <sup>2</sup>Centre for Nanoscience and Nanotechnology South Campus Panjab University Chandigarh, <sup>3</sup>PG Department of Chemistry Sri Guru Gobind Singh College Sector26 Chandigarh.*

The release of dye-laden wastewater into water bodies has become a serious concern due to the potential environmental hazards posed by its toxicity. Among the various physical and chemical treatment methods, adsorption is considered the promising solution for dye removal from water. This method is efficient, highly selective, cost-effective, easy to operate, and adaptable to different experimental conditions, therefore, various adsorbents have been used to remove dyes from water. In this study, a new biosorbent is developed from HCl-treated fallen leaves of *Ficus elastica*, demonstrating high efficiency in removing Methylene Blue from water. The biosorbent was analyzed using scanning electron microscopy, Fourier transform infrared spectroscopy, and Brunauer–Emmett–Teller analysis. The HCl treatment increased the surface area of biosorbent from 0.246 m<sup>2</sup> g<sup>-1</sup> to 1.673 m<sup>2</sup> g<sup>-1</sup> which increased the adsorption capacity of biosorbent. Batch experiments were carried out to evaluate the influence of essential operating parameters on the removal of Methylene Blue, including solution pH, biosorbent dosage, dye concentration, temperature, and contact time. The optimal conditions identified were a pH of 2, a biosorbent dose of 3 mg/mL, and a contact time of 2 hours resulting in maximum dye removal. Desorption-

	<p>adsorption studies conducted for four cycles showed the potential reusability of synthesized biosorbent for the treatment of dye effluents. The results obtained in this study show that the fallen leaves of <i>Ficus elastica</i> could be used as an efficient natural biosorbent for the removal of Methylene Blue from an aqueous solution.</p>
6.	<p><b>FIRST PRINCIPLE CHARACTERIZATION OF NONCOVALENT INTERACTIONS IN ENANTIOSELECTIVE OXETANE RING OPENING VIA SPHENOL BASED CHIRAL PHOSPHORIC ACID CATALYST</b></p> <p><u>Mayank Khara</u><sup>1</sup>, Navjot Kaur<sup>2</sup>, Neetu Goel<sup>1</sup>  <sup>1</sup><i>Panjab University, Chandigarh</i>, <sup>2</sup><i>SGT University, Gurgaon</i>.</p> <p>Asymmetric ring opening reaction of 3,3-substituted oxetanes catalysed by chiral phosphoric acid (CPA) derived from a newly developed SPHENOL (2,2,3,3-tetrahydro-1,1-spirobi[phenalene]-9,9-diol) framework has been investigated by performing density functional calculations. The plausible transition states have been traced by considering the oxetane activation mode. The energy profiles obtained for various substrates provide a rational understanding of the reaction at the atomic level. The truncation models help to attribute the reaction initiation and origin of enantioselectivity to three types of noncovalent interactions between the catalyst and the substrate. The Quantum theory of atom in molecules (QTAIM), Noncovalent Interactions (NCI) Plots and Wiberg Bond Index (WBI) provide conclusive evidence of origin of stereoselectivity for the intramolecular desymmetrization of five substrates considered here. The study establishes that SPHENOL-derived CPA catalyst forges enantioselective desymmetrisation of 3,3-substituted oxetanes with higher enantiomeric excess in comparison to previously known SPINOL and BINOL-derived CPA catalysts.</p>
7.	<p><b>SYNTHESIS OF MICROGEL TEMPLATED SE NANOPARTICLES AND THEIR EFFICIENCY FOR PHOTOCATALYTIC DEGRADATION OF VICTORIA BLUE DYE</b></p> <p><u>Neha Garg</u>, Savita Chaudhary  <i>Department of Chemistry, Panjab University, Chandigarh.</i></p> <p>Herein, Se nanoparticles have been embedded inside the poly-N-isopropylacrylamide (PNIPAM) microgels and utilized as an effective catalyst for the photodegradation of victoria blue (VB) dye. Firstly, Pure PNIPAM microgels were synthesised via free radical precipitation polymerization followed by the in-situ reduction of selenous salt using NaBH<sub>4</sub> as the reducing agent. PNIPAM microgels acts as a templating agent for the stabilization of Se-nanoparticles with the particle size of about 31 nm. The developed photocatalyst shows immense efficiency and recyclability towards the photodegradation of VB dye. The degradation efficiency was found to be almost 100% within 80 min of UV irradiation. Such thermo-responsive systems paved a way for the designing of hybrid materials for environmental remediation applications.</p>

8.	<p><b>A CTAB ENCAPSULATED 1,8-NAPHTHALIMIDE SCHIFF BASE FOR THE SENSING OF ANTHRAX BIOMARKER DIPICOLINIC ACID AND BOVINE SERUM ALBUMIN</b></p> <p><u>Nisha Jain</u>, Navneet Kaur  <i>Department of Chemistry, Panjab University, Chandigarh.</i></p> <p>Keeping in mind the severities of anthrax disease caused by bacteria <i>Bacillus anthracis</i> and side effects of abnormal levels of a nonmetalloprotein bovine serum albumin (BSA), their early diagnosis is highly required. In this work, a binary ensemble OHNP@CTAB was developed for the simultaneous detection of anthrax biomarker dipicolinic acid (DPA) and BSA in aqueous medium. The binary ensemble OHNP@CTAB was fabricated by encapsulation of 1,8-naphthalimide derived Schiff base (OHNP) in the micelles of a cationic surfactant CTAB. Significant changes were observed in the absorption and emission spectrum of OHNP@CTAB in the presence of DPA and BSA mainly due to electrostatic interaction among positively charged receptor and negatively charged guest species. Limit of detection (LOD) values of OHNP@CTAB towards DPA and BSA were calculated to be 1.19 and 0.11 <math>\mu\text{M}</math>, respectively from fluorescence spectral titration data. Moreover, the binary ensemble OHNP@CTAB efficiently detected of BSA and DPA in real samples viz. packaged milk, gulkand and candy.</p>
9.	<p><b>ENHANCED VISIBLE LIGHT DEGRADATION OF HAZARDOUS ORGANIC CONTAMINANTS AND ANTIBACTERIAL ACTIVITY USING SULPHUR-DOPED EXFOLIATED G-CN PHOTOCATALYSTS</b></p> <p><u>Prerna Attri</u>, Ganga Ram Chaudhary  <i>Department of Chemistry, Panjab University, Chandigarh.</i></p> <p>A two-step calcination process was used to create S-gCN photocatalysts that are doped with sulfur and are exfoliated. XRD analysis confirmed the crystalline nature of the materials, while the incorporation of 5% sulfur increased the surface area from 10.294 to 61.185 <math>\text{m}^2\text{g}^{-1}</math>. FE-SEM imaging showed that pristine gCN had tightly stacked nanosheets, whereas sulfur doping and exfoliation resulted in larger, loosely distributed nanosheets. This sulfur inclusion also shifted the energy band gap from 2.81 eV to 2.63 eV, enhancing its potential as a visible light photocatalyst. Studies using photoluminescence showed that the 5% S-gCN had less charge carrier recombination, which was a sign of better photocatalytic performance. This catalyst effectively degraded Tetracycline, Chlorpyrifos, and Eriochrome Black T under visible light nearly four times more efficiently than pristine gCN. Furthermore, 5% S-gCN demonstrated strong antibacterial activity against <i>S. aureus</i>. Overall, this research highlights how doping and exfoliation can enhance the structure and catalytic properties of gCN, contributing to the development of effective visible light-responsive photocatalysts for environmental remediation.</p>
10.	<p><b>DESIGNING MICROGEL-STABILIZED PICKERING LIQUID CRYSTAL-IN-WATER EMULSIONS FOR OPTICAL SENSING OF CHEMICAL AND BIOLOGICAL ANALYTES</b></p>



Shikha Aery<sup>1</sup>, Jerome J. Crassous<sup>2</sup>, Anwasha Sarkar<sup>3</sup>, Abhijit Dan<sup>4</sup>

<sup>1</sup>*Department of Chemistry, Panjab University, Chandigarh,* <sup>2</sup>*Institute of Physical Chemistry, RWTH Aachen University, Aachen, Germany,* <sup>3</sup>*School of Food Science and Nutrition, University of Leeds, Leeds, UK,* <sup>4</sup>*Department of Applied Chemistry, Maulana Abul Kalam Azad University of Technology, Haringhata, West Bengal, India.*

Liquid Crystal (LC)-in-water emulsions are a new generation of optical sensors, consisting of micrometer-sized LC droplets dispersed in aqueous media. They are widely used for the sensitive detection of various chemical and biological analytes. In the presence of analytes, the LC droplets undergo an ordering transition, resulting in observable changes in optical appearance with a polarized optical microscope. However, uncoated LC droplet-based assays in clinical settings face challenges such as colloidal instability, polydispersity, and sedimentation, leading to low shelf life and semi-quantitative results. Microgels are colloidal particles composed of a finite 3D crosslinked network, typically ranging from several micrometers to nanometers. They serve as effective stabilizers (i.e., Pickering emulsifiers) for oil-in-water or water-in-oil emulsions. Herein, we report the use of microgels (both synthetic and biopolymer-based) as Pickering emulsifiers for LC-in-water emulsions. Microgel particles spontaneously and irreversibly adsorb at the LC-water interface, providing Pickering stabilization and significantly enhancing shelf life. Highly monodisperse and ultra-stable Pickering LC droplets can be obtained using microfluidics. Despite the microgel coating, various chemical and biological analytes can still interact with the LC droplets and induce observable transitions. The response of Pickering LC droplets depends on the type of analytes, interfacial layer charge, microgel concentration, number of LC droplets exposed to analytes, and the pH and ionic strength of the medium. The results show that microgel-stabilized Pickering LC-in-water emulsions overcome the limitations of bare emulsions, paving the way for a novel category of LC-based sensors for simple, rapid, label-free, and reliable detection.

11. **NEW INSIGHTS INTO THE N<sub>2</sub>O REDUCTION BY CO OVER PRISTINE AND DOPED MOLYBDENUM PHOSPHIDE (001) SURFACES: A DFT OUTLOOK**

Sonam, Neetu Goel

*Panjab University, Chandigarh.*

A spin-polarized density functional theory (DFT) study was carried out to assess the catalytic efficacy of the pristine and doped molybdenum phosphide (MoP) surfaces in reducing N<sub>2</sub>O via the oxidation of CO. The stepwise mechanism which included four fundamental steps; N<sub>2</sub>O decomposition (the rate-limiting step), N<sub>2</sub> desorption, CO oxidation, and CO<sub>2</sub> desorption—was systematically explored. To obtain a better understanding of the reaction mechanism, metrics such as adsorption energy, relative energy, charge transfer, energy band structure, and projected density of states were comprehensively analyzed. The rate-limiting step which involves the activation of the N<sub>2</sub>O molecule through the cleavage of the N-O bond possesses a high energy barrier for the pristine MoP surface. Therefore, the TM doping (TM= Ti, V, Cr, and Mn) strategy is adopted to boost its catalytic efficiency by reducing the activation energy for the N<sub>2</sub>O decomposition step. The reusability of the catalyst surface can

be easily established on account of the low desorption energies of the final products; N<sub>2</sub> and CO<sub>2</sub>. The present theoretical study will aid the experimentalists in developing and designing MoP-based catalysts to simultaneously remove harmful N<sub>2</sub>O and CO gases in a single step.

**UG/PG Students of Panjab University Campus and Regional Centres**

**12. ENHANCING AQUEOUS ELECTROLYTES IN AL-AIR BATTERIES THROUGH HYDROGEN-BOND NETWORK MODIFICATION WITH HIGH-DONOR SOLVENT ADDITIVES**

Aastha, Palani Natarajan

*Department of Chemistry, Panjab University, Chandigarh*

Aqueous electrolytes are popular in high-energy, low-cost batteries, but the parasitic hydrogen evolution reaction (HER) on reactive metal anodes limits their performance. Manipulation of hydrogen-bond networks in these electrolytes using solvent additives can be opted to reduce the HER. It has also been observed that higher donor numbers lead to significant reductions in self-discharge and hydrogen evolution in Al anodes. This approach allows an Al-air battery to achieve an energy density of almost 3106.04 Wh kg<sup>-1</sup>.

**13. RECYCLING WASTE ALUMINIUM FOIL TO BIO-ACCEPTABLE NANO PHOTOCATALYST**

Arshdeep Kaur Sahi<sup>1</sup>, Bunt Sharma<sup>2</sup>, Rajeev Kumar<sup>1</sup>, Ganga Ram Chaudhary<sup>2</sup>

<sup>1</sup> *Department of Environmental Studies, Panjab University* <sup>2</sup> *Department of Chemistry, Panjab University.*

The surge in the world's population resulting from urbanization and industrialization has led to a significant uptick in water and soil pollution. Aligning with the United Nations goals of sustainability, it is recommended to earnestly investigate innovative methods for repurposing waste into beneficial materials and effective catalysts that are compatible with ecosystems and capable of efficiently decomposing dyes. Additionally, aligning with the objectives of a sustainable society, this study serves as a prototype for repurposing discarded aluminium foil—an everyday single-use material contributing to landfill accumulation—into aluminium oxide (Al<sub>2</sub>O<sub>3</sub>) and aluminium oxyhydroxide (AlOOH) nanocatalysts, intended for efficient photodegradation applications. The developed nano-systems were characterized using FTIR, EDX mapping, XRD, FE-SEM, and TGA/DTA, which determined the bonds, composition, structure, morphology of the particles, and thermal stability, respectively. Liquid chromatography mass spectrometry (LC-MS) was performed to check the Methylene Blue intermediate product formation on photodegradation. The research emphasizes the importance of sustainable material synthesis and offers valuable insights for the development of efficient photocatalysts tailored for specific environmental conditions in the context of dye degradation.

ABSTRACTS OF  
POSTER  
PRESENTATIONS

<b>Chemical sciences – Poster presentation</b>			
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
1.	Dr. Aman Bhalla	Department of Chemistry, Panjab University, Chandigarh.	Comprehensive assessment of environmental and biological effects of isoindoline-1,3-dione and sulphonamide-based Schiff bases using experimental and computational methods.
2.	Dr. Gurpreet Kaur	Department of Chemistry, Panjab University, Chandigarh.	Designing of metal functionalized surfactant based smart materials for bioactive, bioinspired and catalytic applications.
3.	Dr. Palani Natarajan	Department of Chemistry, Panjab University, Chandigarh.	Metal-, hypervalent iodine and high temperature-free methyl radical production from tert-butyl alcohol for the C-H methylation of (iso)quinolines under visible-light.
4.	Dr. Ramesh Kataria	Department of Chemistry, Panjab University, Chandigarh.	Synthesis, structural and biological evaluation of transition metals complexes with Schiff base derived from dehydroacetic acid.
5.	Dr. Rohit Kumar Sharma	Department of Chemistry, Panjab University, Chandigarh.	Decoding $\beta$ -cyclodextrin-mediated inclusion complex formation with phenylalanine-capped AuNPs for colorimetric sensing of Cr(III) and Fe(III).
6.	Dr. Savita Chaudhary	Department of Chemistry, Panjab University, Chandigarh.	Advanced functional materials for combating environmental issues.

7.	Dr. Shweta Rana	Department of Chemistry, Panjab University, Chandigarh.	Poly(1,5-diaminoanthraquinone) @ waste face mask derived ac: PD-BFO nanocomposite electrode for supercapacitor applications.
8.	Dr. Varinder Kaur	Department of Chemistry, Panjab University, Chandigarh.	Plasmonic Photocatalysis of Furfural Reductive Amination in Water Using Pd@BTL-Cd Core-Shell Nanoparticles.
<b>Faculty/Scientists from colleges and other institutions</b>			
9.	Dr. Ramesh Kumar	Department of Chemistry, Kurukshetra University, Kurukshetra.	Magnetite nanoparticles with surface modification for removal of contaminants from aqueous solution.
<b>Research scholars of Panjab university campus and regional centres (JRF, SRF, Project Fellow and post docs)</b>			
10.	Mr. Amit Bharti	Department of Chemistry, Panjab University, Chandigarh.	Microwave assisted synthesis of fluorescent gold-based nanomaterials for the photocatalytic degradation of anionic and cationic dyes.
11.	Ms. Ashiya	Energy Research Centre, UICET, Panjab University, Chandigarh.	Sustainable nanoparticle synthesis for fluorescent detection and antibiotic adsorption.
12.	Ms. Deepika	Energy Research Centre, UICET, Panjab University, Chandigarh.	Waste-to-wealth: Biodiesel production through transesterification of Organic Waste: A Review.
13.	Ms. Deepika Sharma	Department of Chemistry, Panjab University, Chandigarh.	Liquid crystal droplet-embedded hydrogel film for the optical detection of bacterial endotoxin.
14.	Ms. Garima	Department of Chemistry, Panjab University, Chandigarh.	Dual detection of zinc and citrate using a Schiff base chemo sensor for prostate cancer biomarker targeting.

15.	Ms. Heena	Department of Chemistry, Panjab University, Chandigarh.	Naked eye Fe (III) recognition and anticancer efficacy evaluation via diazanyl-propargyl appended imine functionalized moiety
16.	Ms. Hemjot Kaur	Department of Chemistry, Panjab University, Chandigarh.	Molecular engineering of donor and acceptor systems in Zn-porphyrin dyes for superior solar cell efficiency.
17.	Ms. Jyoti	Energy Research Centre, UICET, Panjab University, Chandigarh.	Bio composite panels for indoor applications: Sugarcane bagasse and plant-based polyurethane polymer.
18.	Ms. Jyoti Prasher	Department of Applied Sciences, UIET, Panjab University, Chandigarh.	Designing bioinspired surface-engineered fluorescent carbon dots for biomedical applications.
19.	Ms. Kanchan Kumari	Department of Chemistry, Panjab University, Chandigarh.	Optimizing the relationship between structure and property of metal-based surfactants in non-conventional solvents.
20.	Ms. Minakshi	Department of Chemistry, Panjab University, Chandigarh.	Rational engineering of a Boerhavia diffusa-derived CoFe <sub>2</sub> O <sub>4</sub> -carbon dots@boehmite hybrid platform for advanced photocatalytic. Applications and Ultra-Trace Sensing of Hazardous Pesticides and UO <sub>2</sub> <sup>2+</sup> Ions.
21.	Dr. Paramdeep Kaur	Department of Chemistry, Panjab University, Chandigarh.	Incorporating hexagonal ferrite with transition metals in core-shell-shell nanostructures (SrFe@Dop@M) for dual-purpose applications of detoxification and electrochemical detection of pharmaceutical drugs.

22.	Ms. Pooja Malik	Department of Chemistry, Panjab University, Chandigarh.	Chalcone derived bis-organosilane and its magnetic nanoparticles: unveiling precision in selective Cu (II) ion detection and elucidating biocompatibility.
23.	Ms. Poonam Kumari Sharma	Department of Chemistry, Panjab University, Chandigarh.	Metabolites forming typical amyloid fibrils: Structural investigations.
24.	Dr. Preeti Garg	Department of Chemistry, Panjab University, Chandigarh.	Impregnation of single-atom iron from Metallosurfactants onto MOF-derived porous N-doped carbon for efficient wastewater treatment via Peroxymonosulfate activation.
25.	Mr. Sahil Thakur	Department of Chemistry, Panjab University, Chandigarh.	Photosensitization of carbon nanotubes (CNTs) using organotin (IV) compounds: Production of reactive oxygen species and breakdown of amoxicillin.
26.	Ms. Samiksha Sharma	Department of Chemistry, Panjab University, Chandigarh.	Synthesis of Azomethine functionalized Schiff base for in silico, in vitro antibacterial and antileishmanial evaluation.
27.	Mr. Sandeep Goyal	Department of Chemistry, Panjab University, Chandigarh.	Advanced bio-waste derived carbon dots for efficient and sustainable dye removal.
28.	Ms. Shreya Goswami	UICET, Panjab University, Chandigarh.	Heterostructure photocatalysts for efficient antibiotic degradation for sustainable water purification.
29.	Ms. Simranjeet Kaur	Department of Chemistry, Panjab University, Chandigarh.	Formulation of dual-functional ternary Z-scheme $C_3N_4/SnO_2/CoFe_2O_4$

			heterostructure for photocatalytic degradation and fluorescence detection of hazardous pollutants.
30.	Ms. Sumit	Panjab University, Chandigarh.	Efficient mercury ion abatement through highly porous cellulose nanofibrils combined with microporous organic polymer enhancements.
31.	Ms. Tamanna Wadhawan	Department of Chemistry, Panjab University, Chandigarh.	Carbon dots-based dual-emission ratio metric fluorescent sensors for fluorescence and visual detection of hypochlorite and $\text{Cu}^{2+}$ .
32.	Ms. Tsering Diskit	Department of Chemistry, Panjab University, Chandigarh.	Aldol-click generated silane: A turn-on fluorescent sensor for $\text{Al}^{3+}$ ion and exploring its anti-Alzheimer activity via molecular docking.
33.	Mrs. Vandana	Department of Chemistry, Panjab University, Chandigarh.	Synthesis of new l-proline functionalized terphenyl ligand: Spectroscopic and computational investigation of binding interactions with Cobalt(II) Chloride.
34.	Mr. Vipin Singh	Department of Chemistry, Panjab University, Chandigarh.	Visible light-induced photocatalysis of lignin.
<b>Research scholars from college and other institution (JRF, SRF, Project Fellow and post docs)</b>			
35.	Ms. Neha	Central Scientific Instruments Organisation, Chandigarh.	High-performance liquid chromatography for comparative capsaicin profiling in pepper fruit.
36.	Dr. Nidhi Yadav	National Agrifood Biotechnology Institute, Mohali, Punjab.	Selective synthesis of oxygenated fuel derivative



			from microwave assisted acetalization of glycerol.
37.	Ms. Swati	Department of Chemistry, Maharaja Ranjit Singh Punjab Technical University, Bathinda, Punjab.	Rational design and synthesis of isatin-chalcone hybrids integrated with 1H-1,2,3-triazole: Anti-proliferative profiling and molecular docking Insights.
<b>UG/PG Students of Panjab University Campus and Regional Centres</b>			
38.	Ms. Aanvi	Department of Chemistry, Panjab University, Chandigarh.	Application of bioplastics in pharmaceuticals industry.
39.	Ms. Anshika Sharma	Department of Chemistry, Panjab University, Chemistry.	Graphene quantum dots: A new frontier in nanotechnology.
40.	Ms. Armaandeeep Kaur	Department Of Chemistry, Panjab University, Chandigarh.	Harnessing waste: Solid-state carbon dots from plastics and their advanced applications.
41.	Mr. Dikshant	UICET, Panjab University, Chandigarh.	AI and quantum computing for advanced materials.
42.	Mr. Gurkaran Singh	Department of Chemistry, Panjab University, Chandigarh.	Biogenic growth of magnetic retrievable $\text{Ca}_4\text{Fe}_9\text{O}_{17}$ anchored on rice husk biochar for methylene blue degradation through persulfate activation.
43.	Ms. Kiran	Department of Chemistry, Panjab University, Chandigarh.	Carbon dot application in environment remediation.
44.	Ms. Muskan Sabharwal	Department of Chemistry, Panjab University, Chandigarh.	Desmuramyl peptide (DMP): A potent NOD2 agonist for immunomodulation.
45.	Ms. Nishtha	Department of Chemistry, Panjab University, Chandigarh.	Designing $\text{WO}_3$ doped ZIF-67@ZIF-8 Z-scheme heterostructures for enhanced photocatalytic activity in tetracycline degradation under visible light.

46.	Ms. Palak Banga	Department of Chemistry, Panjab University, Chandigarh.	General overview of graphene quantum dots and its application.
47.	Mr. Raj Karan Singh	UICET, Panjab University, Chandigarh.	MOF architecture for advanced pollutant sensing and removal.
48.	Ms. Riya	Department of Chemistry, Panjab University, Chandigarh.	Efficient scale up of 2-butyl- 2H-pyrazolo[3,4-c] quinolin- 4-amine: a potent TLR7/8 agonist
49.	Ms. Simran Kaur	Department of Chemistry, Panjab University, Chandigarh.	Design and synthesis 1-(3- bromobenzyl)-2-butyl-1H- imidazo[4,5-c] quinolin-4- amine to modulate toll like receptor-7 agonistic activity and adjuvanticity.
50.	Ms. Srishti Mangla	Department of Chemistry, Panjab University, Chandigarh.	Tools for Identifying, Extraction and Characterizing Microplastic Pollution.

**UG/PG Students from Colleges and Other Institutions**

51.	Ms. Anupriya Verma	Guru Nanak College, Sri Muktsar Sahib, Punjab.	Nanotechnology in medicines.
52.	Mr. Anurag Gill	Guru Nanak College, Sri Muktsar Sahib, Punjab.	Steroids and their effect on human body.
53.	Ms. Devika	Guru Nanak College, Sri Muktsar Sahib, Punjab.	Green chemistry for environmental sustainability.
54.	Ms. Palak	Guru Nanak College, Sri Muktsar Sahib, Punjab.	Forensic chemistry at crime scene.
55.	Mr. Ravinderpal Singh	Guru Nanak College, Sri Muktsar Sahib, Punjab.	Role of carbon sequestration in climate change.

**Abstract – poster presentation**

**Faculty/Scientists of Panjab University Campus and Regional Centres**

1. **COMPREHENSIVE ASSESSMENT OF ENVIRONMENTAL AND BIOLOGICAL EFFECTS OF ISOINDOLINE-1,3-DIONE AND SULFONAMIDE-BASED SCHIFF BASES USING EXPERIMENTAL AND COMPUTATIONAL METHODS**

Aman Bhalla<sup>1</sup>, Ankita Garg<sup>1</sup>, Anjali Vijeata<sup>1</sup>, Ganga Ram Chaudhary<sup>1</sup>, Ahmad Umar<sup>2</sup>, Savita Chaudhary<sup>1</sup>

<sup>1</sup>*Department of Chemistry, Panjab University, Chandigarh, India.,*

<sup>2</sup>*Department of Chemistry, Faculty of Science and Arts, Najran University, Kingdom of Saudi Arabia.*

This study presents two distinct yet complementary research efforts focused on the development and evaluation of novel Schiff base compounds, featuring isoindoline-1,3-dione and sulphonamide moieties, with promising biological and environmental applications. The first part of the research introduces a newly designed isoindoline-1,3-dione fluorophore, 2-[1-benzyl-2-(4-methoxy-phenylimino)-ethyl]-isoindole-1,3-dione (L), engineered for dual-channel detection of Fe<sup>3+</sup> and Ru<sup>3+</sup> ions. This fluorophore exhibits a fluorescence "turn-off" response to these metal ions, with detection limits as low as 0.65 μM for Fe<sup>3+</sup> and 0.26 μM for Ru<sup>3+</sup>. Additionally, a simple and cost-effective paper strip method allows rapid, visible detection of Fe<sup>3+</sup> and Ru<sup>3+</sup> at trace levels, making it practical for field applications. The second part of the study focuses on sulphonamide-substituted Schiff bases, evaluating their antimicrobial activity and interactions with Bovine Serum Albumin (BSA). Both experimental data and theoretical models were used to elucidate the binding mechanisms and enhance the understanding of their antimicrobial properties. By integrating experimental techniques with computational modelling, this research provides a thorough investigation into the potential of these Schiff base compounds for use as advanced sensory materials and antimicrobial agents. The detailed analysis of these findings will shed light on their broader implications, offering insights for future innovations in sensor technology and antimicrobial drug development.

2. **DESIGNING OF METAL FUNCTIONALIZED SURFACTANT BASED SMART MATERIALS FOR BIOACTIVE, BIOINSPIRED AND CATALYTIC APPLICATIONS**

Gurpreet Kaur

*Department of chemistry, Panjab University, Chandigarh.*

The term 'functionalized surfactants' is used when an amphiphilic moiety possesses a specialized structural or functional group like carbohydrates, proteins, redox, etc.

	<p>Introduction of such chemical and biochemical functionalities lead to an innovative group of materials for diverse applications. In this respect, Metallosurfactants i.e. metal containing surfactants, especially transition and lanthanide metals, have led to some fascinating advancements in colloidal science. As every metal displays its characteristic properties and every metal-based surfactant has a different location for the metals i.e. head group, tail or may as a counter ion, they therefore exhibit different physical and chemical properties. Metal ions have a very crucial role in several biochemical/biophysical processes. Metals show distinctiveness in redox activity, variable coordination modes, variable reactivity and intracellular availability. Apart from this, they are potential candidates as anticancer agents. The driving force towards the applicability of metal-containing compounds as anticancer drugs has been revolutionized with cisplatin. Therefore, this work aims for the designing of smart materials that can comprehend dual functionality. These materials will offer advantages of metals which imparts properties such as acid–base, redox and magnetic and also give amphiphilic character to the molecule. The incorporation of metals is particularly relevant due to the rich chemistry associated with multiple coordination numbers, geometrics and a number of redox states. This talk will give an overview of the preparation and designing of Metallosurfactants for their utility in bioinspired (interactions with biomolecules/dyes) and electrocatalytic applications (splitting of water/corrosion).</p>
3.	<p><b>METAL, HYPERVALENT IODINE, AND HIGH TEMPERATURE-FREE METHYL RADICAL PRODUCTION FROM TERT-BUTYL ALCOHOL FOR THE C-H METHYLATION OF (ISO)QUINOLINES UNDER VISIBLE-LIGHT</b></p> <p><u>Palani Natarajan</u>  <i>Department of Chemistry, Panjab University, Chandigarh.</i></p> <p>This study outlines a novel methodology to produce methyl radical (<math>\bullet\text{CH}_3</math>) from <i>tert</i>-butyl alcohol (tBA, <math>(\text{CH}_3)_3\text{COH}</math>) utilizing aqueous hydrogen peroxide, a catalytic amount of chloride, and violet LED. It also discusses the potential use of these methyl radicals for the C-H methylation of (iso)quinolines with different functional groups and a plausible reaction mechanism. The mechanistic studies reveal that the exposure of violet LED causes homolytic dissociation of <math>\text{H}_2\text{O}_2</math> into hydroxyl radicals (<math>\bullet\text{OH}</math>). A reaction between the hydroxyl radical (<math>\bullet\text{OH}</math>) and chloride anion (<math>\text{Cl}^-</math>) affords chlorine radical (<math>\bullet\text{Cl}</math>), which subsequently reacted with tBA to produce methyl radical (<math>\bullet\text{CH}_3</math>). The product is yielded by a nucleophilic attack of <math>\bullet\text{CH}_3</math> radical at the most electron-deficient position of 1 followed by deprotonation reaction. In contrast to <math>\text{PhI}(\text{OCOCH}_3)_2</math> or <math>\text{PhI}(\text{OCOCF}_3)_2\text{-Fe}(\text{acac})_3</math> reported in literature, the reagent system disclosed herein for the production of <math>\bullet\text{CH}_3</math> from tBA is cheaper, mild, environmentally friendly, capable of operating at ambient conditions and applicable for synthesis of biologically valuable building blocks.</p>
4.	<p><b>SYNTHESIS, STRUCTURAL AND BIOLOGICAL EVALUATION OF TRANSITION METALS COMPLEXES WITH SCHIFF BASE DERIVED FROM DEHYDROACETIC ACID</b></p>

	<p><u>Ramesh Kataria, Richa</u> <i>Department of Chemistry, Panjab University, Chandigarh.</i></p> <p>The metal complexes derived from Schiff's base exhibit a range of applications, particularly within medicinal chemistry. Dehydroacetic acid (DHA) derived Schiff base was synthesized through the condensation reaction of DHA and 2-picolyamine. Thus, the condensed product was treated with transition metal salts to obtain DHA-derived Schiff bases metal complexes. Single crystal X-ray diffraction was used to study the structures of Ni(II), Cu(II), and Zn(II) metal complexes as well as Schiff's base. The metal complexes were potent antifungal agents compared to Schiff's base. Copper complex exhibited excellent antibacterial activity against Gram-positive and negative bacterial cultures. The antispasmodic activity against the 3D7 strain of <i>P. falciparum</i> was assessed using a fluorescent test based on SYBR green-I. Treatment with Zn(II) and Cu(II) increased activity to 3.5 µg/ml and 2.0 µg/ml, respectively.</p>
5.	<p><b>DECODING B-CYCLODEXTRIN-MEDIATED INCLUSION COMPLEX FORMATION WITH PHENYLALANINE-CAPPED AUNPS FOR COLORIMETRIC SENSING OF Cr(III) AND Fe(III)</b></p> <p><u>Rohit Kumar Sharma, Maitrayee Trivedi, Pankaj Sharma, Amrinder Kaur</u> <i>Department of Chemistry, Panjab University, Chandigarh.</i></p> <p>The synthesis of monodisperse phenylalanine-capped gold nanoparticles (F-AuNPs) using a microwave-assisted, one-step approach that is simple, cost-effective, and environmentally friendly has presented here. The interaction of these nanoparticles was examined in the presence of the macrocyclic supramolecule β-cyclodextrin (β-CD). In this process, phenylalanine serves both as a reducing and capping agent, while β-CD forms an inclusion complex with phenylalanine, yielding a ternary system (βCDF-AuNPs). The reaction parameters such as microwave power, time, temperature, and the concentrations of phenylalanine and HAuCl<sub>4</sub> were optimized and monitored via UV-visible spectroscopy. The βCDF-AuNPs demonstrated excellent stability for over a month, with an estimated average size of around 28 nm. These nanoparticles were further employed to develop a highly selective and sensitive colorimetric sensor for detecting Fe(III) and Cr(III) ions. Upon the addition of Fe(III) and Cr(III), a noticeable redshift occurred due to coordination between the βCDF-AuNPs and the metal ions. This ultrafast colorimetric sensor exhibits detection limits of 105nM for Cr(III) and 152 nM for Fe(III). Additionally, selectivity studies confirmed the sensor's specificity for Fe(III) and Cr(III) ions, even in the presence of high concentrations of other metal ions.</p>
6.	<p><b>ADVANCED FUNCTIONAL MATERIALS FOR COMBATING ENVIRONMENTAL ISSUES</b></p> <p><u>Savita Chaudhary</u> <i>Department of Chemistry, Panjab University, Chandigarh.</i></p>

	<p>Nanotechnology focuses on manipulating materials at the nanoscale where they exhibit distinctive properties. The advantages of using sustainable and cheap biomass precursors exhibit the tremendous opportunity for boosting energy production and their application in environmental remediation processes. The surface morphology of these porous nanomaterials along with their characteristic properties like regenerative nature, non-toxicity, eco-friendly nature, unique surface area were responsible for their diverse applications. The incorporation of various functional groups confers superiority of these materials, resulting in unique and advanced functional properties. With ongoing research, nanotechnology holds great potential to solve critical global issues.</p>
7.	<p><b>POLY(1,5-DIAMINOANTHRAQUINONE) @ WASTE FACE MASK DERIVED AC: PD-BFO NANOCOMPOSITE ELECTRODE FOR SUPERCAPACITOR APPLICATIONS</b></p> <p><u>Shweta Rana, Jaiveer</u> <i>Department of Chemistry, Panjab University, Chandigarh.</i></p> <p>With the fast rise of populations, there is a great demand for sustainable energy sources. As a result, energy storage systems are one of the best alternatives, and supercapacitors are the potential competitor over batteries owing to their exceptional properties such as high power, extended cycle life, and environmentally benign nature. In this regard, rapid development in supercapacitors, including a wide range of electrode materials, has been made for its basic advancement. To address this issue, a waste face mask-based PDAAQ@AC: Pd-BFO binder-free electrode has been designed for high performance supercapacitor applications. A simple hydrothermal process was used for synthesis of palladium doped Bi<sub>2</sub>Fe<sub>4</sub>O<sub>9</sub> followed by coating of waste face mask derived AC with Pd-BFO to prevent restacking of former. Further, DAAQ moieties were hydrothermally polymerized over AC: Pd-BFO to add the pseudocapacitance. Microstructural analysis revealed a 3-dimensional interconnected morphology of PDAAQ@AC: Pd-BFO leading to minimal internal resistance thus facilitating rapid charge transfer reactions at the electrode-electrolyte interface. The designed ternary nanocomposite exhibited high specific capacitance for a single electrode. The practical demonstration was shown by designing symmetric device comprising of PDAAQ@AC: Pd-BFO electrode. The device showed excellent cyclic stability and high energy density of 25.80 Wh/kg in relation to power density. The capacity of four devices coupled in series to illuminate an LED for 180 seconds (video attached in manuscript) showcased the practical utility of ternary nanocomposite-based electrode in long-term energy storage practical applications. The finding made the proposed protocol viable for circular economy whereplast.</p>
8.	<p><b>PLASMONIC PHOTOCATALYSIS OF FURFURAL REDUCTIVE AMINATION IN WATER USING PD@BTL-CD CORE-SHELL NANOPARTICLES</b></p> <p><u>Varinder Kaur</u><sup>1</sup>, Raghbir Singh<sup>2</sup>, Jyoti Rohilla<sup>1</sup></p>

	<p><sup>1</sup>Panjab University Chandigarh, <sup>2</sup>DAV College Chandigarh.</p> <p>This research outlines the development of a core-shell nanoarchitecture (Pd@BTL-Cd) consisting of a cadmium complex with a bicompartamental tripodal ligand (BTL-Cd) that serves as a scaffold for palladium nanoparticles. The structure and composition of Pd@BTL-Cd were characterized through a range of analytical techniques, including FTIR, RAMAN, BET, SEM, TEM, XPS, NH<sub>3</sub>-TPD, and PXRD. The material was utilized as a photocatalyst to promote the conversion of furfural, a renewable aldehyde from biomass, into furfuryl amine through photocatalytic reductive amination. In this process, aqueous ammonia was used as the amine source, with water functioning both as a solvent and a hydrogen source. Optimization of key factors such as reaction time, temperature, catalyst dosage, and the substrate-to-ammonia molar ratio was critical for achieving a high selectivity of 97.4% towards furfuryl amine under visible light within 4 hours. The synthesized photocatalyst efficiently facilitated this selective amination, and the reaction mechanism was further confirmed through DFT studies.</p>
<p><b>Faculty/Scientists from college and institution</b></p>	
<p>9.</p>	<p><b>MAGNETITE NANOPARTICLES WITH SURFACE MODIFICATION FOR REMOVAL OF CONTAMINANTS FROM AQUEOUS SOLUTION</b></p> <p><u>Ramesh Kumar, Keerti Rani</u>  <i>Department of Chemistry, Kurukshetra University, Kurukshetra.</i></p> <p>Magnetite nanoparticles are of immense importance due to their vast applications including environmental and biomedical applications owing to their unique characteristics. In this context, surface functionalized magnetite nanoparticles have attracted the attention of scientists as they have high surface to volume ratio along with magnetic character. By virtue of this magnetite nanoparticles can easily be separated from the aqueous solution under the influence of external magnetic field. Moreover high surface to volume ratio make them effective adsorbent. In the present study, synthesis of surface functionalized magnetite nanoparticles and their applications have been discussed. Transmission Electron Microscopy (TEM), Vibrating Scanning Magnetometry (VSM), Fourier Transform Infrared Spectroscopy (FTIR), Thermogravimetric Analysis (TGA), and X-Ray Diffraction Technique (XRD) were used to characterize the surface functionalized nanoparticles.</p>
<p><b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b></p>	
<p>10.</p>	<p><b>MICROWAVE ASSISTED SYNTHESIS OF FLUORESCENT GOLD BASED NANOMATERIALS FOR THE PHOTOCATALYTIC DEGRADATION OF ANIONIC AND CATIONIC DYES</b></p> <p><u>Amit Bharti, Rohit Kumar Sharma</u></p>

	<p><i>Department of Chemistry, Panjab University.</i></p> <p>In this work, synthesis of fluorescent monometallic gold nanoclusters (AuNCs) and bimetallic gold-Indium nanoparticles (AuInNPs) were carried out using glutathione as a capping and reducing agent. Various optimizing conditions like concentrations of metals, capping ligand, time and temperature were studied using microwave method. The prepared nanomaterials then characterized using various physio-chemical techniques such as UV-Vis spectroscopy, fluorescence spectroscopy, HR-TEM, FT-IR, EDX, TGA and Zeta potential. Indium doped bimetallic nanoparticles showed increase in size, stability i.e., thermal and colloidal stability as compared to monometallic AuNCs. Also, bimetallic nanoparticles showed high catalytic activity than monometallic nanoclusters. The synthesized nanomaterials showed photocatalytic degradation of both anionic and cationic dyes. Rhodamine B, Methylene Blue, Methyl Orange, Congo Red and Reactive Black dyes were degraded using these nanomaterials as catalyst.</p>
11.	<p><b>SUSTAINABLE NANOPARTICLE SYNTHESIS FOR FLUORESCENT DETECTION AND ANTIBIOTIC ADSORPTION</b></p> <p>Ashiya<sup>1</sup>, Ritu Gupta<sup>2</sup>, Amrit Pal Toor<sup>2</sup>  <sup>1</sup><i>Energy Research Centre, Panjab University Chandigarh,</i> <sup>2</sup><i>Dr. S.S. Bhatnagar University Institute of Chemical Engineering and Technology, Panjab University Chandigarh.</i></p> <p>Contamination of water by organic chemical pollutants is one of the most critical environmental problems today as these are harmful to human beings and the aquatic ecosystem. Organic chemical pollutants persist for a long time in water and cause deleterious effects on human health even in small concentrations. Hence, decontamination of water demands simple methods using efficient material. A wide range of analytical strategies and approaches have been developed, accomplishing significant advances in searching for efficient, fast, reliable, sensitive, and accurate protocols for sample analysis in recent decades. Fluorescence detection methods, due to their fast response, high sensitivity and specificity and low-cost, are widely used in chemical and biological sensing. Nowadays, nanostructured materials have unique properties that make them ideal candidates for developing more advanced applications as biosensors and chemical sensors for detecting environmental pollutants such as heavy metal ions, phenolic chemicals, polyaromatic hydrocarbons, pesticides, and antibiotics. This review provides the sensing mechanisms of nanomaterials for fluorescence based detection of antibiotics and also, we outlined the basic principles or mechanisms of green synthesis especially for metal oxide and removal of Antibiotics through adsorption process.</p>
12.	<p><b>WASTE-TO-WEALTH: BIODIESEL PRODUCTION THROUGH TRANSESTERIFICATION OF ORGANIC WASTE: A REVIEW</b></p> <p><u>Deepika</u><sup>1</sup>, Amrit Pal Toor<sup>2</sup></p>



	<p><sup>1</sup><i>Energy Research Centre, Panjab University,</i> <sup>2</sup><i>S.S. Bhatnagar University Institute of Chemical Engineering and Technology, Panjab University.</i></p> <p>Biodiesel, a renewable and environmentally friendly biofuel made from organic matter, has proven to be a competitive and long-term replacement for conventional diesel fuel. The amount of solid and liquid organic waste is continuously increasing all over the world. The necessity of their reuse and recycling is, therefore, becoming more and more pressing. Furthermore, the limited fossil fuel resources, in conjunction with the need to reduce greenhouse gas emissions, advocate the production of renewable fuels. In this work, we analyse a sustainable second-generation process to produce biodiesel by transesterification of waste non-edible seed oil, and plants waste. As the greatest temporary replacement for mineral diesel, biodiesel production and consumption have been rising rapidly due to the high demand for diesel fuel worldwide and the detrimental effects that it has on the environment and human health when burned directly. The viability, difficulties, and economic feasibility of each feedstock are examined in the process of producing biodiesel. Many technologies have been used to produce biodiesel, but the transesterification process has proven to be the most cost-effective and efficient approach, producing the maximum amount of biodiesel, making it the technique of choice for commercial bio-production. This review also contributes to a better understanding of the factors influencing biodiesel production trends, thereby encouraging the development of sustainable and efficient biodiesel technologies.</p>
13.	<p><b>LIQUID CRYSTAL DROPLET-EMBEDDED HYDROGEL FILM FOR THE OPTICAL DETECTION OF BACTERIAL ENDOTOXIN</b></p> <p><u>Deepika sharma</u><sup>1</sup>, Sonal Singhal<sup>1</sup>, Abhijit Dan<sup>2</sup>  <sup>1</sup><i>Panjab University, Chandigarh,</i> <sup>2</sup><i>Maulana Abul Kalam Azad University of Technology West Bengal.</i></p> <p>Endotoxin is a toxic inflammatory stimulator liberated from the outer cell membrane of Gram- negative bacteria, known to be the reason for endotoxemia, that can lead to hemorrhages, necrosis of the kidneys, septic shock and sometimes even up to death. Endotoxin detection from biological samples such as bacterial cell lysates and human serums remain a very challenging task for bioprocess engineers. Numerous efforts have been devoted to the development of assays for the detection of endotoxin. However, these methods are still not robust and efficient enough to meet the requirements for detection of endotoxin. Therefore, the development of a stable and easily controlled method with a combination of sensitive detection of endotoxin in complex biological fluids will be of great importance in the pharmaceutical industry. In this work, we developed a simple and dual-functional material based on liquid crystal (LC)-embedded chitosan (CS) hydrogel matrix that can enable a combination of sensitive real-time detection bacterial LPS in complex biological fluids.</p>
14.	<p><b>DUAL DETECTION OF ZINC AND CITRATE USING A SCHIFF BASE CHEMOSENSOR FOR PROSTATE CANCER BIOMARKER TARGETING</b></p>

	<p><u>Garima</u>  <i>Department of Chemistry and Centre for Advance Studies in Chemistry, Panjab University, Chandigarh 160014, India.</i></p> <p>Prostate cancer (PC) remains one of the most common cancers in men, underscoring the need for reliable and early diagnostic tools. This study introduces a star-shaped Schiff base chemosensor designed to detect two key biomarkers, zinc ion (<math>Zn^{2+}</math>) and citrate, which are important indicators in PC diagnosis. The sensor first binds <math>Zn^{2+}</math>, triggering a fluorescence shift, and then binds citrate, producing a distinct emission. This dual detection system was tested using paper-based test strips, in vitro cell studies, and in vivo experiments. By specifically targeting mitochondria, the chemosensor enhances diagnostic accuracy. This non-invasive approach could offer significant improvements in early detection of prostate cancer through the sequential detection of <math>Zn^{2+}</math> and citrate.</p>
15.	<p><b>NAKED EYE Fe(III) RECOGNITION AND ANTICANCER EFFICACY EVALUATION VIA DIAZENYL-PROPARGYL APPENDED IMINE FUNCTIONALIZED MOIETY</b></p> <p><u>Heena</u><sup>1</sup>, Gurjaspreet Singh<sup>1</sup>, Baljinder Singh Gill<sup>2</sup>, Deepanjali Baliyan<sup>2</sup>, Sofia Gupta<sup>1</sup>, Subash Chandra Sahoo<sup>1</sup>, Vikas<sup>1</sup>  <sup>1</sup><i>Department of Chemistry, Panjab University Chandigarh,</i> <sup>2</sup><i>Department of Biochemistry, Central University of Punjab, Bathinda.</i></p> <p>The study delves into the synthesis of diazenyl-propargyl appended imine functionalized moiety (4) emphasizing its structural dynamic, Fe(III) sensitivity, and anticancer potential. The synthesized compound was characterized via NMR (<sup>1</sup>H, <sup>13</sup>C), TGA, mass spectrometry, and single-crystal X-ray crystallography. The color transition of the compound from yellow to red demonstrates naked-eye sensing for Fe(III), validated by UV-visible spectroscopy. The limit of detection (LOD) and Association Constant (K<sub>a</sub>) were calculated from the linear calibration curve and the B-H plot come out to be 28.71 nM and 2.17x10<sup>5</sup> M<sup>-1</sup>, respectively. As per Job's plot Fe(III) binds to probe (4) in 1:1 stoichiometry. The interaction of probe (4) with Fe(III) has been examined through VSM (vibrating spectrum magnetism) study, FT-IR, <sup>1</sup>H NMR and mass spectrometry. The pharmacokinetic properties of the synthesized compound were assessed, emphasizing absorption, distribution, metabolism, excretion and toxicity. The cytotoxicity assay using SAF-1 cell line indicated that the compound is nontoxic. Also compound (4) showed positive response on cervical cancer cells line and this anti-cancer potential has been further explored through molecular docking analysis.</p>
16.	<p><b>MOLECULAR ENGINEERING OF DONOR AND ACCEPTOR SYSTEMS IN ZN-PORPHYRIN DYES FOR SUPERIOR SOLAR CELL EFFICIENCY</b></p> <p><u>Hemjot Kaur</u>, Neetu Goel</p>

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A comprehensive study was conducted on various Zn-porphyrin sensitizers using both static and time-dependent density functional theory (DFT) calculations to identify promising candidates for dye-sensitized solar cells (DSSCs). The SM315 dye, which holds a record power conversion efficiency of 13%, was used as a benchmark. This reference dye comprises a bis(2',4'-bis(hexyloxy)-[1,1'-biphenyl]-4-yl) amine donor (D0), a phenyl ring as a  $\pi$ -linker, and a carboxylic acid as the acceptor (A0). To optimize the dye's design, eleven electron-donating groups (D1-D11) and four electron-withdrawing acceptors (A1-A4) were introduced. The performance of these newly designed sensitizers was simulated in a solar cell setup featuring a TiO<sub>2</sub> semiconductor and I<sub>3</sub><sup>-</sup>/I<sup>-</sup> electrolyte. Most of the modified dyes exhibited red-shifted absorption spectra. Frontier molecular orbital (FMO) analysis showed that the engineered dyes SM-D9-A1 to SM-D9-A4 had narrow band gaps and well-aligned frontier orbitals with the semiconductor's conduction band, facilitating efficient electron injection and dye regeneration. Key efficiency parameters, including light-harvesting efficiency (LHE), short-circuit current density (JSC), open-circuit voltage (VOC), exciton binding energy (EBE), reorganization energy ( $\lambda$ ), electron transfer rate (k), and polarizability and hyperpolarizability ( $\alpha$  and  $\beta_{tot}$ ), were evaluated against the SM315 dye. Notably, the dyes featuring the D9 donor group and A1-A4 acceptor groups achieved an impressive power conversion efficiency surpassing 29%. This research not only proposes the design of a highly efficient porphyrin sensitizer but also offers in-depth insights into its role in enhancing DSSC performance through advanced computational analysis.

17. **BIOCOMPOSITE PANELS FOR INDOOR APPLICATIONS: SUGARCANE BAGASSE AND PLANT-BASED POLYURETHANE POLYMER**

Jyoti, Anupama Sharma  
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The utilization of agricultural biomass and byproducts in particleboard production to meet the global demand for wood-based materials is increasing day by day. One such byproduct is sugarcane bagasse, a promising raw material for particle board manufacturing because of its renewability, abundance, and eco-friendly properties. This research aimed to produce and evaluate the physical and mechanical properties of particle boards bonded with castor oil-based polyurethane POLYMER. This work entails the investigation of various parameters, such as particle size, resin amount, moulding temperature, and curing time, to optimize the properties of the resulting particle boards. The physical properties, including water absorption and thickness swelling, were analyzed by immersing the particle board in water for 2 and 24 hours. The density of resulting particle boards were in the range of 700-900 kg/m<sup>3</sup>. Mechanical and dynamic properties (static and dynamic elastic modulus, modulus of rupture, internal bonding, and dimensional stability) were determined using the universal testing machine at room temperature. The resulting particle boards have great potential to replace current indoor building materials because of their durability, sustainability, and cost-effectiveness.

18.	<p><b>DESIGNING BIOINSPIRED SURFACE-ENGINEERED FLUORESCENT CARBON DOTS FOR BIOMEDICAL APPLICATIONS</b></p> <p><u>Jyoti Prasher</u> <i>Panjab University, Chandigarh.</i></p> <p>Over the past decade, there has been a significant improvement in the evolution of light-emitting carbon-based quantum dots, which are emerging as promising nanomaterials over traditionally utilized semiconductor or inorganic quantum dots. Carbon dots (CDs) have been explored for various biomedical applications such as biosensing, bioimaging, drug delivery, etc. The facile synthetic protocol, tunable fluorescence properties, cost-effectiveness, biocompatibility, low cytotoxicity, environmental friendliness, and chemical stability make carbon dots an attractive nanomaterial for advanced biological applications. Carbon dots can be synthesized by a variety of precursors by utilizing various methods. However, recent advances in the field have emphasized on the use of affordable, sustainable, and renewable carbon precursors for improving the feasibility and competitiveness of carbon dot synthesis. In this regard, bioinspired approaches to synthesize novel C-dots using simple biomolecules, biopolymers, and small organic precursors are gaining huge importance owing to their various advantages such as eco-friendly behavior, cost-effectiveness, expected biocompatibility, etc. In this direction, we are particularly interested in investigating the largely underexplored potential of bioinspired molecules for the development of fluorescent C-dots. In this context, we have developed a one-step green synthesis method for the successful fabrication of amino-acid-based C-dots under microwave irradiation. We have utilized citric acid and arginine as carbon and nitrogen precursors, respectively. The highly fluorescent C-dots were characterized by various spectroscopic and microscopic techniques. The stability of the C-dots was also investigated at different pH values. The C-dots were observed to be biocompatible in nature, suggesting their huge potential to be used as novel bioimaging.</p>
19.	<p><b>OPTIMIZING THE RELATIONSHIP BETWEEN STRUCTURE AND PROPERTY OF METAL BASED SURFACTANTS IN NON-CONVENTIONAL SOLVENTS</b></p> <p><u>Kanchan Kumari</u>, Gurpreet Kaur <i>Panjab University, Chandigarh.</i></p> <p>Surfactants, a class of amphiphilic compounds possess both hydrophilic and hydrophobic regions and thereby display variation in their solubility. These amphiphile molecules exhibit a variety of self-aggregated structures, including micelles, vesicles, liquid crystals and rods, and forms soft assemblies via the formation of hierarchical structure. The self-aggregation of surfactants depends on number of factors like solvents and cosolvents, temperature, concentration, presence of salts, and change in surfactant skeleton. However, metal ions play an important role in various biochemical/biophysical processes. Metal shows discreteness in redox activities, variable reactivity and variable</p>

	<p>coordination modes. Metallosurfactants form a class of surfactants which exhibit properties of metal complexes as well as surfactants. They can self-aggregate into micelles, inverse micelles and liposomes. Depending on variables including concentration, temperature, and the presence of other materials, surfactants can display a variety of phases. In recent times, there is an upheaval in the use of these self-assembled nanostructures as a drug formulation by the pharmaceutical industry, since these structures in the form of hydrogels, vesicles and liposomes can improve the efficiency of drugs. The effect of addition of non-conventional solvents on micellization has been very well studied. It was studied that the increase in the concentration of these solvents leads to increase or decrease in the Critical micelle concentration (CMC) of the surfactant as the salt effects the aggregation process. The influence due to temperature on the CMC was also studied. The thermodynamics of micellization were enumerated from the temperature dependence of CMC.</p>
20.	<p><b>RATIONAL ENGINEERING OF A BOERHAVIA DIFFUSA-DERIVED COFe<sub>2</sub>O<sub>4</sub>-CARBON DOTS@BOEHMITE HYBRID PLATFORM FOR ADVANCED PHOTOCATALYTIC APPLICATIONS AND ULTRA-TRACE SENSING OF HAZARDOUS PESTICIDES AND UO<sub>2</sub><sup>2+</sup> IONS</b></p> <p><u>Minakshi, Sonal Singhal</u> <i>Panjab University, Chandigarh.</i></p> <p>A fluorescent nanomaterial (CDBHCF) based on biomass generated carbon dots (CDs) was synthesized with the goal of utilizing natural resources to build effective materials for the detection and obliteration of water contaminants. As a support material for the CDs, boehmite (BH) was used to anchor the CDs and cobalt ferrite (CF) particles. A simple hydrothermal procedure was employed to synthesize the CDBHCF nanocomposite, which selectively recognizes uranyl ions (UO<sub>2</sub><sup>2+</sup>) and the insecticide methyl parathion (MP). The corresponding structural, morphological and opto-electronic properties of the nanomaterials have been investigated by different physicochemical techniques. Extremely low concentrations of MP and UO<sub>2</sub><sup>2+</sup> were detected using the fluorescent CDBHCF probe with detection limit of 22.4 nM and 4.4 nM, respectively. Real sample analysis was ultimately used to validate the suggested sensor platform. Additionally, the CDBHCF nanocomposite was used to photocatalytically eliminate tetracycline (TC) from water samples. The effects of several operational factors, such as catalyst dosage and initial pH, on the degradation efficiency were carefully investigated. Under ideal circumstances, the fabricated CDBHCF nanocomposite showed outstanding photocatalytic TC degradation results (92 percent degradation in 120 minutes) when exposed to visible light. Therefore, the suggested approach provided a novel understanding of the dual functionality of the CDBHCF nanocomposite: as a photocatalyst for the photocatalytic degradation of contaminants and as a fluorescent probe for real-time monitoring.</p>
21.	<p><b>INCORPORATING HEXAGONAL FERRITE WITH TRANSITION METALS IN CORE-SHELL-SHELL NANOSTRUCTURES (SRFE@DOP@M) FOR DUAL-</b></p>

	<p><b>PURPOSE APPLICATIONS OF DETOXIFICATION AND ELECTROCHEMICAL DETECTION OF PHARMACEUTICAL DRUGS</b></p> <p><u>Paramdeep Kaur</u>, Sonal Singhal <i>Panjab University, Chandigarh.</i></p> <p>With increasing population, demand for clean and portable water is ever rising in order to sustain quality life. To fulfil the exigencies of growing population, tremendous growth in industries has been evidenced in recent times. The propagation of waste water from industries is the foremost inevitable concern in present day. Untreated effluents from industries are being directly discharged into local water bodies and water streams; thus, affecting all forms of life monstrously. Metal based nanocatalysts have encountered prodigious attention from scientific community ascribed to their potential applications as photocatalysts and electrochemical sensors. In view of such environmental concerns a novel hexagonal ferrite-based core-shell-shell nanostructures (SrFe@Dop@M) were designed for dual application of simultaneous electrochemical detection and photocatalytic degradation of pharmaceutical drugs. Phase analysis and topographical investigations of synthesized nanostructures were examined via PXRD, FE-SEM, HR-TEM and XPS techniques. Electron transfer rate of SrFe@Dop@M was estimated by EIS and CV studies. The comparative photocatalytic evaluation of synthesized nanostructures was performed towards degradation of levofloxacin and sulfamethoxazole. SrFe@Dop@Mn was observed to portray best photocatalytic performance around 3 times than that of bare SrFe and SrFe@Dop, attributable to lowest energy band gap value and highest electron transfer rate. The SrFe@Dop@Mn glassy carbon electrode (GCE) was further employed as an electrochemical sensor towards detection of levofloxacin in waste water samples, providing impressive linear range from 55.2 nM to 772.8 nM and limit of detection as low as 0.037 nM. The real sample analysis was evaluated to realize the practical applicability of modified sensor.</p>
22.	<p><b>CHALCONE DERIVED BIS-ORGANOSILANE AND ITS MAGNETIC NANOPARTICLES: UNVEILING PRECISION IN SELECTIVE Cu(II) ION DETECTION AND ELUCIDATING BIOCOMPATIBILITY</b></p> <p><u>Pooja Malik</u><sup>1</sup>, Gurjaspreet Singh<sup>1</sup>, Sumesh Khurana<sup>1</sup>, Mithun<sup>1</sup>, Pallavi Markan<sup>1</sup>, Tsering Diskit<sup>1</sup>, Kamal Nain Singh<sup>1</sup>, Baljinder Singh Gill<sup>2</sup>, Deepanjali Baliyan<sup>2</sup></p> <p><sup>1</sup><i>Department of Chemistry, Panjab University, Chandigarh, India,</i> <sup>2</sup><i>Department of Biochemistry, Central University of Punjab, Bathinda.</i></p> <p>The escalating concern regarding the adverse effects of metal ion toxicity on both human health and environmental ecosystems necessitates the development of efficient detection methodologies. This study presents a focused investigation on the selective and sensitive detection of Cu(II) ions employing hybrid magnetic nanoparticles derived from chalcone-based bis-organosilane. These nanoparticles exhibit a notably low detection</p>

	<p>limit in the nano-scale range, rendering the sensor highly sensitive to Copper(II) ion detection while maintaining robust anti-interference capabilities, even in the presence of diverse metal ions. Real sample analysis confirms the sensor's efficacy in detecting Cu(II) ions below WHO-prescribed levels. Computational analyses reveal molecular interactions and biological activities, including potent antibacterial and antioxidant properties, suggesting promising applications. Furthermore, the biological effectiveness of chalcone-derived bis-organosilane is investigated, unveiling notable antibacterial efficacy and also exhibiting potential as a scavenger of free radicals, indicating promising applications in both antibacterial and antioxidant domains.</p>
23.	<p><b>METABOLITES FORMING TYPICAL AMYLOID FIBRILS: STRUCTURAL INVESTIGATIONS</b></p> <p><u>Poonam Kumari Sharma</u> <i>Department of Chemistry, Panjab University, Chandigarh.</i></p> <p>Metabolite-based amyloids are unique self-assembled systems that form through the aggregation of small molecules, such as metabolites, into structured fibrillar aggregates. This phenomenon has garnered interest due to its implications in biological processes, material science, and biotechnology. Structural investigations using techniques such as X-ray diffraction, nuclear magnetic resonance (NMR) spectroscopy, and cryo-electron microscopy have revealed insights into the molecular arrangements and interactions driving the self-assembly of these metabolites into amyloid-like structures. Understanding the conditions that favor or inhibit this assembly can inform the design of novel biomaterials and therapeutic strategies for amyloid-related diseases. This review discusses recent advancements in the field, highlighting the intricate relationship between metabolite chemistry and amyloid formation, as well as the potential applications of these self-assembled systems in various domains.</p>
24.	<p><b>IMPREGNATION OF SINGLE-ATOM IRON FROM METALLOSURFACTANTS ONTO MOF-DERIVED POROUS N-DOPED CARBON FOR EFFICIENT WASTEWATER TREATMENT VIA PEROXYMONOSULFATE ACTIVATION</b></p> <p><u>Preeti Garg, Ganga Ram Chaudhary</u> <i>Department of Chemistry, Panjab University, Chandigarh.</i></p> <p>Single-atom catalysts (SACs) have attracted significant attention due to their distinctive composition, comprising individual metal atoms securely anchored onto supports. These catalysts demonstrate outstanding efficacy in heterogeneous catalysis for environmental applications. Nonetheless, fully exploiting their atomic-level structure, which is pivotal for catalytic activity and selectivity, presents a considerable challenge in SAC formulation. Consequently, metal-organic frameworks (MOFs) have emerged as a promising approach for precisely regulating the coordination environment of SACs. In</p>

	<p>this study, we synthesized highly porous single-atom iron anchored on a nitrogen-doped carbon matrix (FeSAC/NC) through the pyrolysis of Fe/ZIF-8 MOF. The quantity of iron in the MOF was regulated using metallosurfactants as metal precursors. FeSAC/NC served as scaffolds for catalyzing the degradation of TC or other organic pollutants in the presence of peroxymonosulfate (PMS) via advanced oxidation processes. We investigated the kinetic parameters, concentration effects, as well as the reusability and stability of the synthesized catalyst.</p>
25.	<p><b>PHOTOSENSITIZATION OF CARBON NANOTUBES (CNTS) USING ORGANOTIN(IV) COMPOUNDS: PRODUCTION OF REACTIVE OXYGEN SPECIES AND BREAKDOWN OF AMOXICILLIN</b></p> <p><u>Sahil Thakur</u><sup>1</sup>, Raghubir Singh<sup>2</sup>, Varinder Kaur<sup>1</sup>  <sup>1</sup><i>Panjab University, Chandigarh</i>, <sup>2</sup><i>Dav College, Chandigarh</i>.</p> <p>This study focuses on investigating the photosensitization of carbon nanotubes (CNTs) using organotin(IV) compounds to create a hybrid material with superior photocatalytic properties and the ability to generate reactive oxygen species. Two organotin(IV) compounds (referred to as compounds 1 and 2) were synthesized, characterized using spectroscopic and spectrometric techniques, elemental analysis, and single-crystal X-ray diffraction, and then incorporated into the CNTs. The resulting hybrid materials (1@CNT and 2@CNT) were analyzed by FTIR, TGA, FE-SEM, HR-TEM, PXRD, and XPS, and their photosensitizing capabilities and production of reactive oxygen species were evaluated. The enhanced photocatalytic performance of the hybrid materials, compared to bare CNTs, is attributed to a reduced band gap and inhibition of rapid recombination of photogenerated electrons due to encapsulation. The ability of photocatalyst 1@CNT to generate reactive species was demonstrated by the degradation of Amoxicillin (AMX) under optimized conditions for catalyst dosage, H<sub>2</sub>O<sub>2</sub> concentration, reaction time, and pH. Material 1@CNT achieved approximately 83% AMX degradation by producing free radicals (<math>\cdot\text{OH}</math> and <math>\cdot\text{O}_2^-</math>) under visible light at pH 6, as confirmed by UV-visible spectroscopy, EPR, and DFT studies. Moreover, the structural stability and sustained photocatalytic performance of 1@CNT over four cycles underscore its potential as an eco-friendly approach for breaking down environmental pollutants.</p>
26.	<p><b>SYNTHESIS OF AZOMETHINE FUNCTIONALIZED SCHIFF BASE FOR IN SILICO, IN VITRO ANTIBACTERIAL AND ANTILEISHMANIAL EVALUATION</b></p> <p><u>Samiksha Sharma</u>, Gurjaspreet Singh  <i>Department of Chemistry, Panjab University, Chandigarh</i>.</p> <p>This article presents a newly synthesized Schiff base which has been employed as a multifaceted agent in the treatment of infectious diseases. The synthesized compound was characterized by NMR (<sup>1</sup>H and <sup>13</sup>C), IR spectroscopy, mass spectrometry, and X-ray crystallography. This compound has a potential to show antibacterial activity as</p>



	<p>evidenced by a considerable zone of inhibition against multiple bacterial strains. Additionally, it exhibits strong antileishmanial effects at a concentration of 2 mM, effectively inhibiting the proliferation of all <i>Leishmania donovani</i> parasites within 48 hours, with an IC<sub>50</sub> value of 0.087 mM. Molecular docking studies have been performed to provide theoretical validation, yielding a favourable binding score.</p>
27.	<p><b>ADVANCED BIO-WASTE DERIVED CARBON DOTS FOR EFFICIENT AND SUSTAINABLE DYE REMOVAL</b></p> <p><u>Sandeep Goyal</u>, Savita Chaudhary  <i>Department of Chemistry, Panjab University, Chandigarh.</i></p> <p>Carbon dots (CQDs) are an efficient option for reducing water pollution due to their extremely biocompatible nature and prospective application in waste water treatment. Utilizing discarded coconut husk as a precursor source, biogenic carbon dots (CQDs) with a size range of 2 nm were created in this instance. Victoria blue B (VB) dye from waste water samples has a remarkable adsorption effectiveness of more than 90%, which is further assisted by the hydrophilic nature and larger surface area of as manufactured CQDs. After optimizing a number of dye adsorption parameters, such as the dose of the adsorbent and adsorbate, the pH of the reaction medium, and the equilibrium duration, it was discovered that 8 mg of adsorbent was enough to remove 70 mg of VB dye from 4 mL of aqueous solution in 60 minutes at pH = 7.</p>
28.	<p><b>HETEROSTRUCTURE PHOTOCATALYSTS FOR EFFICIENT ANTIBIOTIC DEGRADATION FOR SUSTAINABLE WATER PURIFICATION</b></p> <p><u>Shreya Goswami</u>, Amrit Pal Toor  <i>Dr. SSB UICET, Panjab University, Chandigarh.</i></p> <p>The growing population, excessive urbanisation, and industrialisation of the modern era have made environmental contamination, particularly water pollution, a major problem. Pollutants accountable for contaminating water are primarily untreated industrial effluents such as agrochemicals, heavy metals, pigments, dyes and pharmaceutical products. Antibiotics, however, have negative impacts on the growth of some organisms because they are drugs that prevent the growth of bacteria. Recently, the promise of semiconductor-based photocatalysts to address energy and environmental problems has drawn interest from all over the world. Conversely, a lot of semiconductor materials have rapid recombination, which results in limited photo-catalytic activity even when they have a low band gap. <i>BiOX</i> has excellent features: (1) capacity to increase absorption in the visible light region (which makes up 43% of the solar spectrum); (2) high rate of separation of charge carriers formed by photogenerated light; (3) available tunable band gap for photodegradation of refractory pollutants.</p>
29.	<p><b>FORMULATION OF DUAL-FUNCTIONAL TERNARY Z-SCHEME C<sub>3</sub>N<sub>4</sub>/SNO<sub>2</sub>/CoFe<sub>2</sub>O<sub>4</sub> HETEROSTRUCTURE FOR PHOTOCATALYTIC</b></p>

## DEGRADATION AND FLUORESCENCE DETECTION OF HAZARDOUS POLLUTANTS

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Replicating photosynthesis process, an innovative dual Z-scheme  $C_3N_4/SnO_2/CoFe_2O_4$  heterostructures (CSnCo-1, CSnCo-0.5 and CSnCo-2) were fabricated for the photocatalytic degradation of anthracycline drug, doxorubicin (DXR) and aromatic compound, p-nitrophenol (PNP) and fluorescence detection of heavy metal ion,  $Hg^{2+}$ ; DXR and PNP. CSnCo-0.5 exhibited superior photocatalytic activity, with pseudo-first-order kinetics and rate constant values being 5.60, 3.02, 1.23, and 1.38 times higher for DXR, and 4.2, 3.0, 1.18, and 1.12 times higher for PNP, relative to CN, CSn-20, CSnCo-1, and CSnCo-2, respectively. UV-vis diffuse reflectance spectroscopy, and photoluminescence spectra validate the construction of a direct dual Z-scheme charge transfer pathway which enhances the photocatalytic efficacy of the system. Furthermore, CSnCo-0.5 demonstrated high selectivity and sensitivity for fluorescence detection of  $Hg^{2+}$ , DXR, and PNP, with detection limit reaching as low as  $0.57 \mu M$ ,  $0.05 \mu M$ , and  $0.63 \mu M$ , respectively. Moreover, the sensor delivered effective analytical results in authentic water samples.

## 30. EFFICIENT MERCURY ION ABATEMENT THROUGH HIGHLY POROUS CELLULOSE NANOFIBRILS COMBINED WITH MICROPOROUS ORGANIC POLYMER ENHANCEMENTS

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Pristine microporous organic polymer (p-MOP), owing to the presence of heteroatoms, has emerged as a significant platform for sensing and adsorption of heavy metal ions. The present work is a novel approach for developing highly porous hybrid architectures with trimesic acid and phenylene diamine-based p-MOP embedded over rice straw-derived cellulose nanofibers (ACNFs/MOP) for the sensing and remediation of mercury ions in the aqueous medium. The ACNFs/MOP were successfully characterized by various techniques, such as FTIR spectroscopy, BET surface area analysis, X-ray diffraction, XPS, HR-TEM, and TGA. The hybrid exhibited excellent porosity and crystallinity. The ACNFs/MOP hybrid was highly selective for Hg(II) ions, displaying substantial enhancement in fluorescence intensity with an LOD of  $3.927 \text{ nM}$  while also facilitating simultaneous adsorption. The adsorption showed a strong fit with pseudo-second-order kinetics and Langmuir isotherm models with an excellent adsorption capacity of  $416.18 \text{ mg g}^{-1}$ , attributed to electrostatic interactions, coordination surface complexation, and metal- $\pi$  interactions, as confirmed by XPS studies. Thermodynamic studies indicated an endothermic adsorption process. Box-Behnken Design-Response Surface methodology with Design Expert Software-13 was applied to model the process parameters. The hybrids were 97 % efficient even after five cycles of reusability, exhibiting their excellent potential for removing perilous Hg(II) ions from wastewater.

31.	<p><b>CARBON DOTS-BASED DUAL-EMISSION RATIOMETRIC FLUORESCENT SENSORS FOR FLUORESCENCE AND VISUAL DETECTION OF HYPOCHLORITE AND Cu<sup>2+</sup></b></p> <p><u>Tamanna Wadhawan</u><sup>1</sup>, S.K. Mehta<sup>1</sup>, Shweta Wadhawan<sup>2</sup>  <sup>1</sup>Department of Chemistry, Panjab University, Chandigarh, <sup>2</sup>Department of Chemistry, GGSDS College, Chandigarh.</p> <p>Carbon dots (CDs) with blue emission were synthesized by solvothermal method using hydroquinone and 5-aminoisphthalic acid as precursors. The strong oxidation of ClO<sup>-</sup> caused the fluorescence quenching of CDs at 405 nm, and synchronously generated a new emission peak at 500 nm. Furthermore, upon the addition of Cu<sup>2+</sup> to CDs-ClO<sup>-</sup> system, the green fluorescence at 500 nm was quenched, while the blue emission at 405 nm remained unchanged, due to the complexation between Cu<sup>2+</sup> and the amino group on the CDs surface. Meanwhile, the fluorescence color of system changed from blue to bright green and then to dark blue by sequentially increasing the concentrations of ClO<sup>-</sup> and Cu<sup>2+</sup>. The fluorescence signal of F500/F405 exhibited a linear relationship with the concentration of ClO<sup>-</sup> and Cu<sup>2+</sup> in a certain range, respectively. Thus, a ratiometric fluorescence sensor based on the obtained CDs were developed to sequentially detect ClO<sup>-</sup> and Cu<sup>2+</sup> with detection limits of 0.40 μM and 0.31 μM, respectively. Additionally, the CDs were mixed with polyvinyl alcohol hydrogel to form test strips, which were successfully used for visual detection of ClO<sup>-</sup> and Cu<sup>2+</sup>. Satisfactory results were also obtained in the analysis of ClO<sup>-</sup> and Cu<sup>2+</sup> in actual water samples.</p>
32.	<p><b>ALDOL-CLICK GENERATED SILANE: A TURN-ON FLUORESCENT SENSOR FOR Al<sup>3+</sup> ION AND EXPLORING ITS ANTI-ALZHEIMER ACTIVITY VIA MOLECULAR DOCKING</b></p> <p>Gurjaspreet Singh, <u>Tsering Diskit</u>  Department of Chemistry, Panjab University, Chandigarh.</p> <p>Alzheimer's disease (ad) is one of the leading neurodegenerative disorder whose cure is yet to be developed. Elevated levels of aluminium ion and acetylcholinesterase in brain tissue are main concern for progression of ad. Hence, both detection of aluminium ion and inhibition of acetylcholinesterase are important research areas that have gained attention. Aldol-generated chalcones and click-derived triazoles are among the emerging privileged scaffolds for selective and sensitive detection of metal ions and as promising pharmacological drugs. The present work focuses on design and development of 'chalcogenyl-based triazole coupled organosilane' that could selectively detect neurotoxic aluminium ion. The binding strength and ratio between the two was discovered from b-h plot and job's plot method respectively from fluorescent studies.</p>

	<p>Further linear calibration curve was utilized to calculate the limit of detection (Iod). The possible binding site of chemosensor for aluminium ion has been recognized from 1h nmr studies and dft calculations. Molecular docking, a computational approach was used to scrutinize the synthesized ‘chalcogenyl based triazole coupled organosilane’ as whether it could inhibit the activity of acetylcholinesterase and thus be further examined as potent pharmacological drug in treatment of ad.</p>
33.	<p><b>SYNTHESIS OF NEW L-PROLINE FUNCTIONALIZED TERPHENYL LIGAND: SPECTROSCOPIC AND COMPUTATIONAL INVESTIGATION OF BINDING INTERACTIONS WITH COBALT(II) CHLORIDE</b></p> <p><u>Vandana</u>, Mohit, Kamal Nain Singh, Amarjit Kaur, Gurjaspreet Singh <i>Chemistry Department, Panjab University, Chandigarh.</i></p> <p>A molecule having binding coordination with transition metal and metalloenzymes plays a crucial role in medicinal and industrial chemistry. Herein, we synthesize a new L-proline-based terphenyl ligand to investigate the binding interactions with cobalt(II) by spectroscopic and theoretical approach. The formulated compound has been well characterized by elemental analysis, NMR (<sup>1</sup>H and <sup>13</sup>C), FT-IR, Mass spectrometry. Moreover, the complete structure elucidation of synthesized L-proline-based terphenyl ligand was achieved via X-ray crystallography. The UV-visible spectroscopy and computational study reveals that the newly synthesized ligand confers a good binding response towards Cobalt(II) chloride as supported by calculated spectroscopic results. We hope that the present information can be utilized to develop new metal coordinated compounds acting as useful metallodrugs or competitive artificial metalloenzymes.</p>
34.	<p><b>VISIBLE LIGHT-INDUCED PHOTOCATALYSIS OF LIGNIN</b></p> <p><u>Vipan Singh</u> <i>Department of Chemistry, Panjab University, Chandigarh.</i></p> <p>Photocatalysis is a unique class of chemical transformation in which catalyst absorbs light, and transfer takes place in the form of electron and energy to the organic compounds. Lignin is a highly cross-linked aromatic. It is one of the most sustainable resource in nature for aromatic compounds. Lignin abundance in nature and its potential of providing high-value low-molecular weight aromatic compounds has made the controlled depolymerization of lignin is an intense focus for both industrial and academic research. In our work we tried the Photocatalysis of lignin by using DDQ. As we are using visible light and a Metal free photocatalyst, so our approach is economical as well as environment friendly.</p>
<p><b>Research Scholars from Colleges and other Institutions (JRF, SRF, Project Fellow and Post Docs)</b></p>	

35.	<p><b>HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY FOR COMPARATIVE CAPSAICIN PROFILING IN PEPPER FRUIT</b></p> <p><u>Neha</u>, Anupma Sharma, Ritesh Kumar, Rishemjit Kaur, Saurav Kumar, Amol P Bhondekar  <i>Central Scientific Instruments Organisation.</i></p> <p>Chilli Peppers and Bell Peppers are a part of the group of species <i>Capsicum annum</i>, where common bell peppers generally exhibit a sweeter flavor and aroma. Chili peppers are known for their pungent smell attributed to the capsaicinoids, particularly Capsaicin, which is responsible for the “spicy” flavor of the chillies. This alkaloid (capsaicinoid) compound, found in the capsicum family, activates heat sensitive receptors in the body causing a burning sensation. There are various varieties of chillies having varying amounts of capsaicin resulting in different levels of “spiciness”. Capsaicin has shown to have a positive effect in treatment of hypertension and heart diseases and in general spicy food has been associated with weight loss as per some recent studies. It has shown a potential for cancer prevention as capsaicin has antioxidant properties. In the present work, the distribution of capsaicinoids across the various parts of the capsicum fruit has been studied. An ultrasonic assisted extraction method has been used to extract the capsaicin from different parts of the pepper fruit enabling a comparative analysis of capsaicinoids concentration across various components of the capsicum fruit including-placenta, seed and pericarp. Identification and quantification of capsaicin in various parts has been done using High-Performance Liquid Chromatography (HPLC). Capsaicin standard (&gt;95% purity) has been used for the calibration (2.5-100 ppm) in HPLC.</p>
36.	<p><b>SELECTIVE SYNTHESIS OF OXYGENATED FUEL DERIVATIVE FROM MICROWAVE ASSISTED ACETALIZATION OF GLYCEROL</b></p> <p><u>Nidhi Yadav</u><sup>1</sup>, Gaurav Yadav<sup>2</sup>, Md Ahmaruzzaman<sup>3</sup>  <sup>1</sup>National Agrifood Biotechnology Institute, Mohali, <sup>2</sup>Panjab University Chandigarh, <sup>3</sup>National Institute of Technology Silchar, Assam.</p> <p>Glycerol contains 52 wt.% oxygen content, therefore unable to be directly used as fuel due to its poor combustion ability. Thus, the catalytic conversion of glycerol into various oxygen-containing fuel additives is grabbing more attention nowadays. This work provides a novel, sustainable, and eco-friendly method for synthesizing heterogeneous acid carbon catalysts from pearl millet cob (PMC) waste. The hydrothermal carbonization process was carried out at different temperatures to fabricate the series of sulfonated pearl millet cob (SPMC) catalysts. XRD, FT-IR, SEM-EDS, XPS, BET, TGA, and CHNSO analyses were performed to characterize fabricated catalysts. The synthesized catalyst, SPMC-70 (catalyst synthesized at 70 °C temperature), possesses OH, COOH, and SO<sub>3</sub>H functional groups and a significant total acid density (2.03 mmol/g) with 34 m<sup>2</sup>/g surface area. The SPMC catalysts were employed for the microwave-assisted acetalization reaction of glycerol with acetone for solketal</p>

	<p>production. The SPMC-70 catalyst showed the highest catalytic activity among all the synthesized catalysts and provided 99.11±0.3% GL conversion with 100 % selectivity of solketal under optimal reaction conditions. Additionally, the recyclability test was performed, and it found that the best catalyst was reusable for up to five reaction cycles. These results showed the effectiveness of carbon-based heterogeneous acid catalysts in deriving a fuel additive, solketal.</p>
37.	<p><b>RATIONAL DESIGN AND SYNTHESIS OF ISATIN-CHALCONE HYBRIDS INTEGRATED WITH 1H-1,2,3-TRIAZOLE: ANTI-PROLIFERATIVE PROFILING AND MOLECULAR DOCKING INSIGHTS</b></p> <p><u>Swati</u><sup>1</sup>, Shaveta<sup>2</sup>, Kewal Kumar<sup>1</sup>, Vipin Kumar<sup>3</sup>  <sup>1</sup><i>Department of Chemistry, Maharaja Ranjit Singh Punjab Technical University, Dabwali Road, Bathinda,</i> <sup>2</sup><i>Department of Chemistry, Baba Farid College, Muktsar Road, Bathinda,</i> <sup>3</sup><i>Department of Chemistry, Guru Nanak Dev University, Amritsar.</i></p> <p>In this study, a series of isatin-chalcone linked triazoles were synthesized using Cu-promoted Azide-Alkyne Cycloaddition (CuAAC) reaction and evaluated for their cytotoxicity against various cancer cell lines. The most potent compound displayed approximately 2.5 times greater activity compared to both reference compounds (5-florouracil and cis-platin) against ovarian cancer cell lines. These findings were supported by molecular docking analyses. Docking revealed comparable VEGFR-2 affinities for 5b and 5-FU but highlighted stronger interaction of 5b with EGFR, evident from its lower docking score. Overall, these results signify the notable anti-proliferative potential of most synthesized hybrids, notably emphasizing the efficacy of compound 5b in suppressing cancer cell growth.</p>
<b>UG/PG Students of Panjab University Campus and Regional Centres</b>	
38.	<p><b>APPLICATION OF BIOPLASTICS IN PHARMACEUTICALS INDUSTRY</b></p> <p><u>Aanvi</u>, Savita Chaudhary  <i>Department of Chemistry, Panjab University, Chandigarh.</i></p> <p>Bioplastics are gaining traction in the pharmaceutical industry due to their environmentally friendly properties and potential to enhance drug delivery systems. These sustainable materials, derived from renewable biomass sources such as plant starches, cellulose, and proteins, offer a biodegradable alternative to conventional petroleum-based plastics. Their application in pharmaceuticals primarily focuses on packaging, drug formulation, and controlled release systems. In packaging, bioplastics provide a safer and more sustainable option for storing medications, reducing the environmental impact associated with plastic waste. They can be engineered to possess barrier properties that protect sensitive drugs from moisture and oxygen, ensuring their stability and efficacy. Additionally, bioplastics can be used to create innovative drug</p>

	<p>delivery systems, such as nanoparticles and microspheres, that enable targeted and controlled release of therapeutic agents. This capability enhances the bioavailability of drugs and minimizes side effects, improving patient outcomes. Moreover, bioplastics can be designed to be compatible with various active pharmaceutical ingredients, allowing for the development of customized formulations tailored to specific therapeutic needs. As the pharmaceutical industry increasingly prioritizes sustainability, the integration of bioplastics into drug manufacturing and packaging processes presents a promising avenue for reducing environmental footprints. In conclusion, the application of bioplastics in the pharmaceutical industry not only addresses environmental concerns but also enhances drug delivery and patient safety. Continued research and development in this field may lead to more innovative solutions that align with the growing demand for sustainable practices in healthcare.</p>
39.	<p><b>GRAPHENE QUANTUM DOTS: A NEW FRONTIER IN NANOTECHNOLOGY</b></p> <p><u>Anshika Sharma</u>, Palani Natrajan  <i>Department of Chemistry, Panjab University, Chemistry.</i></p> <p>Graphene quantum dots are nanoscale fragments of graphene with size less than 100nm. they are chemically, physically stable gqds have garnered significant attention in various fields including electronics, photonics, biomedicine and energy storage owing to their versatile characteristics and potential applications. Functionalized gqds can detect various biomolecules, ions and environmental pollutants with high sensitivity. They are environment friendly and exhibit excellent bio-compatibility which further broadens their potential applications in diverse fields. The use of graphene quantum dots in disease treatment is an innovative and advanced approach in the fields of chemistry, material science and biology. Preclinical studies have shown promising results in using hybrid quantum dots for cancer treatment which warrants further extensive research to explore their therapeutic properties. However, it is important to address the safety concerns of hybrid quantum dots in cancer treatment to ensure they do not accumulate in healthy tissues and cause harm. Pharmacokinetic studies have revealed that different types of modified graphene quantum dots primarily accumulate in the liver, heart, lungs, spleen and kidneys. Application of gqds in biomedicine is essential to meet the growing demands in this field.</p>
40.	<p><b>HARNESSING WASTE: SOLID-STATE CARBON DOTS FROM PLASTICS AND THEIR ADVANCED APPLICATIONS</b></p> <p><u>Armaandeep Kaur</u>, Savita Chaudhary  <i>Department of Chemistry, Panjab University, Chandigarh.</i></p> <p>Despite of being integral part of modern life and offering undeniable benefits in terms of versatility, durability and functionality, plastics become global environmental challenge that is deeply affecting ecosystem and economy. Moreover, microplastics and larger plastic debris can disrupt habitats, alter food webs and even affect nutrient cycling in environment. Traditional disposal methods such as recycling, landfilling and incineration</p>

	<p>are proving inadequate due to their inefficiency. Beyond all these techniques, one promising avenue is utilization of plastic waste in production of high-valued advanced solid state carbon dots that not only mitigate negative impacts of plastics but also offers multifaceted applications such as energy storage devices, Chemosensors and light-emitting diodes. Thus, carbon-based nanomaterials addresses plastic pollution as well contribute to the development of sustainable, high-performance materials for future disciplines.</p>
41.	<p><b>AI AND QUANTUM COMPUTING FOR ADVANCED MATERIALS</b></p> <p><u>Dikshant</u> <i>SSB UICET, Panjab University, Chandigarh.</i></p> <p>AI and Quantum computing for Advanced materials Dikshant, mentor -Dr. Gaurav Verma In the evolving landscape of human civilization, the demand for new technologies and methodologies to sustain life is paramount Materials play a crucial role in this, and discovering the ideal materials for specific applications often requires testing billions of possibilities, which is time-consuming, resource-intensive, and inefficient. A transformative solution to this challenge lies in the integration of Artificial Intelligence (AI) with material science. Many companies developed databases like FAIR, MatterSim, and Genome which are revolutionizing material research. We can use these databases in research to run simulations in deep learning with the help of building neural networks and techniques like Transmission Electron Microscopy (TEM), Field Emission Scanning Electron Microscopy (FESEM), X-ray Diffraction (XRD), etc. Generative AI and core machine learning can replicate and predict new structures with the same structure characteristics. Deep learning analyzes the reaction and structure of material and the requirement of synthesis of new material; with this, we can predict new materials and properties without forming them in the lab, and it also filters out unavoidable materials. So, we can run lab test on only a few selected materials. This has a wide-scale application in industry and research laboratories. This can bring revolution to the world.</p>
42.	<p><b>BIOGENIC GROWTH OF MAGNETIC RETRIEVABLE <math>\text{Ca}_4\text{Fe}_9\text{O}_{17}</math> ANCHORED ON RICE HUSK BIOCHAR FOR METHYLENE BLUE DEGRADATION THROUGH PERSULFATE ACTIVATION</b></p> <p><u>Gurkaran Singh</u><sup>1</sup>, Gaurav Yadav<sup>1</sup>, Ramesh Kumar Sharma<sup>2</sup>, Ganga Ram Chaudhary<sup>2</sup> <i><sup>1</sup>Department of Chemistry, Centre of Advanced Studies in Chemistry, Panjab University, <sup>2</sup>Sophisticated Analytical Instrumentation Facility, Panjab University.</i></p> <p>The presence of dyes in wastewater gained significant attention due to rapid industrialization. Methylene blue is a common cationic dye used widely in the textile industry caused several problems due to its toxicity and persistence nature. Herein, we have successfully fabricated the <math>\text{Ca}_4\text{Fe}_9\text{O}_{17}</math>/Biochar (CFO-BC) nanocomposite by co-precipitation method for persulfate activation. The as-synthesized catalyst shows</p>



	<p>effective removal of methylene blue dye with 96.33% efficiency in just 40 min with a pseudo-first-order rate constant of <math>0.03547 \text{ min}^{-1}</math>. The catalyst was characterized by XRD, FTIR, HRTEM, BET, XPS, FESEM, and VSM. The average crystalline size and crystallinity of the CFO-BC nanocomposite were found to be 31.74 nm and 52.048 %, respectively. The mechanism of methylene blue degradation by CFOBC nanocomposite follows both the electron-transfer pathway and radical pathway as shown by the scavenging test. The scavenger study shows the presence of reactive species such as sulfate radical (<math>\text{SO}_4^{\cdot-}</math>), superoxide radical (<math>\text{O}_2^{\cdot-}</math>), and electron for the degradation of methylene blue dye. Moreover, the catalyst shows four-time reusability under optimum conditions, which demonstrates the potential use of this catalyst for further usage.</p>
43.	<p><b>CARBON DOT APPLICATION IN ENVIRONMENT REMEDIATION</b></p> <p><u>Kiran</u>, Savita Chaudhary  <i>Chemistry department, Panjab University, Chandigarh.</i></p> <p>Carbon dots (CDs) are emerging as a revolutionary class of nanomaterials with significant applications in environmental remediation. These carbon-based nanoparticles, typically ranging from 1 to 10 nanometers in size, exhibit unique optical and electronic properties that make them highly effective in addressing environmental pollutants. One of the primary applications of carbon dots is in the treatment of contaminated water and soil. Their ability to adsorb heavy metals and organic pollutants allows for efficient degradation and transformation into less harmful substances. The surface functionalization of carbon dots enhances their interaction with various contaminants, enabling them to effectively capture and remove pollutants from the environment. Additionally, carbon dots are biodegradable, which minimizes their ecological impact compared to traditional remediation methods. This characteristic makes them a more sustainable option for environmental cleanup efforts. Recent research also highlights the potential of carbon dots as sensors for detecting pollutants, providing real-time monitoring of water quality and environmental health. Their versatility and effectiveness position carbon dots as a promising solution for tackling pollution challenges, particularly in developing regions where traditional remediation techniques may be less feasible. In summary, the application of carbon dots in environmental remediation showcases their potential to contribute significantly to cleaner ecosystems. As research continues to advance, the integration of carbon dots into remediation strategies could lead to more efficient and environmentally friendly solutions for addressing pollution and promoting sustainable development.</p>
44.	<p><b>DESMURAMYL PEPTIDE (DMP): A POTENT NOD2 AGONIST FOR IMMUNOMODULATION</b></p> <p><u>Muskan Sabharwal</u><sup>1</sup>, Aarzo Kamboj<sup>1</sup>, Deepak B. Salunke<sup>2</sup>  <sup>1</sup><i>Department of Chemistry and Centre of Advanced Studies in Chemistry, Panjab</i></p>

*University, Chandigarh, <sup>2</sup>Department of Chemistry and Centre of Advanced Studies in Chemistry, Panjab University, Chandigarh, India National Interdisciplinary Centre of Vaccine, Immunotherapeutics and Antimicrobials, Panjab University, Chandigarh.*

Nucleotide-binding oligomerization domain 2 (NOD2) is a key pattern recognition receptor of the innate immune system that senses pathogen-derived bacterial infections via binding to peptidoglycan fragments like muramyl dipeptide (MDP). MDP, the smallest immunologically active portion of bacterial cell wall, and is a well-characterized vaccine adjuvant and protective agent against infections and cancer. The clinical use of MDP is hampered by poor pyrogenicity as well as rapid elimination and low oral bioavailability. These limitations have been addressed by the use of stable analogs such as Murabutide due to their increased stability and reduced toxicity. In addition, structure-activity relationship (SAR) studies have resulted in the development of Desmuramyl peptides (DMPs), molecules combining an optimized NOD2 agonist activity. DMP is a simplified derivative where the sugar portion (the muramyl group) is removed, leaving only the peptide backbone. This modification generally leads to enhanced stability and potentially altered immunological properties while retaining some of the beneficial immune-stimulating effects associated with MDP. Current strategies focus on creating new chemical derivatives of DMP platforms with desired NOD2 agonist potency. Here, we report on the synthesis of a DMP-derived compound currently under biological evaluation and aim to improve upon its immuno-stimulatory activity.

45. **DESIGNING WO<sub>3</sub> DOPED ZIF-67@ZIF-8 Z-SCHEME HETEROSTRUCTURES FOR ENHANCED PHOTOCATALYTIC ACTIVITY IN TETRACYCLINE DEGRADATION UNDER VISIBLE LIGHT**

Nishtha, Preeti Garg, Ganga Ram Chaudhary

*Department of Chemistry and Centre of Advanced Studies in Chemistry, Panjab University Chandigarh.*

The design of suitable catalyst is the bottleneck in the photo-catalytic reaction system. Herein, we constructed a Z-scheme heterojunction for antibiotic degradation under visible light irradiation. WO<sub>3</sub> nanostructures were synthesized via a co-precipitation method and then immobilized onto ZIF-67@ZIF-8 MOFs via hydrothermal process, resulting in a WO<sub>3</sub>@ZIF-67@ZIF-8 nanocomposite. The successful doping of WO<sub>3</sub> nanoparticles was confirmed through X-ray diffraction and Fourier transform infrared spectroscopy. FE-SEM and HR-TEM images revealed that WO<sub>3</sub> unevenly distributed across the surface and core of the hexagonal shape ZIF-67@ZIF-8. BET analysis demonstrated the microporous nature of the composite. The photocatalytic activity of WO<sub>3</sub>@ZIF-67@ZIF-8 was evaluated by assessing its ability to degrade tetracycline under visible light irradiation. The results showed a maximum degradation efficiency using 5 mg of the catalyst over 120 minutes, following first-order kinetics. Compared to ZIF-67@ZIF-8 and WO<sub>3</sub> NPs alone, the WO<sub>3</sub>@ZIF-67@ZIF-8 composite exhibited significantly enhanced degradation efficiency. Additionally, the catalyst demonstrated

	<p>excellent stability and recyclability, maintaining consistent degradation performance after four reuse cycles.</p>
46.	<p><b>GENERAL OVERVIEW OF GRAPHENE QUANTUM DOTS AND ITS APPLICATION</b></p> <p><u>Palak Banga</u>, Palani Natrajan  <i>Department of Chemistry, Panjab university, Chandigarh.</i></p> <p>Graphene quantum dots (GQDs) have been regarded as one kind of promising veterans in the field of disease treatment, which has emerged a novel research mode for interdisciplinary cooperation among chemistry and material science to biology. Preclinical evidence suggests hybrid quantum dots hold significant promise for cancer therapy necessitating further investigations into their therapeutic potential. But safety is a major factor, both in preventing them from collecting inadvertently on healthy tissues as well as accumulation throughout the body creating unexpected side effects. Biocompatible quantum dots have been used in many medical fields, including intracellular imaging, drug delivery, chemical sensing, disease treatment and tissue engineering. For example, in the form of targeted diagnostics to scan molecules within our bodies and then treated graphene quantum dots based on them are used for therapeutic applications or imaging. Common use of targeted GQDs include cancer treatment and drug delivery so as to prevent the healthy cells from being affected. In contrast, pharmacokinetic studies have suggested that various modified GQDs are mainly distributed in the liver, lungs and heart as well as to a lesser extent the spleen and kidneys which may not be enough for clearance.</p>
47.	<p><b>MOF ARCHITECTURE FOR ADVANCED POLLUTANT SENSING AND REMOVAL</b></p> <p><u>Raj Karan Singh</u>  <i>UICET, Panjab university, Chandigarh.</i></p> <p>With rapid economic development, the emergence of new materials bring convenience to people and are often considered to be as a boon but what people do not notice are the bane that it does not reflect but affect humans and wildlife residing and this in turn are termed as environmental pollution or Emerging contaminants [EC's]. The elimination of these environmental contaminants has been widely investigated by classic physical, chemical and biological approaches. MOF's often referred to as Metallo-Organic Frameworks are a class of porous polymers consisting of clusters of organic ligands that are bonded together by single/multiple coordinate bonds. MOFs, over the recent years, have attracted a great deal of interest when it comes to environmental pollution control because of their unique crystalline property, thermal stability, freely adjustable structure per requirements, surface area, and versatility have led to their numerous industrial application namely-metal sensing, high storage devices, wastewater treatment, biosensing and much more. MOF's greatest advantage over other materials like carbon</p>

	<p>and zeolites is its versatility in terms of structure, which can be changed according to one's needs. Further elaborating there exist a wide variety of MOF's which are made using conventional and unconventional techniques since 1990, MOF's have opened a new corridor of adsorbent technology which may help us with our previously existing and to be discovered environmental problems and may also be Noah's ark in suppressing such problems.</p>
48.	<p><b>EFFICIENT SCALE UP OF 2-BUTYL-2H-PYRAZOLO[3,4-C] QUINOLIN-4-AMINE: A POTENT TLR7/8 AGONIST</b></p> <p>Deepak B.Salunke, <u>Riya</u>  <i>Department Of Chemistry, Panjab University, Chandigarh.</i></p> <p>Toll-like receptor (tlr) 7 and 8 agonists are promising candidates for vaccine adjuvants, as they directly activate antigen-presenting cells (apcs) and enhance th1-driven immune responses. In this study, we synthesized 2-butyl-2h-pyrazolo[3,4-c]quinolin-4-amine, a potent tlr7/8 agonist. Its ability to induce ifn-<math>\alpha</math> and other pro-inflammatory cytokines in human peripheral blood mononuclear cells (hpbmcs) highlights its potential as a vaccine adjuvant. Specifically, it has an ec50 value of 0.19 <math>\mu\text{m}</math> for tlr7 and ec50 of 0.056 <math>\mu\text{m}</math> for tlr8. With its exceptional potency and selectivity for tlr7 and tlr8, it presents a strong candidate for further development in immunotherapeutic applications. We planned to create derivatives through structural modifications, enhance its potency via alum adsorption, and explore conjugation with other tlr agonists.</p>
49.	<p><b>DESIGN AND SYNTHESIS 1-(3-BROMOBENZYL)-2-BUTYL-1H-IMIDAZO[4,5-C]QUINOLIN-4-AMINE TO MODULATE TOLL LIKE RECEPTOR-7 AGONISTIC ACTIVITY AND ADJUVANTICITY</b></p> <p><u>Simran Kaur</u>, Kushvinder Kumar, Deepak B.Salunke  <i>Department of Chemistry and Centre of Advanced Studies in Chemistry, Panjab University, Chandigarh.</i></p> <p>TLR-7/8 agonists are a well-known class of vaccine adjuvants, with a leading example now included in Covaxin, a licensed human COVID-19 vaccine. This thereby provides the opportunity to develop newer, more potent adjuvants based on structure–function studies of these classes of compounds. Among the various TLRs, TLR7/8 recognize the viral-sRNA, and are also activated by various synthetic small molecules like imiquimod, resiquimod, and 1-benzyl-2-butyl-1H-imidazo[4,5-c]quinolin-4-amine (BBIQ) and BBIQ was reported to be a highly active TLR7 agonist, more potent than imiquimod and had vaccine adjuvant activity as immunotherapeutic agents in malaria as well as leishmania infection models. In the present work, following a similar synthetic route, we prepared new derivative of BBIQ i.e. 1-(3-bromobenzyl)-2-butyl-1H-imidazo[4,5-c]quinolin-4-amine.</p>

50.	<p><b>TOOLS FOR IDENTIFYING, EXTRACTION AND CHARACTERIZING MICROPLASTIC POLLUTION</b></p> <p><u>Srishti Mangla</u><sup>1</sup>, Bunty Sharma<sup>2</sup>, Ganga Ram Chaudhary<sup>1</sup>  <sup>1</sup><i>Department of Chemistry, Panjab University, Chandigarh,</i> <sup>2</sup><i>SAIF/CIL, Panjab University, Chandigarh.</i></p> <p>In today's world, plastic is integral to our daily lives. However, through various physical, chemical, and biological processes, larger plastic items degrade into microplastics, which have emerged as significant pollutants affecting both human and animal health. Microplastics infiltrate common sources such as drinking water, seafood, and salt, constituting a major component of marine debris. They can carry toxic effects, leading to health issues such as cancer, respiratory problems, cardiovascular diseases, and inflammatory conditions. The situation is exacerbated by the absence of reliable and precise sampling techniques, making it essential to address microplastic pollution. Several analytical techniques have been developed for the extraction and identification of microplastics. Density separation is the most common and straightforward method for recovering microplastics from environmental samples. Electrostatic separation is another effective approach, particularly for removing microplastics mixed with organic materials. Magnetic separation utilizes magnetic fields to extract microplastics, employing magnetic sorbents with strong properties for efficient removal. Other methods include membrane technology, oil separation, and elutriation. For identification, various analytical techniques are employed. Fourier-transform infrared spectroscopy (FT-IR) effectively determines the polymer composition of microplastics, as distinct functional groups and chemical bonds generate unique spectral patterns. Raman spectroscopy is notable for its specificity and versatility, allowing the detection of particles smaller than 10 μm, along with variations in size, shape, and color. Additionally, Laser Direct Infrared (LDIR) imaging techniques are emerging as effective methods for analyzing microplastics. Overall we have summarize the identification, separation and charactering tool for microplastic.</p>
<b>UG/PG Students from Colleges and Other Institutions</b>	
51.	<p><b>NANOTECHNOLOGY IN MEDICINES</b></p> <p><u>Anupriya Verma</u>, Kirandish Kaur, Amandeep Kaur  <i>Guru Nanak College, Sri Muktsar Sahib, Punjab.</i></p> <p>Nanotechnology involves manipulating matter at the atomic or molecular scale, typically 100 nanometers or smaller. Nanotechnology has many potential applications in medicine. Current applications of nanotechnology in medicines offer ways of promising drug transportation and address the issues of lack of targeting and permeability of</p>

	<p>traditional drugs. The physical and chemical properties in the domain of nanomedicine applications are wonderful. The new progresses of different kinds of nanomedicines (including gold nanoparticles, nanorobots, black phosphorus nanoparticles, brain diseases, gene editing and immunotherapy etc) in anti-tumor, antibacterial, ocular diseases and arteriosclerosis in recent years are discovered.</p>
52.	<p><b>STERIODS AND THEIR EFFECT ON HUMAN BODY</b></p> <p><u>Anurag Singh</u>, Kirandish Kaur, Anita Rani <i>Guru Nanak Collage, Sri Muktsar Sahib, Punjab.</i></p> <p>Steroids, a class of organic compounds characterized by a four-ring carbon structure, exert profound effects on the human body through their role as hormones. This paper examines the biochemical mechanisms by which anabolic steroids influence muscle growth, protein synthesis, and metabolic processes. By binding to specific androgen receptors, these compounds activate gene expression, leading to enhanced muscle hypertrophy and increased strength. Additionally, the paper discusses the pharmacokinetics of steroids, including absorption, distribution, metabolism, and excretion, highlighting their anabolic versus catabolic effects. The implications of steroid use, both therapeutic and illicit, are analysed in the context of health risks and ethical considerations in sports and medicine, emphasizing the need for a nuanced understanding of their chemical nature and physiological impact.</p>
53.	<p><b>GREEN CHEMISTRY FOR ENVIRONMENTAL SUSTAINABILITY</b></p> <p><u>Devika</u>, Kirandish Kaur, Anita Rani <i>Guru Nanak College, Sri Muktsar Sahib, Punjab.</i></p> <p>Green chemistry is a transformative paradigm that seeks to optimize chemical processes and product design for enhanced environmental sustainability. This paper examines the twelve principles of green chemistry, focusing on strategies to minimize hazardous substance use, reduce waste, and improve energy efficiency. We analyze case studies illustrating the implementation of green methodologies in sectors such as pharmaceuticals, agrochemicals, and materials science, highlighting innovations that utilize renewable feedstocks and benign solvents. Additionally, we explore the role of catalysis and reaction optimization in reducing the environmental footprint of chemical processes. By emphasizing the integration of green chemistry principles into industrial practices and research initiatives, this study underscores the potential for sustainable chemical practices to mitigate pollution, conserve resources, and contribute to a circular economy, ultimately advancing global sustainability goa.</p>
54.	<p><b>FORENSIC CHEMISTRY AT CRIME SCENE</b></p> <p><u>Palak</u>, Kirandish Kaur, Rippandeep Kaur, Amandeep Kaur <i>Guru Nanak College, Sri Muktsar Sahib, Punjab.</i></p>

	<p>Forensic chemistry is applied chemistry in a legal environment. Experts in this field have a wide range of methods and instruments to help identify unknown substances. The range of different methods is important because of the destructive nature of some instruments and the number of possible unknown substances that can be found at the scene. The chemical and physical expertise covers the widest area of work by using a number of instrumental methods of analysis in their work. Developed methods can analyze a variety of materials including pigments, glass, building materials, soils, minerals, metals, metal alloys and their corrosion products, organic and bioinorganic materials.</p>
55.	<p><b>ROLE OF CARBON SEQUESTRATION IN CLIMATE CHANGE</b></p> <p><u>Ravinderpal Singh</u><sup>1</sup>, Kirandish Kaur<sup>1</sup>, Rippandeep Kaur<sup>1</sup>, Amandeep Kaur<sup>1</sup>  <sup>1</sup> <i>Guru Nanak College Sri Muktsar Sahib, Punjab.</i></p> <p>Carbon sequestration plays a vital role in mitigating climate change by capturing and storing carbon dioxide (CO<sub>2</sub>) from the atmosphere, thereby reducing greenhouse gas emissions. We will discuss carbon sequestration, its significance, strategies, and potential environmental benefits. Firstly, the importance of carbon sequestration as a solution to the growing challenge of global warming. There is urgent need to address rising CO<sub>2</sub> levels which effects climate change, ecosystems, human health, and the economy. We will discuss sequestration strategies, natural carbon sinks such as forests, wetlands, and agricultural lands. Additionally, our study covers the emerging field of technological carbon capture and storage (CCS), the potential environmental benefits associated with carbon sequestration efforts. The study emphasizes the restoration and preservation of ecosystems, including reforestation and afforestation initiatives, as effective means to acknowledges the co-benefits of carbon sequestration.</p>

# Dental Sciences

- Dr. Harvansh Singh Judge Institute of Dental Sciences & Hospital

**CO-ORDINATORS**

*Sectional President*

**Dr. Vishakha Grover**

**9814277780**

*Sectional Secretary*

**Dr. Jyoti Sharma**

**9780031383**



**CHASCON 2024**  
**NATIONAL CONFERENCE ON**  
**“Indigenous Technologies for Viksit Bharat”**  
**SECTION: DENTAL SCIENCES**

**Program (November 07, 2024)**  
**Venue: Dr. HSJIDS, Panjab University, Sector-25, Chandigarh**

Sectional President Dr. Vishakha Grover 9814277780		Sectional Secretary Dr. Jyoti Sharma 9780031383	
Time	Program		
09:15-09:45	Poster Presentation <i>Venue:</i> Lecture Theatre 1, Dr. HSJIDS, Panjab University, Chandigarh		
09:45-10:00	Inauguration of Sectional Program <i>Venue:</i> Lecture Theatre 1, Dr. HSJIDS, Panjab University, Chandigarh		
10:00-10:45	<b>Session Chair:</b> Dr. Deepak Kumar Gupta <b>Speaker:</b> Dr. Varinder Garg Prinicpal Investigator of ICMR-CIBioD, PGIMER, Chandigarh. <i>“Innovation for affordable healthcare”</i> <i>Venue:</i> Lecture Theatre 1, Dr. HSJIDS, Panjab University, Chandigarh		
10:45-11:30	<b>Session Chair:</b> Dr. Shefali Singla <b>Speaker:</b> Dr. Vikas Aggarwal <i>“Hit the Bullseye-Mastering occlusion with Digital Analysis”</i> <i>Venue:</i> Lecture Theatre 1, Dr. HSJIDS, Panjab University, Chandigarh		
11:30-12:00	Tea Break (DHSJIDS)		
12:00-1:00	Oral Presentations (PG) <i>Venue:</i> PG Seminar Room, Dept. of Periodontics		
1:00-2:00	Lunch		
2:00-3:00	Oral Presentations (UG) <i>Venue:</i> PG Seminar Room, Dept. of Periodontics		
3:00- 3:15	Tea break		
3:15-4:45	Oral Presentations (Faculty) <i>Venue:</i> Committee Room		

## KEY SPEAKER

S.No.	Name of Participant	Affiliating Institution	Title of Abstract
1.	Dr. Vikas Aggarwal	Director, International Center Of Dental Excellence (ICODE), New Delhi.	Development of Wound Healing Herbal Formulation.
2.	Dr. Virender Garg	OSD to President, Principle Investigator, ICMR-CIBioD Project at PGIMER, Chandigarh.	Bio-flavonoids: Natural compounds with promising therapeutic potential for pancreatic cancer.

# HIT THE BULLSEYE- MASTERING OCCLUSION WITH DIGITAL ANALYSIS



DR VIKAS AGGARWAL

Director, International Center of  
Dental Excellence (ICODE), New  
Delhi.

## ABSTRACT

Occlusion understanding and its management has been an enigma for dentist around the world, because of unique design of Mandible, TMJ, Biomechanics, Neuro Anatomy, and function of Teeth and Jaws, in the absence of instruments for biometric analysis and its understanding, Diagnosis and management of occlusion becomes more of guess work. This leads to confusion and difference of opinion among clinician in multidisciplinary dental treatment approach. A thorough understanding of Digital occlusal analysis, helps dentists make better diagnosis, a better treatment plan and a better prognosis.

# INNOVATION FOR AFFORDABLE HEALTHCARE



**DR. VIRENDER GARG**

OSD to President, Principle  
Investigator, ICMR-CIBioD Project  
at PGIMER, Chandigarh.

## **ABSTRACT**

In the economic reality of a developing country, cheaper drugs and low priced healthcare infrastructure models can work wonders. India's research engine is now driving a new model of innovation that draws on the philosophy of affordable access. The lecture shall highlight India's contribution to affordable healthcare beyond being pharmacy of the world. Latest government initiatives and innovations at national level will also be discussed.

ABSTRACTS OF  
ORAL  
PRESENTATIONS

<b>Oral Presentations – Dental Sciences</b>			
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
1.	Dr. Amandeep Kaur	Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Regenerative endodontics.
2.	Dr. Amandeep Singh Uppal	Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Digital design smiling.
3.	Dr. Amrita Rawla	Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Artificial intelligence: The changing face in dental healthcare.
4.	Dr. Gurparkash Singh Chahal	Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Fractured abutment screw retrieval: A case report.
5.	Dr. Manjot Kaur	Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Ergonomics in dentistry.
6.	Dr. Rose Kanwaljeet Kaur	Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Oral health and Psoriasis.
7.	Dr. Ruchi Singla	Dr Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Tiny tools, big impact: Micro robotics in endodontics.
8.	Dr. Suruchi Aditya	Dr Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Perceived stress amongst undergraduate dental students: A cross-sectional study.
9.	Dr. Swaty Jhamb	Dr. Harvansh Singh Judge	Compression dome concept: The new dawn.

		Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	
10.	Dr. Vandana Gupta	Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Cryosurgery for oral lesions.
<b>Faculty/Scientists from Colleges and other Institutions</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institutions</b>	<b>Title of Abstract</b>
11.	Dr. Mandeep Kaur Bhullar	M.M. Mullana Dental College and Hospital, Ambala, Haryana.	Psychological factors and oral health related quality of life.
<b>UG/PG Students of Panjab University Campus and Regional Centres.</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
12.	Dr. Aarushi Sharma	Dr Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	From prevention to preservation: Indian innovations in dental health.
13.	Dr. Charvi Raheja	Dr Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Thermography as a recent advancement in field of dentistry.
14.	Dr. Divya Sood	Dr Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Indian-origin bone grafts: Innovations and emerging technologies.
15.	Mr. Gautam Saini	Dr Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Next-generation sequencing (NGS) applications in precision dentistry: Unravelling genetic insights for improved oral health care.
16.	Dr. Kulbir Kaur	Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Revolutionizing dentistry: The role of AI in diagnostics, treatment, and patient care.
17.	Dr. Mallika Mangal	Dr Harvansh Singh Judge Institute of Dental Sciences	Metal ion release of titanium and titanium alloys implants using

		and Hospital, Panjab University, Chandigarh.	dissimilar abutment material: A systematic review.
18.	Ms. Manjot Kaur	Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Exosomes in dentistry: Unlocking potential for diagnostics, therapeutics, and regenerative medicine.
19.	Dr. Muskaan Sarwal	Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Microneedling as an emerging non-invasive technique along with adjunctive agents in the management of mucogingival conditions and deformities: A systematic review.
20.	Dr. Nidhi Aggarwal	Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Artificial intelligence in Periodontics.
21.	Ms. Nishita	Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Digital smile designing: Applications of artificial intelligence.
22.	Dr. Pridhi Garg	Dr Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Genetic insights into the co-occurrence of diabetes mellitus: A scoping review.
23.	Ms. Prisha Aggarwal	Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	T scan - digital occlusion analysis.
24.	Ms. Ritika Khurana	Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Transforming smiles: The role of augmented reality in modern dentistry.
25.	Dr. Sangeeta Gupta	Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Magnification in dentistry.
26.	Dr. Shreya	Dr Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Beyond the prescription: Responsible antibiotic use in dentistry.



<b>Abstract File</b>	
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>	
S.No	Abstract
1.	<p><b>REGENERATIVE ENDODONTICS</b></p> <p><u>Amandeep Kaur</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Millions of teeth are saved each year by root canal therapy. Although current treatment modalities offer high level of success for many conditions, an ideal form of therapy might consist of regenerative approaches in which diseased or necrotic pulp tissue are removed and replaced with healthy pulp tissue to revitalize teeth. So, this paper will present an overview of Regenerative endodontics which is the creation and delivery of tissue to replace diseased, missing and traumatised pulp.</p>
2.	<p><b>DIGITAL SMILE DESIGNING</b></p> <p><u>Amandeep Singh Uppal</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>One of the important ways of social interaction is through verbal and nonverbal communication. The human face is capable of eliciting multi-response according to the situation; amongst them, a smile plays a significant effect in relaying a positive communication that can immensely influence societal outcomes. An important part of dental treatment is to restore the tooth to functionality and to aesthetically rehabilitate it, which forms the core of aesthetic dentistry. Modern advancements have led us to various aesthetic treatment options. Recently, due to the boom of information technology, we are progressing into the digital age where everything has almost been made through computers and the internet. In the dental field, advanced software is being used to modify and create smiles, thereby completely revolutionizing aesthetic dentistry. Digital smile design is a recently introduced concept and software which analyses the smile of an individual through various input scanners and photographs. They provide a plethora of solutions and predictions as to how the smile can be designed, to the point it can pinpoint minor corrections. So, this presentation brings to you the importance of smiles and the analysis using digital smile design.</p>
3.	<p><b>ARTIFICIAL INTELLIGENCE: THE CHANGING FACE IN DENTAL HEALTHCARE</b></p> <p><u>Amrita Rawla</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab</i></p>

	<p><i>University, Chandigarh.</i></p> <p>Artificial Intelligence (AI) refers to evolving technology that tries to simulate human intelligence using computers and machines. AI requires specialized software for programming languages and training machine learning algorithms. Its advancement in machine learning and deep learning (which are subsets of AI) in particular are creating a major shift in healthcare. We are able to use applications of Convolutional Neural network (CNN) and Artificial Neural network (ANN) in almost all major specialities in dental practice. With the advent of Generative Artificial Intelligence (GAI), we will be able to transform the entire dental and medical healthcare. Personalized simulations are possible with Generative Artificial Intelligence (GAI) tools, and soon with this we will be able to revolutionise the entire dental and medical health care. With AI advancement we will be able to present a realistic 3D model of organs, detect diseases at cellular level, predict personalised genomics and diseases at risk. The seamless integration of AI into clinical workflow and practice maybe a boon but it also faces certain challenges, majorly because of data privacy and security issues. Thus, AI holds a promising future, if done with a balancing act of innovation and ethics. In this presentation, I am highlighting the major changes that can be brought about with the help of artificial intelligence tools in healthcare system.</p>
4.	<p><b>FRACTURED ABUTMENT SCREW RETRIEVAL: A CASE REPORT</b></p> <p><u>Gurparkash Singh Chahal</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>A 39-year-old patient reported to our department with the chief complaint of loose prosthesis with respect to implant placed with respect to 36, 37 regions. The implant was placed 1 year ago and the second stage surgery and subsequent prosthetic work completed 6 months ago. Upon clinical and radiographic evaluation abutment screw was found to be fractured in the lower third of the implant with respect to 37 regions. The broken abutment screw was retrieved non surgically and a traumatically by using the Osstem ESR kit. The abutment screw was replaced with a new one and the prosthesis given again.</p>
5.	<p><b>ERGONOMICS IN DENTISTRY</b></p> <p><u>Manjot Kaur</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Nature of the dental profession and postures assumed by dental surgeons during their professional work has an enormous effect on their body. Dentists nowadays are becoming more prone to musculoskeletal disorders. A well-adapted design of the workplace is a basic requirement for maintaining musculoskeletal health that will in turn enhance work efficiency. The prevalence of work-related Musculoskeletal Disorders (MSDs) in dentists is increasing day by day. Dental practitioners have to work with instruments, equipment and working postures that does not fit the required way of working and/or individual characteristics. The ergonomic limitations play a</p>

	<p>distinct role in such musculoskeletal injuries. Application of Ergonomic principles in the design of work systems is the key to prevent occupational injury. Ergonomics draws on a number of scientific disciplines, including physiology, biomechanics, psychology, anthropometry and kinesiology. This presentation discusses the various methods to stabilize the dental operator to allow the operator to work with comfort, efficiency, and ease.</p>
6.	<p><b>ORAL HEALTH AND PSORIASIS</b></p> <p><u>Rose Kanwaljeet Kaur</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Psoriasis is a common multisystem chronic inflammatory disease with predominantly skin and joint manifestations. Psoriasis is classified clinically into several types such as plaque type (also known as psoriasis vulgaris), inverse, erythrodermic, pustular, guttate, psoriatic onychodystrophy and psoriatic arthritis. The plaque type is the most common form of the disease affecting up to 90% of the cases. It is characterized by erythematous papules covered by silvery scales, that gradually enlarge at the periphery, forming plaques. Elbows, knees, sacral territory, and scalp are usually affected. The dermatological and joint manifestations of the disease are well documented but whether psoriasis has oral manifestations remains a subject of controversy. It is now well accepted that some patients with psoriasis manifest oral lesions synchronous with their skin disease, and that some oral manifestations share similar histopathological features with their cutaneous counterpart, plus follow a clinical course parallel with the cutaneous disease. This narrative review aims to provide a comprehensive overview of the current understanding of the relationship between psoriasis and oral health.</p>
7.	<p><b>TINY TOOLS, BIG IMPACT: MICRO ROBOTICS IN ENDODONTICS</b></p> <p><u>Ruchi Singla</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Micro robotics is revolutionizing the field of endodontics by offering a highly precise, minimally invasive approach to complex dental procedures such as root canal treatments. Traditional, endodontic methods rely heavily on manual dexterity and conventional tools, often leading to challenges in accessing intricate root canal systems and achieving optimal cleaning and shaping of the canals. However, with the advent of micro robotics, these challenges are being overcome by enhancing accuracy and control during procedures. Microrobots, equipped with advanced sensors and navigation systems, are designed to operate in the confined spaces of root canals, performing tasks such as debridement, irrigation, and even targeted delivery of therapeutic agents. These robots can reach difficult-to-access areas with ease, reducing the risk of human error and improving the overall success rate of endodontic treatments. Additionally, their ability to perform minimally invasive operations reduces patient discomfort, recovery time, and the risk of complications, marking a</p>

	<p>significant advancement in patient care. This emerging technology also holds promise for reducing procedure times and enhancing the efficiency of dental clinics. As research in this field progresses, the integration of micro robotics into endodontics may soon become a standard practice, leading to improved outcomes in dental care. This presentation includes the design, functionality, and clinical applications of micro robotics in endodontics, highlighting the transformative potential of this technology in modern dental practices.</p>
8.	<p><b>PERCEIVED STRESS AMONGST UNDERGRADUATE DENTAL STUDENTS: A CROSS-SECTIONAL STUDY</b></p> <p><u>Suruchi Aditya</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>The Objective of the study is to assess the sources and consequences of stress, and the coping strategies adopted by undergraduate dental students. Materials and methods: This was a cross-sectional, descriptive study using a modified Dental Environment Stress questionnaire exploring demographic data, the prevalence of, forms of stress (using a Likert-type rating scale), and means adopted to reduce stress in dental students. The tool was pre-tested and validity and reliability were ensured. The Informed Consent form was filled by the participants. The questionnaire was filled out anonymously by students undergoing internship at Dr Harvansh Singh Judge Institute of Dental Sciences, Chandigarh and the data collected was analysed statistically. Results: 84 undergraduate dental students undergoing internship participated in the study. The most common sources of academic stress were examinations (62%), amount of work assigned in coursework (56%), uncertainty of future career prospects (54%), fear of being unable to catch up if falling behind (52%) and inadequate time for relaxation (46%). The most common effects of stress were fatigue, eye strain, sleep disturbances, and feelings of anxiety. The coping mechanisms adopted to decrease stress were listening to music, watching the internet/movies, sleeping, and getting support from friends and family. Conclusion: The study highlights the importance of promoting the psychosocial well-being of students by giving them a positive learning environment and stress management education.</p>
9.	<p><b>COMPRESSION DOME CONCEPT: THE NEW DAWN</b></p> <p><u>Swaty Jhamb</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Tooth structure comprises enamel, dentin, cementum, and pulp. The Enamel is the hardest known substance in the human body, and it safeguards the inner dentin from the deleterious forces. Our teeth were originally designed to sustain the vertical compression forces, which when subjected to tension, undergo crack propagation with eventual pain, fracture, and depletion of tooth structure. The current knowledge of the</p>

	<p>tooth microanatomy in concurrence with diagnostic and restorative advancements has revolutionized dentistry to achieve healthy tooth form both functionally and biomechanically. The dental professional strives to imitate the naturally intact tooth for its intricacies. Dentists have been designing full coverage restorations for severely mutilated and root canal treated teeth but evidence now supports that just like the dome of a cathedral, tooth is shaped like compression dome. The functional zones on a tooth are the “Bio Dome” and “Bio Rim.” The Biodome is the coronal half of the compression dome and the cervical half of the tooth below the contact area that supports the coronal compression dome is being called the Bio-Rim. The paper highlights the newer concept of restoration of badly mutilated teeth.</p>
10.	<p><b>CRYOSURGERY FOR ORAL LESIONS</b></p> <p><u>Vandana Chhabra</u>, Vandana Gupta  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Cryosurgery is the deliberate destruction of tissue by application of extreme cold. The basic technique of cryotherapy stresses rapid cooling, slow thawing and repetition of the freezing process to maximize tissue destruction. Oral mucosal lesions are usually categorized into surface lesions generally involving the epithelium and superficial connective tissue of mucosa. In the treatment of oral mucosal lesions, surgical modality is considered as golden standard. There is still a need for evolution of atraumatic bloodless procedure, which could give, same or better results than surgical modality. Cryosurgery is well received by patients due to the absence of bleeding and minimal to no scarring. Clinical advantages include the ease of application, preservation of inorganic structure of bone, and very low incidence of infection. It can be repeated without permanent side effects and is more localized in action than radiotherapy or chemotherapy. Useful in candidates for whom surgery is contraindicated due to either age or medical history.</p>
<p><b>Faculty/Scientists from Colleges and other Institutions</b></p>	
S.No	Abstract
11.	<p><b>PSYCHOLOGICAL FACTORS AND ORAL HEALTH RELATED QUALITY OF LIFE</b></p> <p><u>Mandeep Kaur Bhullar</u>  <i>M.M. Mullana Dental College and Hospital, Ambala, Haryana.</i></p> <p>The orthodontist should include the psychological dimension in their overall assessment when undertaking patients for orthodontic treatment. Adolescents with commonly occurring forms of malocclusion often are presumed to be at risk for negative self-esteem and social maladjustment. Much of the orthodontic treatment that is undertaken is to improve psychological well-being and OHRQoL. With this aim in mind a study was conducted to relate the psychological factors such as Self-esteem and OHRQoL in patients seeking orthodontic treatment and the correlation of the four</p>

domains of OHRQoL to each other. The study was conducted on 60 patients 32 males and 28 females in the age range 11-15 years with a mean age of 13.22+/-1.26 seeking orthodontic treatment. The instruments used to evaluate Self-esteem were Rosenberg's self-esteem scale and for OHRQoL was Child perception questionnaire (CPQ). The data thus collected was used to relate the Self-esteem and OHRQoL of the patient and evaluate correlations of all four domains of OHRQoL to each other. Analysis was conducted using IBM SPSS STATISTICS version 22.0. The results of the study showed a high degree of negative correlation between Self-esteem and OHRQoL as depicted by a Spearman's Rho correlation coefficient of -0.798. The results show that all the factors of OHRQoL are related and affect the psychosocial aspects of the patient. A careful study of patient's psychological wellbeing before starting the orthodontic treatment gives insight about the patient's self-esteem and body image, patient's motivation and cooperation during treat.

**UG/PG Students of Panjab University Campus and Regional Centres**

<b>S.No</b>	<b>Abstract</b>
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12.	<p><b>FROM PREVENTION TO PRESERVATION: INDIAN INNOVATIONS IN DENTAL HEALTH</b></p> <p><u>Aarushi Sharma</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>"The strength of Indian innovation lies in its ability to marry the wisdom of our ancestors with the demands of the future." – N. R. Narayana Murthy 'CHASCON 2024' focuses on the theme "Indigenous Technologies for Viksit Bharat" and motivates the workforce towards the building of a self-reliant India. Including Indian Dental Innovations under this banner is a must as India continues to rise as a key player in global dentistry, combining its rich heritage with modern innovation to improve oral health worldwide. The presentation invites attendees to embark on two intertwined journeys: the path of Indian indigenous development in dentistry and the journey of a tooth from saving to replacing. It explores how traditional Indian practices and innovations work hand-in-hand to preserve dental health, from efforts to prevent and preserve teeth to effectively filling cavities and ultimately replacing extracted teeth with regeneration techniques and advanced implants. The session highlights 'Viksit Bharat' through a series of real-world case studies showcasing successful dental practices that make India unique and how supporting such ideas can result in superior patient outcomes. These outcomes include early diagnosis, easier and healthier prevention, less treatment cost and better compliance. The presentation ends highlighting India's high incidence of oral cancer and the indigenous practices combined with modern screening technologies that are pivotal in addressing this crisis.</p>
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13.	<p><b>THERMOGRAPHY AS A RECENT ADVANCEMENT IN FIELD OF DENTISTRY</b></p> <p><u>Charvi Raheja</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Thermography is a non-invasive imaging technique that detects infrared radiation emitted from the skin's surface, creating thermal images that reveal temperature variations. In dentistry, thermography has emerged as a promising indigenous technology for Viksit Bharat (Developed India), aligning with the vision of self-reliance and healthcare advancements. It serves as a diagnostic tool to assess conditions related to inflammation, vascular changes, and nerve injuries. Thermography can help detect dental issues such as pulpitis, periodontitis, and temporomandibular joint disorders (TMD). For example, in cases of pulpitis, inflamed pulpal tissues exhibit increased local temperature, which can be identified through thermal imaging. Similarly, temperature asymmetries around the temporomandibular joint can indicate inflammation or dysfunction. Thermography also has applications in assessing nerve injuries caused by maxillofacial trauma. It detects changes in skin temperature that reflect disruptions in sympathetic nerve control and blood flow, making it useful for evaluating the extent of infraorbital or other nerve injuries and monitoring recovery. The technique's advantage lies in providing a non-invasive, radiation-free assessment of physiological changes in real-time. While studies indicate that thermography can effectively detect acute inflammation or vascular changes, further research is needed to confirm its reliability in predicting outcomes or monitoring nerve recovery. As an indigenous innovation, thermography presents significant potential to enhance diagnostic capabilities in dentistry, supporting early diagnosis, treatment planning, and India's journey towards healthcare excellence.</p>
14.	<p><b>INDIAN-ORIGIN BONE GRAFTS: INNOVATIONS AND EMERGING TECHNOLOGIES</b></p> <p><u>Divya Sood</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Recent advancements in bone graft technology from India are making treatments more effective and accessible. Innovations like Osseo graft, a xenograft developed locally, have brought advanced solutions for bone regeneration. Additionally, safer versions of animal and donor bone grafts are being used more widely. Companies like Surgi wear focus on making these advanced bone grafts more affordable. Notable their products like G-Graft, a Hydroxyapatite bone graft material combined with collagen granules, are widely used. The availability and cost effectiveness of Indian origin bone graft make them popular choices in clinical practice. Together, these innovations are</p>

	<p>improving bone repair in dental care in India. Other available bone graft such as OsteoGen and Cerabone have shown promising clinical results in enhancing bone formation and periodontal regeneration.</p>
15.	<p><b>NEXT GENERATION SEQUENCING (NGS) APPLICATIONS IN PRECISION DENTISTRY: UNRAVELING GENETIC INSIGHTS FOR IMPROVED ORAL HEALTH CARE</b></p> <p><u>Gautam Saini</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Next-Generation Sequencing (NGS) technologies represent a paradigm shift in genomic analysis, offering unprecedented insights into the genetic underpinnings of oral health and disease. This paper delves into the multifaceted applications of NGS in precision dentistry, encompassing microbial analysis, genetic risk assessment, pharmacogenomics, and personalized treatment strategies. By harnessing NGS capabilities, dentists can unravel genetic insights, enhance diagnostic accuracy, predict disease trajectories, and optimize therapeutic interventions, ultimately leading to improved oral health outcomes and patient care.</p>
16.	<p><b>REVOLUTIONIZING DENTISTRY: THE ROLE OF AI IN DIAGNOSTICS, TREATMENT, AND PATIENT CARE</b></p> <p><u>Kulbir Kaur</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Artificial Intelligence (AI) is transforming dentistry by enhancing diagnostics, treatment planning, and patient care. This presentation explores AI's diverse applications in dental practices, including radiographic diagnosis, clinical decision support, augmented reality (AR) for procedural training, and robotic-assisted surgery. AI systems use machine learning techniques, such as supervised, unsupervised, and reinforced learning, to process large datasets, identify dental anomalies, and optimize treatment outcomes. Convolutional neural networks (CNNs), in particular, aid in image recognition, enabling early detection of conditions like caries, periodontal disease, and oral cancer. AI also serves as virtual assistants for appointment management and patient data organization, streamlining workflows and improving patient experience. In prosthodontics, AI-driven 3D printing ensures precise restoration design and customized orthodontic appliances. However, challenges remain, including data privacy, limited access to comprehensive datasets, high costs of data annotation, and variability in AI's generalizability across different practices. Despite these challenges, AI's future in dentistry holds immense potential. Successful integration will require collaboration between dental professionals and AI developers to ensure accuracy, security, and enhanced patient outcomes.</p>



17.	<p><b>METAL ION RELEASE OF TITANIUM AND TITANIUM ALLOYS IMPLANTS USING DISSIMILAR ABUTMENT MATERIAL: A SYSTEMATIC REVIEW</b></p> <p><u>Mallika Mangal</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Introduction: Dental implants, based on osseointegration principles, have transformed dentistry by offering durable solutions for missing teeth. However, the emerging concept of tribocorrosion including metal ion release and wear at the implant-abutment interface remains a challenge. Aim of the Study: This systematic review is aimed to investigate the differences in metal ion release at implant abutment interface when titanium/titanium alloy implants are coupled with dissimilar abutment materials as compared to titanium/titanium alloy abutments. Material and Methods: A comprehensive search relevant to the predefined key terms was conducted across five databases (PubMed, Scopus, Web of Science, Embase, Google Scholar) upto March, 2024 using the PECO framework. Inclusion criteria focused on in vitro studies on metal ion release at the implant-abutment interface. The eligibility and risk of bias of study was assessed using the QUIN tool. Results: A total 17 studies (477 specimens) were included for data analysis. The findings revealed significant variations in ion release depending on material combinations. Ti implants paired with dissimilar abutment materials showed increased ion release over time, especially from days 43 to 84 as compared to Ti/Ti alloy abutment. Conclusion: Within the limitations of the analysis, metal ion release was substantially variable for Ti/Ti alloy abutments compared to other metal abutment materials coupled with Ti/Ti alloy implant and was found to be increase over time.</p>
18.	<p><b>EXOSOMES IN DENTISTRY: UNLOCKING POTENTIAL FOR DIAGNOSTIC, THERAPEUTICS, AND REGENERATIVE MEDICINE</b></p> <p><u>Manjot Kaur</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Exosomes are nano-sized extracellular vesicles that play a crucial role in intercellular communication, carrying bioactive molecules such as proteins, lipids, and nucleic acids. In dentistry, exosomes have emerged as promising tools for diagnostics, therapeutics, and regenerative medicine. This paper explores the multifaceted applications of exosomes in oral health care, including their potential in disease diagnostics, drug delivery, and tissue regeneration. By harnessing the capabilities of exosomes, dentists can improve diagnostic accuracy, develop targeted therapies, and enhance tissue repair and regeneration, ultimately advancing the field of precision dentistry.</p>
19.	<p><b>MICRONEEDLING AS AN EMERGING NON-INVASIVE TECHNIQUE ALONG WITH ADJUNCTIVE AGENTS IN THE MANAGEMENT OF MUCOGINGIVAL CONDITIONS AND DEFORMITIES: A SYSTEMATIC REVIEW</b></p>

	<p><u>Muskaan Sarwal</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Introduction: Microneedling used with adjunctive agents like (IPRF, Vitamin. C, Edible oils) in the treatment of various mucogingival conditions and deformities which include (gingival soft tissue augmentation procedures, gingival depigmentation, gingival inflammation, gingival recession, interdental papilla deficiency). Objective: This Systematic review aims to analyze microneedling as an emerging technique in periodontal therapy with the use of adjunctive agents in the treatment of mucogingival conditions and deformities. Methodology: A comprehensive search is conducted across 3 databases (PubMed, Scopus and Web of Science) up to September 2024. The PICO framework guided the search strategy and relevant articles are filtered out from all 3 databases. After removal of duplicates, the articles are thoroughly screened to further filter out the articles pertaining to inclusion and exclusion criteria. Results: The data compilation for systematic review is under process. The results and findings would be presented at the time of final presentation.</p>
20.	<p><b>ARTIFICIAL INTELLIGENCE IN PERIODONTICS</b></p> <p><u>Nidhi Aggarwal</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Artificial Intelligence (AI) is gaining a lot of momentum in recent times in almost all walks of life. The unfolding of AI programs over the years makes analysis of complex datasets and logical interpretation of its possible article introduces the applications of AI in dentistry and further aims to emphasize the various applications specific to the field of Periodontics and Implantology. From helping the dentist interpret dental radiographs and clinically evaluate patients more efficiently to helping the dental students hone their hand skills, the possibilities are immense. Currently in clinical dentistry, AI is still a fantastic idea on paper, but with greater research and financial backing, it can most certainly be our reality in the near future.</p>
21.	<p><b>DIGITAL SMILE DESIGNING: APPLICATIONS OF ARTIFICIAL INTELLIGENCE</b></p> <p><u>Komal Sehgal, Nishita</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>A fundamental objective of an aesthetic treatment is the patient's satisfaction &amp; that the outcome should meet the patient's expectations. When a patient wishes to attain that smile but is sceptical to undertake the treatment is when a clinician can use the</p>

	<p>Digital smile designing (DSD) tool. DSD is a relatively new technology but it has already revolutionized the field of cosmetic dentistry. It aims to help the clinician by improving aesthetic visualization of the patient, giving understanding of the possible solution therefore educating &amp; motivating them about the benefits of the treatment. This process can be used to correct dental imperfections like gaps &amp; misalignments. It can also be used to fabricate restorations wherein a digital impression of the jaws is taken with a digital intraoral scanner. The impressions are then uploaded to the CAD/CAM processing machine where they are 3D-printed. DSD involves participation of patients in the designing process, leading to customization of smile design as per individual needs. In the last two decades smile designing has evolved from analogue to digital designing. From the earlier times when hand drawing on printed photos of the patient were used to explain the patients of the outcome, it has now progressed into complete digital drawing on DSD software. However, using AI for smile design raises numerous technical &amp; ethical concerns. This paper aims to explore the role &amp; use of artificial intelligence in smile designing, its advantages, drawbacks &amp; ongoing development of a similar AI based tool in Bharat.</p>
22.	<p><b>GENETIC INSIGHTS INTO THE CO-OCCURRENCE OF DIABETES MELLITUS- A SCOPING REVIEW</b></p> <p><u>Pridhi Garg</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Introduction: Diabetes mellitus (DM) significantly increases the risk of periodontitis, a severe periodontal disease, due to hyperglycaemia and inflammation. The bidirectional relationship between DM and periodontitis affects disease progression and management, highlighting the importance of integrated treatment approaches. Objective: This paper aims to identify shared genetic factors between diabetes mellitus and periodontitis to improve understanding and develop targeted treatments Methodology: A comprehensive search was conducted based on predefined key terms, in PubMed, Scopus, and Web of Science up to July 2024, focusing on in silico and in vivo validation of genes. After removing duplicates, articles were rigorously screened and data was extracted to construct a qualitative synthesis. Result: Data compilation is in progress, with results and findings to be presented at the time of presentation.</p>
23.	<p><b>T SCAN – DIGITAL OCCLUSION ANALYSIS</b></p> <p><u>Prisha Aggarwal</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Use of articulating paper is a popular method of guessing the force of occlusion on the natural teeth, implants prosthesis and removable prosthesis, even though the mechanism of proprioception is different in all of them. The subjective analysis through the paper marks is arbitrary and based on non-scientific hypothesis. T scan is biometric tool and helps to evaluates occlusal forces objectively. It gives us scientific data about non simultaneous contact of teeth by recording occlusion in .003 seconds per frame. Force on each tooth, parts of each tooth, each quadrant and each half of jaw</p>

	<p>is shown in percentage of forces respectively along with the timing of contact. This review presentation will consist of the rationale of using t-scan, timing of the first tooth contact, the balance between right and left side of the arch, the high forces on implant prosthesis, crown and bridges and even natural teeth. It will show the development of canine guidance and disclusion time in lateral excursion and time taken from first tooth contact to maximum intercuspation. It's uses in different disciplines of dentistry.</p>
24.	<p><b>TRANSFORMING SMILES: THE ROLE OF AUGMENTED REALITY IN MODERN DENTISTRY</b></p> <p><u>Ritika Khurana</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Augmented reality (AR) has revolutionized the way dentists visualize and create patient smile designs. Initially used in dental education, AR allowed students to interact with virtual environments and receive real-time feedback, enhancing their learning experience. Today, AR is applied in various dental fields, from radiology to surgery, offering unprecedented precision and efficiency. Traditionally, smile design involved two-dimensional images and physical mock-ups, which were time-consuming and lacked immersion. Now, AR gives patients an instant 3D preview of their future smile during consultations. This not only saves dentists time but also provides patients with a fully immersive experience, enhancing their satisfaction. By the end of the presentation attendees will gain insights into the latest AR applications in dentistry and explore how future innovations will continue to reshape smile design and patient care.</p>
25.	<p><b>MAGNIFICATION IN DENTISTRY</b></p> <p><u>Sangeeta Gupta</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Magnification plays a crucial role in dentistry by enhancing precision and improving outcomes in various procedures. Magnification is an essential tool that contributes significantly to the quality and efficiency of dental care.</p>
26.	<p><b>BEYOND THE PRESCRIPTION: RESPONSIBLE ANTIBIOTIC USE IN DENTISTRY</b></p> <p><u>Shreya Goel</u>  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p>

	<p>Antibiotics will continue to play a crucial role in dental care, particularly in preventing and managing infections. However, the overuse and misuse of antibiotics in dentistry are expected to contribute further to the growing global crisis of antimicrobial resistance. This presentation, "Beyond the Prescription: Responsible Antibiotic Use in Dentistry," will explore future guidelines and best practices for antibiotic prescribing. It will emphasize the importance of judicious use in routine and emergency dental care, aiming to balance infection prevention with the need to curb resistance. Case studies and evidence-based recommendations will highlight strategies for optimizing antibiotic use and improving patient outcomes in the evolving landscape of dental practice.</p>
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ABSTRACTS OF  
POSTER  
PRESENTATIONS

<b>Poster Presentations – Dental Sciences</b>			
<b>UG/PG Students of Panjab University Campus and Regional Centres</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
1.	Ms. Ira Madaan	Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Applications of artificial intelligence in various fields of dentistry.
2.	Dr. Namya Dhalla	Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	From roots to remedies: Incorporating ayurvedic principles in dental care.
3.	Ms. Sakshi Arora	Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.	Smartphone application for caries detection.
<b>UG/PG Students from Colleges and Other Institutions</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
4.	Ms. Anoushka Bajaj	MCOADS, Manipal, Karnataka.	Unravelling mystery of biofilm: Analytical methods.

<b>Abstract File – Dental Sciences</b>	
<b>UG/PG Students of Panjab University Campus and Regional Centres</b>	
<b>S.No.</b>	<b>Abstract</b>
1.	<p><b>APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN VARIOUS FIELDS OF DENTISTRY</b></p> <p><u>Ira Madaan</u>, Kavya Khurana  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Artificial intelligence is the capability of a computer to do problem-solving and decision-making tasks like the human brain. Machine learning is when a machine learns through data to build the capability of decision-making and problem-solving like the human brain. Machine learning occurs through neural networks (NN's) which are mathematical non-linear models. They use artificial neurons to mimic the decision making and problem-solving ability of the human brain. Convolutional neural networks (CNN) and artificial neural networks (ANN) are the most commonly user neural networks in dentistry. Deep learning refers to training a machine with large amounts of data. It is useful for more complex data like imagery. Artificial intelligence has many applications in dentistry including in orthodontic diagnosis and treatment planning, determination of working length, detection of vertical root fractures, estimation of bone loss, diagnosis of cysts of the face and jaws, cephalometric analysis and much more.</p>
2.	<p><b>FROM ROOTS TO REMEDIES: INCORPORATING AYURVEDIC PRINCIPLES IN DENTAL CARE</b></p> <p><u>Namya Dhalla</u>, Nikita Sharma  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Oral health is an integral part of the general well-being. Oral diseases are amongst the most common non-communicable diseases worldwide, affecting an estimated 3.5 billion people. The silent epidemic of oral diseases disproportionately affects disadvantaged communities, hence, for good oral and systemic health, proper maintenance of dental hygiene is crucial. Ayurvedic medicine is one of the world's oldest holistic healing systems, emphasizes balance in the body, mind, and spirit, aiming to promote overall health and well-being. There has been a long tradition of improving oral hygiene using phytochemicals and other plant products used in conventional medicine. The exploration of herbal products used in traditional medicine may lead to the development of novel preventive or therapeutic strategies for oral diseases. Though Ayurvedic medications can ease the pain or discomfort associated with frequent dental diseases, they should not be used as an alternative, but as a supplement to standard dental procedures. The science of Ayurveda should hence, be integrated with modern dentistry, and the use of natural herbal remedies for various dental procedures must be encouraged in both children and adults. Our</p>



	poster is thus, focused on the possible role of Ayurveda in the prevention and management of various orofacial diseases.
3.	<p><b>SMARTPHONE APPLICATION FOR CARIES DETECTION</b></p> <p><u>Sakshi Arora</u>, Nishita  <i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Currently, there are different mobile applications available that can assist individuals in managing their health behaviours and conditions like the apps that aid with smoking cessation, weight loss &amp; medication adherence. Similarly, there are many oral health apps available that can aid both the patient &amp; the dentist. One such type of category of apps utilises Artificial Intelligence to identify caries in their early stages. Their aim is to connect families with dental healthcare providers within the network and improve existing dental care practices. This technology uses AI-powered image recognition to analyse photographs of children's teeth captured using smartphones. By applying AI algorithms, the app can identify and detect early signs of dental caries, allowing parents to seek timely treatment for their children and therefore, cease/slow down the progression of already existing carious lesions as well as to prevent the formation of new lesions. In addition to the direct benefits for children's oral health, the possible impact of the use of this technology on a large scale might also reduce the burden of dental caries and its complications/implications on health systems. Therefore, it is now possible to use AI technology to achieve population-wide dental screening and early detection, ultimately reducing the severity of tooth decay and dental disease related emergencies. This poster will explore smartphone applications used for caries detection, their advantages and limitations as well as development of a similar tool in India.</p>
<b>UG/PG Students from Colleges and Other Institutions</b>	
<b>S.No.</b>	<b>Abstract</b>
4.	<p><b>UNRAVELLING MYSTERY OF BIOFILM: ANALYTICAL METHODS</b></p> <p><u>Anoushka Bajaj</u><sup>1</sup>, Vishakha Grover<sup>2</sup>  <sup>1</sup><i>MCODS, Manipal, Karnataka,</i> <sup>2</sup><i>Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.</i></p> <p>Objective: The bacteria colonizing the hard and soft tissues of the oral cavity are known to significantly influence oral health and disease. This limited knowledge about the behaviour and proper ties, combined with recognition of the considerable diversity that exists within individual species, raises serious questions to the foundations on which previous conclusions, concerning the aetiology of periodontal</p>

diseases, rest. Materials & Methods: Recent studies of subgingival dental plaque, based on different identification methods, provide direct evidence of substantial diversity of plaque microbiota. Till date only about 280 bacterial species have been isolated by cultivable methods, characterized and formally named out of this enormous microbial diversity of oral biofilms. As a consequence, there is a complete lack of information about the properties of a substantial proportion of the plaque microbiota, apart from their position in the taxonomic hierarchy of bacteria. Results: The emerging realization is it is impossible to fully understand oral health and disease without identifying and understanding the pathogenic potential of all of the bacteria that colonize the oral cavity. Conclusion: The current poster shall provide an update on current status of oral microbiota, ecological significance of their biofilm life style and various methods to study microbes residing in oral biofilms.

# Earth and Environmental Sciences

- Geology
- Geography
- Environment Studies

## **CO-ORDINATORS**

*Sectional President*

**Dr. Rajeev Kumar**

**9815104094**

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**Dr. Vishwa Bandu Singh**

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**CHASCON 2024**  
**NATIONAL CONFERENCE ON**  
**“Indigenous Technologies for Viksit Bharat”**  
**SECTION: EARTH AND ENVIRONMENTAL SCIENCES**

**Program (Thursday, November 07, 2024)**  
**Venue: Department of Geology, Panjab University, Sector-14, Chandigarh**

Sectional President Dr. Rajeev Kumar 9815104094		Sectional Secretary Dr. Vishwa Bandhu Singh & Dr. Mahesh Thakur 9872833637, 9878743251	
Time	Program		
09:00-9:45	Display of Posters by the Participants <i>Venue:</i> Department of Geology, Panjab University, Chandigarh		
9:45-10:00	Inauguration of Sectional Program <i>Venue:</i> Seminar Hall, Department of Geology, Panjab University, Chandigarh		
10:00-10:45	<b>Session Chair:</b> Prof. Rajeev Patnaik <b>Speaker:</b> Prof. Girish Chandra Kothyari Department of Engineering and Earth Science, University of Petroleum and Energy Studies, Dehradun, Uttaranchal, India <b>Lecture Title:</b> <i>Paleoseismological investigation along the Back thrust bounding the northern limb of Janauri Anticline, NW Himalaya, India</i>		
10:45-11:30	<b>Session Chair:</b> Prof. Navneet Kaur <b>Speaker:</b> Mr. Vidya Nand Negi Scientist, Central Ground Water Board, Ministry of JAL Shakti, Chandigarh <b>Lecture Title:</b> <i>Hydrogeological Assessment and Sustainable Groundwater Management of Alluvial Aquifers in Haryana</i>		
11:30-12:00	Tea Break		
12:00-1.00	Oral Presentations (Faculty) <i>Venue:</i> Seminar Hall, Department of Geology, Panjab University Poster Presentations (UG/PG) <i>Venue:</i> Department of Geology, Panjab University, Chandigarh		
1.00-2.00	Lunch Break		
2.00-5.00	Oral Presentations: UG/PG and Research Scholars <i>Venue:</i> Seminar Hall, Department of Geology, Panjab University Poster Presentations (Research Scholars and Faculty) <i>Venue:</i> Department of Geology, Panjab University, Chandigarh		
3.30-4.00	Tea Break		

## KEY SPEAKERS

<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
1.	Dr Girish Kothyari	Associate Professor University of Petroleum and Energy Studies, Dehradun, Uttaranchal, India	Paleoseismological Investigation Along The Back Thrust Bounding The Northern Limb Of Janauri Anticline, Nw Himalaya, India
2.	Mr. Vidya Nand Negi	Central Ground Water Board Ministry of Jal Shakti Government of India	Hydrogeological Assessment And Sustainable Groundwater Management Of Alluvial Aquifers In Haryana

# PALEOSEISMOLOGICAL INVESTIGATION ALONG THE BACK THRUST BOUNDING THE NORTHERN LIMB OF JANAURI ANTICLINE, NW HIMALAYA, INDIA



DR GIRISH CH KOTHYARI

Associate Professor

University of Petroleum and Energy  
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## ABSTRACT

Despite numerous paleoseismological studies along the active front of the Himalayas, there is still a lack of precision regarding earthquake recurrence, rupture characteristics, and slip mechanisms, which hinders a comprehensive understanding of the region's seismic hazards. Given the seismic threat from past Himalayan earthquakes—such as those in Kashmir, Chamba, Kumaun-Garhwal, and Nepal—it is crucial to identify seismogenic structures and the potential rupture lengths that may be affected in the future. This study conducts a paleoseismological investigation along the ~150 km long Back Thrust (BT) of the Himalayan Frontal Thrust, which bounds the northern limb of the Janauri Anticline (JA) in the northwest frontal Himalayas. Utilizing the optically stimulated luminescence (OSL) dating technique, this study reports three newly identified seismic events along the BT: Event I (535–1269 AD), Event II (1447–1636 AD), and Event III (1660–1929 AD). Findings at the Palahta locality in Punjab state align with previously identified recent earthquakes (MRE) near Hajipur, specifically Event II (1447–1636 AD), which suggests a rupture length of ~97 km along the BT. The timing of other seismic events (Event I and Event III) are considered independent occurrences, filling critical gaps in the paleoseismic database. This expanded database enables a more detailed exploration of paleoseismic events along Himalayan seismogenic structures, aiding in improved seismic hazard assessment and supporting long-term infrastructure planning in the Himalayan region.

# HYDROGEOLOGICAL ASSESSMENT AND SUSTAINABLE GROUNDWATER MANAGEMENT OF ALLUVIAL AQUIFERS IN HARYANA



MR. VIDYA NAND NEGI

Central Ground Water Board  
Ministry of Jal Shakti  
Government of India

## ABSTRACT

The green revolution state of Haryana comprises of high yielding alluvial aquifers hydrogeologically; since more than 98% area of the state is occupied by Quaternary Alluvial deposits. Aquifer material in the state consists of coarse-to-medium grain sand and kankars which are interbedded with clayey aquicludes and aquitards except for the northern and southern most portions of the state which encompass Siwalik's and Delhi Supergroup of rocks respectively. Aquifer depletion, deterioration of groundwater quality and water-logging are the three key emerging issues of the state. The depth to water level lies between 1.05mbgl in Panchkula district and 56.50mbgl in Fatehabad district (CGWB, June 2024). Excess withdrawal of groundwater to cater the irrigation needs of increased area under paddy cultivation along with the rising domestic and industrial demands has led to the decline of water table with more than one-fourth area of the state falling under the deeper (>20mbgl) groundwater levels (CGWB, June 2024). State's overall stage of groundwater extraction is 135.74% as per the dynamic groundwater resources (CGWB, GWRA 2022-23) with 88 blocks out of 144 falling under over-exploited category and 35 blocks falling under safe category. Haryana's annual extractable groundwater resources is 8.69bcm with annual groundwater recharge and extraction being 9.54bcm and 11.79bcm respectively as per the latest data (CGWB, GWRA 2022-23). Growing concerns regarding the aquifer quality in the state is attributed to the anthropogenic and geogenic presence of *Fluoride*, *Uranium* and *Nitrate* in groundwaters exceeding the acceptable limits prescribed by BIS. Electrical conductivity of groundwaters in central Haryana is exceeding 3000 $\mu$ S/cm in multiple patches which is affecting the suitability of the aquifers for potable and irrigation purposes. Water logging issues occur where the depth to water level falls below 3mbgl. Central and southern parts of the state including Jhajjar, Jind, Kaithal, Fatehabad, Bhiwani, Rohtak and Hisar districts are coping with water logging and salinity issues due to excessive canal irrigation and less withdrawal from saline aquifers. Alluvial aquifers of Haryana state are world's one of the highest yielding water bearing formations but are depleted and deteriorated in terms of groundwater quantity and quality. Sustainable groundwater management and development through demand focused approaches and supply enhancement measures are key interventions for building the resilient hydrogeological infrastructure in the state.

ABSTRACTS OF  
ORAL  
PRESENTATIONS



<b>Oral Presentations – Earth and Environmental Sciences</b>			
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
1.	Dr. Supriya Vaid	Goswami Ganesh Dutta Sanatan Dharma College, Sector 32C, Chandigarh.	Phytotoxicity of Citronellol against <i>Cassia occidentalis L.</i>
<b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
2.	Mr. Archit Arora	Department of Environment Studies, Panjab University, Chandigarh.	Assessing heat wave patterns in India using ERA5 reanalysis data.
3.	Mr. Arjun Rana	University Business School, Panjab University, Chandigarh.	Ancient and indigenous water management systems: A case study of Bengaluru.
4.	Mr. Jugraj Singh	Department of Geology, Panjab University, Chandigarh.	Numerical modelling and stability measures for vulnerable rock slopes along national highway-5, Shimla, northwestern Himalaya, India.
5.	Ms. Manmeet Kour	Department of Environment Studies, Panjab University, Chandigarh.	Bioplastic films from starch of <i>Colocasia esculenta</i> and its waste: A smart template for sensing applications.
6.	Ms. Pooja Yadav	Department of Environment Studies, Panjab University, Chandigarh.	Pollen and climate change: A growing concern for environmental health in India.
7.	Mr. Ramkrishna Mondal	Department of Geology, Panjab University,	Lithium assessment and it's mineralogy from

		Chandigarh.	coals and associated strata in Makum coalfield Assam, (Northeast India).
8.	Ms. Surbhi Vashisht	Govt. Home Science College, Affiliated to Panjab University, Chandigarh.	Revolutionizing plastic packaging by embracing indigenous biodegradable materials for sustainability.

**Research Scholars from Colleges and other Institutions (JRF, SRF, Project Fellow and Post Docs)**

<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
9.	Mr. Himangshu Borah	Wildlife Institute of India, Dehradun, Uttarakhand.	Diversity and assemblage structure of fish in the west Kameng river basin, Arunachal Pradesh.
10.	Mr. Saurabh Choudhary	Central University of Rajasthan, Ajmer, Rajasthan.	A comprehensive review of indoor air quality in various buildings with a focus on the hospital environment.

**UG/PG Students of Panjab University Campus and Regional Centres**

<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
11.	Ms. Radhika Awasthi	Department of Environment Studies, Panjab University, Chandigarh.	Rainfall induced early warning system in Shimla: Enhancing disaster preparedness and mitigation.
12.	Ms. Simran Thareja	Department of Environment Studies, Panjab University, Chandigarh.	Water conservation practices in agriculture to cope with water scarcity.

**Faculty/Scientists from Colleges and Other Institutions**

**S.No. Abstract**

1. **PHYTOTOXICITY OF CITRONELLOL AGAINST *Cassia occidentalis L.***

Supriya Vaid

*Goswami Ganesh Dutta Sanatan Dharma College, Sector 32C, Chandigarh.*

*Cassia occidentalis L.* is an aggressive tropical and sub-tropical weed belonging to family Fabaceae. It is about 1.5 m tall shrub with dark olive-green seeds that grows wildly in wastelands in many parts of the country. Though many methods of weed control have been used in the past, the use of synthetic herbicides has been very extensive in the last few decades owing to the fact that these are cheap and readily available but these methods of weed control have many implications specially in terms of causing environmental pollution, being bad for human and animal health and non-bio-degradable. Keeping this in mind, a study was undertaken to assess the inhibitory potential of citronellol (a volatile monoterpene and a natural plant product which is environment-friendly, user-friendly and bio-degradable) against this weed. There was a significant inhibition in germination of the test weed even at low concentrations of the monoterpene. The parameters of seedling growth of the test weed in terms of radicle length, seedling length and seedling dry weight were also reduced considerably in response to the test monoterpene. On the basis of this study, it is concluded that invasive weeds like *C. occidentalis* can be managed by using environment-friendly phytotoxins like citronellol either directly or by serving as a lead molecule.

**Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)**

**S.No. Abstract**

2. **ASSESSING HEAT WAVE PATTERNS IN INDIA USING ERA5 REANALYSIS DATA**

Archit Arora, Sanjeev Bharadwaj

*Department of Environment Studies, Panjab University, Chandigarh.*

This study aims to assess heat wave patterns in India using the ERA5 reanalysis data from the Copernicus Climate Data Store. By analysing temperature trends and heat wave occurrences over a selected time period of the research focuses on identifying significant changes in heat patterns, examining the spatial distribution of heat waves, and assessing the impact of these changes on different regions of India. The study employs statistical methods and climate indices to

	<p>provide insights into the long-term trends and potential future scenarios. The findings are expected to contribute to the development of effective heat mitigation strategies and inform policymakers on climate adaptation measures.</p>
<p>3.</p>	<p><b>ANCIENT AND INDIGENOUS WATER MANAGEMENT SYSTEMS: A CASE STUDY OF BENGALURU</b></p> <p><u>Arjun Rana</u> <i>University Business School, Panjab University, Chandigarh.</i></p> <p>In the 1500s, Kempegowda, the founder of Bengaluru, was guided by his mother's advice: “Keregalam Kattu, Marangalam Nedu”— “Build lakes and plant trees.” Acting on this, Kempegowda developed an extensive network of lakes and water tanks across Bengaluru’s terrain to store and manage water. These interconnected water bodies were designed so that overflow from one tank would replenish another, allowing gradual seepage into the ground, thus recharging the city’s aquifers. Since Bengaluru lacks a perennial river, sustaining this system was crucial to the city’s water supply until the British introduced piped water from the Kaveri River. However, Bengaluru is facing an imminent water crisis with diminishing monsoon rainfall, as observed in 2023, and declining water levels in Kaveri-fed dams. The city’s current demand is estimated at 2,600 million Liters per day, and with 50% of its 14,000 borewells now dry, the need to revive the traditional water management system has never been more urgent. This case study examines the ancient water conservation methods used in Bengaluru-lakes, tanks, and check dams—and provides insights into addressing the city’s growing water scarcity, exacerbated by climate change. The findings would highlight the importance of restoring these sustainable water management practices to mitigate future water crises in urban centres.</p>
<p>4.</p>	<p><b>NUMERICAL MODELING AND STABILITY MEASURES FOR VULNERABLE ROCK SLOPES ALONG NATIONAL HIGHWAY-5, SHIMLA, NORTH WESTERN HIMALAYA, INDIA</b></p> <p><u>Jugraj Singh</u>, Mahesh Thakur <i>Department of Geology, Panjab University, Chandigarh.</i></p> <p>Advancements in technology and a growing population have led to the development of geoengineering projects, such as dams, tunnels, bridges, and road networks in mountainous regions, which in turn contribute to slope destabilization. National Highway-5, a critical route, connects Shimla, Kinnaur, Kullu, and the China border to the rest of India, playing a vital role in defence and security. This area features complex geomorphological and geological terrains, frequently experiencing slope failures. In this study, a comprehensive geotechnical investigation was conducted along NH-5 in Shimla, Himachal Pradesh. The investigation applied Rock Mass Rating (RMR), Slope Mass Rating (SMR), kinematic analysis, and numerical modelling using the finite</p>

	<p>element method (FEM) to analyse the Dhalli landslide (September 2017), malyana landslide (August 2018) and the surrounding area. Kinematic analysis of joint data indicated that the rocks are primarily susceptible to wedge and planar failures. The RMR results classified the slopes as fair (Class III) and weak (Class IV), while the SMR results placed them in the completely unstable (Class V), unstable (Class IV), and partially stable (Class III) categories. Numerical models were developed using the RS2 module of Rocscience, which shows that the Strength Reduction Factor (SRF) for most of the slopes is less than 1, indicating instability. The analysis also identified probable unstable zones within the slopes. Key factors contributing to the slope instability were identified, and several recommendations were proposed to enhance the stability of the road cut slopes.</p>
5.	<p><b>BIOPLASTIC FILMS FROM STARCH OF <i>Colocasia esculenta</i> AND ITS WASTE: A SMART TEMPLATE FOR SENSING APPLICATIONS</b></p> <p><u>Manmeet Kour</u><sup>1</sup>, Rajeev Kumar<sup>1</sup>, Savita Chaudhary<sup>2</sup>  <sup>1</sup><i>Department of Environment Studies, Panjab University, Chandigarh,</i>  <sup>2</sup><i>Department of Chemistry, Panjab University, Chandigarh.</i></p> <p>The progressive advancement in fabricating biodegradable and renewable bioplastics is persuasively required to furnish the effective alternative to non-biodegradable plastics. In this view, the current work highlights the production of starch-based bioplastic films using waste <i>Colocasia esculenta</i> as a viable starting precursor. The functional ability of developed taro starch-based films was further modified by incorporating the additional fillers of carbon dots (CQDs) generated from the waste slurry produced during the extraction of starch from taro herbs. The optimization of films was achieved by varying the CQDs amount (0.4%, 0.8%, 2% and 4% w/w) on taro-based films. The developed films are eco-friendly, non-lethal and easily biodegradable under disposal conditions. The data illustrates that the addition of CQDs has the ability to enhance the fluorescence property, mechanical properties (Tensile Strength 0.332 - 4.635MPa, Elongation at break value 42.45 - 547.63%) and water resistance ability of films (Moisture content 15-6.4%, Water Solubility 50-30%, Water Vapour Transmission Rate 2.0012- 1.0054gm-2h-1 and Water Contact Angle 40.6-89.6°). The developed films are found to be thermally stable. The formed films possessed anti-oxidative abilities which safeguard the film from oxidative attacks, ultimately protects the film from external environment. In addition, the developed films had displayed smart templating aptitude towards the selective sensing of iron in aqueous medium. This is one of the primary reports where metal ion sensing is reported for Taro@CQD nanocomposites-based films. Our outcomes of this work hold significant relevance to provide smart sensory and biodegradable probe for metal ion sensing.</p>
6.	<p><b>POLLEN AND CLIMATE CHANGE: A GROWING CONCERN FOR ENVIRONMENTAL HEALTH IN INDIA</b></p>

Pooja Yadav<sup>1</sup>, Khaiwal Ravindra<sup>2</sup>, Suman Mor<sup>1</sup>

<sup>1</sup>*Department of Environment Studies, Panjab University, Chandigarh,*

<sup>2</sup>*Department of Community Medicine and School of Public Health, Post Graduate Institute of Medical Education and Research, India.*

Pollen, the microscopic grains produced by plants for reproduction, plays a crucial role in plant ecology but can also significantly impact human health. While not all pollen causes allergies, certain types – particularly from grasses, trees, and weeds – are known to trigger allergic reactions in susceptible individuals. Climate change is altering pollen dynamics across India in several ways. Rising temperatures and increased atmospheric carbon dioxide levels are leading to longer growing seasons for many plants. This extended period of plant growth results in prolonged pollen seasons, increasing the duration of potential exposure for allergy sufferers. Moreover, climate change is influencing the quantity of pollen produced by plants. Many species are generating more pollen under these altered environmental conditions, potentially intensifying the allergic response in sensitive individuals. The distribution of plant species is also shifting, introducing new allergenic plants to areas where they were previously absent. These changes in pollen patterns have significant implications for public health in India. More people may develop allergies or experience more severe symptoms, leading to an increased incidence of respiratory issues, including asthma exacerbations. The impact extends beyond health, affecting productivity and quality of life for millions. Understanding the link between climate change and pollen is crucial for developing effective strategies to mitigate its health impacts. This knowledge can inform public health policies, improve allergy management approaches, and underscore the importance of addressing climate change for environmental and human health.

7.

**LITHIUM ASSESSMENT AND IT'S MINERALOGY FROM COALS AND ASSOCIATED STRATA IN MAKUM COALIFIED ASSAM (NORTHEAST INDIA)**

Ramkrishna Mondal, Debabrata Das, Shivam Sharma

*Department of Geology, Panjab University, Chandigarh.*

Lithium, the lightest metal, it's increase valued due to its increasing demand in modern industries, including low density, high electrochemical potential, and reactivity with water, make it essential for applications in energy storage and pharmaceuticals. The most significant growth area for lithium is rechargeable batteries, which are critical for renewable energy technologies. Lithium is found in various natural sources, such as hard rock minerals, brine, and clay. In addition to traditional sources, lithium enrichment has been identified in coal and its associated strata. Studies on coal-bearing strata reveal the presence of lithium in clay-rich regions, offering a new avenue for lithium extraction. Beyond coal seams, lithium is also found in coal byproducts, such as coal ash and gangue.

	<p>Coal gangue, is often rich in clay and other minerals that can contain lithium. These materials represent a potential source of lithium that could be extracted through advanced leaching processes. This paper, the focus is on determining lithium concentration in both coal and associated strata from the Makum coalfield. To achieve this, ICP-MS is used. By combining ICP-MS data with sequential leaching techniques, aiming to identify the specific lithium-bearing mineral phases. Additionally, XRD analysis is employed to further characterize the mineralogical composition of the samples. In conclusion, lithium's role in modern technology, particularly in energy storage sector, continues to drive global demand. Alternative sources such as coal and gangue are also gaining attention. This type of Li resources will help secure a stable supply of this critical metal in upcoming years.</p>
8.	<p><b>REVOLUTIONIZING PLASTIC PACKAGING BY EMBRACING INDIGENOUS BIODEGRADABLE MATERIALS FOR SUSTAINABILITY</b></p> <p>Ritu Pradhan, <a href="#">Surbhi Vashisht</a>  <i>Department of Foods and Nutrition, Govt. Home Science College, affiliated to Panjab University, Chandigarh.</i></p> <p>The packaging industry accounts for 46% of plastic waste from the total waste generated. Due to its non-biodegradable nature and its harmful impact on the environment, concerns about its production and disposal have been growing rapidly. In response to stringent environmental regulations, the packaging industry is actively seeking cost-effective biodegradable materials for food packaging that offer sustainable solution while minimizing environmental impact. Aligning with the vision of Viksit Bharat, this paper explores the potential of embracing sustainable indigenous alternatives to plastic packaging. A comprehensive literature survey was conducted using Web of Science, Google Scholar, PubMed, and Scopus etc. Peer-reviewed articles, case studies, research papers across various journals were explored. Relevant data was extracted and categorized for analysis. The present review highlights that biopolymer derived from indigenous resources such as bamboo, banana and palm leaf, jute, coconut coir, bagasse, rice husk, corn starch, vegetable peels etc. can significantly reduce plastic waste generated from disposal of plastic packaging. Biodegradable packaging materials offers an alternative to conventional plastic packaging contributing to minimize harmful impact of plastic on the environment. Although, these materials support local economies and contribute to environment sustainability, but pose some limitations such as inferior barrier properties, low heat resistance, poor mechanical strength, and high cost. The viability of these materials for large-scale production can be enhanced by technological advancements. Embracing indigenous biodegradable resources offers a promising path toward achieving environmental sustainability and supporting economic growth in alignment with the Viksit Bharat vision.</p>
<p><b>Research Scholars from Colleges and other Institutions (JRF, SRF, Project Fellow and Post Docs)</b></p>	

S.No.	Abstract
9.	<p><b>DIVERSITY AND ASSEMBLAGE STRUCTURE OF FISH IN THE WEST KAMENG RIVER BASIN, ARUNACHAL PRADESH</b></p> <p><u>Himangshu Borah</u>, Meghavi Purohit, Vineet K Dubey, Rakshit Rayal, J. Antony Johnson <i>Wildlife Institute of India, Dehradun, Uttarakhand.</i></p> <p>Aim: This study aims to explore the diversity and distribution of fish species in relation to environmental parameters in the underexplored West Kameng River Basin. Location: The study was conducted in the West Kameng Basin of Arunachal Pradesh, covering an area of approximately 140 km with an elevation gradient ranging from 400m to 2500m (masl). Methods: Fish sampling was performed using cast nets with mesh size of 1x1 cm and nylon dragnet. Water quality parameters were measured on-site using YSI multi-parameter kit. The Catch Per Unit Effort (CPUE) was calculated. The analysis of abundance, traits, and environmental data is conducted using ordination methods: Correspondence Analysis (CA), followed by Principal Component Analysis (PCA). The trait dataset was analysed using the Hill and Smith (1976) method. Result: A total of 16 species were recorded encompassing 279 sites. The cumulative CPUE across all sites was recorded at 7334 grams/hour. The CPUE was higher for Dirang River followed by Tenga. The most abundant species, Schizothorax Richardsonii, accounted for 55.77% of the total catch, followed by Schizothorax progastus (9.04%). The fish community is significantly influenced by altitude, temperature, and depth. Hierarchical clustering analysis identified two distinct sub-assemblages. The ordination of the five functional traits identified the traits such as maximum length and food habit together explaining 55% of the variance in the fish communities. Conclusion: The results have identified the environmental parameters that play a crucial role in shaping the fish community structure of the West Kameng River Basin, along with their key functional traits.</p>
10.	<p><b>A COMPREHENSIVE REVIEW OF INDOOR AIR QUALITY IN VARIOUS BUILDINGS WITH A FOCUS ON HOSPITAL ENVIRONMENTS</b></p> <p><u>Saurabh Choudhary</u>, Saurav Shekhar, Tanvi Choudhary, P. N. Kamble <i>Department of Environmental Science, School of Earth Sciences, Central University of Rajasthan, Ajmer, Rajasthan.</i></p> <p>The indoor environment significantly impacts occupants' health, comfort, and productivity, particularly in healthcare facilities, where maintaining optimal conditions is critical for patient recovery, staff performance, and infection control. This review focuses on key factors affecting indoor air quality (IAQ) across various building types, with an emphasis on hospitals. Hospitals present</p>



	<p>unique challenges due to the need to control airborne pathogens, provide adequate ventilation, and ensure a safe environment for both patients and staff. The review examines different assessment methods and standards used to evaluate indoor environmental quality (IEQ), comparing hospital environments with those of commercial and residential buildings. Furthermore, it highlights the importance of effective IAQ management strategies tailored to the healthcare sector. Despite advancements in IAQ monitoring and control, gaps remain in current practices, particularly in addressing the specific needs of hospitals. By analysing existing strategies and identifying shortcomings, this review provides recommendations to improve IAQ in healthcare facilities, with a focus on enhancing patient outcomes, operational efficiency, and overall well-being. Addressing these challenges is crucial for creating safer and more efficient indoor environments in hospitals, benefiting both patients and medical professionals. Keywords: Indoor air quality, hospital environment, healthcare facilities, airborne pathogens, indoor environmental quality, ventilation, infection control, building types, patient recovery, IAQ assessment methods.</p>
<p><b>UG/PG Students of Panjab University Campus and Regional Centres</b></p>	
<p><b>S.No.</b></p>	<p><b>Abstract</b></p>
<p>11.</p>	<p><b>RAINFALL-INDUCED EARLY WARNING SYSTEM IN SHIMLA: ENHANCING DISASTER PREPAREDNESS AND MITIGATION</b></p> <p><u>Radhika Awasthi</u>  <i>Department of Environmental Studies, Panjab University, Chandigarh.</i></p> <p>Shimla is the one of the major cities in Indian Himalayan region (Himachal Pradesh), where seasonal rainfall-induced landslides are very common which result into potential loss to life &amp; property. The present study describes the development and implementation of a rainfall-induced early warning system (RIEWS) in Shimla for disaster preparedness and mitigation. An integrated solution for building the real-time landslide monitoring and early warning system to provide community-scale disaster resilience is proposed. This solution integrates multiple modules such as a heterogeneous sensor system, data storage and management, event detection framework, alert dissemination, and emergency communication system to address issues such as capturing dynamic variability, managing multi-scale voluminous datasets, extracting key triggering information regarding the onset of possible landslide. The RIEWS delivers real-time rainfall predictions and risk analysis through the employment of advanced meteorological data, remote sensing technologies including predictive modelling. The system includes the incorporation of local knowledge and stakeholder participation to guarantee that alerts are well communicated with residents as wells authorities. The RIEWS saves lives by better preparing</p>

	<p>countries for their specific conditions, not only in terms of immediate response but also through the capacity to plan and develop longer-term infrastructure away from high-risk areas based on historical trends with disaster events. LEWS can forecast the pore pressure based on the real-time and antecedent rainfall conditions and soil properties of the specific location. The early warning system (EWS) is currently operational in landslide-prone areas like Kalimpong and Darjeeling in West Bengal, Nilgiris district in Tamil Nadu and Manikaran (HP).</p>
12.	<p><b>WATER CONSERVATION PRACTICES IN AGRICULTURE TO COPE WITH WATER SCARCITY</b></p> <p><u>Simran Thareja</u>, Rajeev Kumar  <i>Department of environment Studies, Panjab University, Chandigarh.</i></p> <p>The increasingly demand for freshwater in last few decades, due to continued population growth and the direct impact of climate change, water supply limits and global warming, which leads to greater evaporation and thus surface drying, thereby increasing the intensity and duration of drought. In the coming decades, water experts are predicting more than half the world’s population will suffer acute water scarcity by 2050. The concept is often described in terms such as sustainable water use, conservation, water use efficiency, water productivity, reducing water footprint, breeding for high water-use efficiency crops, sustainable use of saline and groundwater, shifting from flood irrigation to sprinkler and drip irrigation systems, improved irrigation scheduling, using local climate and soil information to help farmers more precisely irrigate to meet crop water needs and applying less water to crops during drought-tolerant growth stages to save water and improve crop quality or yield and use of smart irrigation systems. Unconventional approach is planting non-traditional crops such as halophytic forage crops. These plants have an economic value and can tolerate harvesting ten times per year and were capable of recovering and maintaining a reasonable fresh productive biomass and its cellulosic biomass can use for ethanol production. Growing these plants as multi-use crops for forage and biofuel production on salt affected land that can be irrigated with brackish water or seawater. Thus, freeing fresh water for food and feed, contribute to energy security, guarantee environmental sustainability.</p>

ABSTRACTS OF  
POSTER  
PRESENTATIONS

<b>Poster Presentations – Earth and Environmental Sciences</b>			
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
1.	Dr. Mahesh Thakur	Department of Geology, Panjab University, Chandigarh.	Application of luminescence dating in geological and archaeological studies.
<b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
2.	Mr. Abhishek Kralia	Department of Geology, Panjab University, Chandigarh.	Geomorphic and tectonic evolution of the Siwalik in the Haridwar-Kotdwar Region, Northwestern Himalayas, India.
3.	Ms. Dhriti Bragta	Department of Environment Studies, Panjab University, Chandigarh.	Deciphering catalytic prowess: Silver nanoparticles synthesized from <i>Odontoefibula orientalis</i> in reducing organic pollutants, integrated with its antibacterial profiling.
4.	Ms. Lovepreet Kaur	Department of Environment Studies, Panjab University, Chandigarh.	Advances in biowaste fabricated green nanomaterials for pesticide remediation from aqueous medium.
5.	Mr. Sarabjeet Singh	Department of Geology, Panjab University, Chandigarh.	Lateral variation in the nature of out-of-sequence deformation along the main boundary thrust in NW Himalaya (India).
6.	Ms. Shefali Thakur	Department of Geology Panjab University, Chandigarh.	Geomorphic investigation of the alluvial fans of Dehra Dun Valley, NW Himalaya, India.

7.	Mr. Shubham Choudhary	Department of Geology, Panjab University Chandigarh.	The spatial correlation between geothermal activity and associated structures in the Kinnaur region of the North Western Himalaya, India.
<b>UG/PG Students of Panjab University Campus and Regional Centres</b>			
<b>S.No.</b>	<b>Name Of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
8.	Ms. Ambika Kumari	Department of Environment Studies, Panjab University, Chandigarh.	Synthesis, effects and applications of curcumin.
9.	Ms. Arushi Thakur	Department of Geology, Panjab University, Chandigarh.	Correlation between on-ground investigations and remote sensing data in the mining regions of Odisha.
10.	Ms. Chahat	Department of Environment Studies, Panjab University, Chandigarh.	Nanoparticle - immobilized membrane for photocatalytic dye breakdown in industrial effluent.
11.	Ms. Eishrat Panjeta	University Institute of Chemical Engineering and Technology, Panjab University, Chandigarh.	Sustainable hydrogen production from agricultural stubble waste.
12.	Ms. Gurnoor Kaur	Department of Environmental Studies, Panjab University, Chandigarh.	Microbial bioremediation of plastics: Unlocking nature's potential for waste reduction.
13.	Mr. Lovedeep Singh	Department of Geology, Panjab University, Chandigarh.	GNSS Observations of Northwest Himalaya.
14.	Ms. Nandini Khurana	Department of Environment Studies, Panjab University, Chandigarh.	Bamboo as sustainable material in the construction industry: An overview.

<b>Abstract File – Environment and Earth Sciences</b>	
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>	
<b>Sr. No</b>	<b>Abstract</b>
1.	<p><b>APPLICATION OF LUMINESCENCE DATING IN GEOLOGICAL AND ARCHAEOLOGICAL STUDIES</b></p> <p><u>Mahesh Thakur</u> <i>Department of Geology, Panjab University, Sector 14, Chandigarh.</i></p> <p>Archaeology and the Earth Sciences make considerable use of luminescence dating, a chronological technique based on the light emission, or luminescence, by common minerals, primarily quartz. The existence of radioactive isotopes of elements like uranium (U), thorium (Th), and potassium (K) is used in luminescence dating. As dosimeters, naturally occurring minerals like feldspar and quartz record the radiation exposure levels they have received. The total amount of radiation to which the sample was exposed during the burial period can be determined by measuring the luminescence signal's brightness. The age of the sample can be calculated by dividing the total energy received by the sample (Equivalent Dose) by the annual radiation dose (Residual Dose) it receives from its surroundings. Events from a few years to more than 400,000 years ago can be dated using optically stimulated luminescence (OSL) dating. The method is most frequently applied to sediments that are up to 100,000 years old. Nowadays, dating quartz is typically done using the single aliquot regenerative dosage (SAR) technique. Numerous fields, such as geomorphological reconstruction, paleoenvironmental reconstruction, earthquake history, river system reconstruction, and chrono stratigraphy, benefit from OSL dating.</p>
<b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b>	
2.	<p><b>GEOMORPHIC AND TECTONIC EVOLUTION OF THE SIWALIK IN THE HARIDWAR KOTDWAR REGION, NORTHWESTERN HIMALAYAS, INDIA</b></p> <p><u>Abhishek Kralia, Mahesh Thakur</u> <i>Department of Geology, Panjab University, Chandigarh.</i></p> <p>We present the findings of an integrated study on geomorphic indices and tectonic geomorphology of drainage networks and landforms along the Siwalik and Himalayan Frontal Thrust (HFT) in the Haridwar and Kotdwar regions. The HFT, an active geological structure, forms scarps along the mountain front. The</p>

	<p>presence of strath terraces along the Malin and Khoh Rivers indicates ongoing tectonic activity in this area. Geomorphic mapping, utilizing CARTOSAT-1 imagery and field investigations along the Khoh River, revealed strath terraces located approximately 70 meters above the current river channel, formed due to uplift along the HFT's hanging wall. In this region, the Siwalik and HFT are separated by transverse faults the Mitthawali Fault (MF) and Khoh River Fault (KRF) which divide the area into three distinct segments: the western segment (WS), central segment (CS), and eastern segment (ES). Each segment exhibits unique tectonic evolution, quantified through morphometric indices like normalized steepness index (Ksn), valley floor width-to-height ratio (Vf), chi analysis, and mountain front sinuosity (Smf). The results show significant variation across the segments, with higher Ksn values in CS compared to WS and ES, and higher Vf values along CS. Chi analysis also suggests heightened tectonic activity in CS. Smf values across all segments are below 1.6, indicating active mountain fronts. The results highlight notable tectonic activity in the region, potentially posing a seismic hazard. To better understand the neotectonic evolution, we have collected optically stimulated luminescence (OSL) samples from the Malin and Khoh River terraces, currently under processing for further analysis.</p>
3.	<p><b>DECIPHERING CATALYTIC PROWESS: SILVER NANOPARTICLES SYNTHESIZED FROM ODONTOEFIBULA ORIENTALIS IN REDUCING ORGANIC POLLUTANTS ,INTEGRATED WITH ITS ANTIBACTERIAL PROFILING</b></p> <p><u>Dhriti Bragta</u><sup>1</sup>, Dr. Preeti Garg<sup>2</sup>, Dr. Rajeev Kumar<sup>1</sup>  <sup>1</sup>Department of Environment Studies, Panjab University,<sup>2</sup>Department of Chemistry, Panjab University, Chandigarh.</p> <p>The present study is focused on the biogenic synthesis of silver nanoparticle utilising fungus extract of the Basidiomycetes fungus <i>Odontofibula orientalis</i> isolated from Deodar cedar trees of the forests of Kharapathar, Shimla Himachal Pradesh. As per the literature survey conducted the selected fungal strain has never been used for the synthesis of nanoparticles. The synthesis process was efficient and rapid completing the reaction within an hour. Transmission electron microscopy analysis of the fungus synthesised silver nanoparticles showed that they have a particle size distribution spanning from 25 to 30 nm. Reducing agent sodium borohydride in the presence of heterogeneous catalyst (silver nanoparticles) were used to remove Methylene Blue and Rhodamine B dye and additionally, tetracycline was chosen as a common antibiotic contaminant, from aqueous solutions. Results show that Methylene blue (10 ppm), Rhodamine B (10 ppm) and Tetracycline (15 ppm) were successfully reduced 96%, (6 min), 91% (7 min) and 73.72% (90 min) respectively. The synthesised silver nanoparticles were tested for their in-vitro</p>

	<p>antioxidant activity and antibacterial potential against bacteria <i>Escherichia coli</i>. Fungus produced highly stabilised nanoparticles by an affordable and environmentally acceptable green synthesis. Without noticeably lowering their catalytic efficacy, the materials could be utilised for more than five times, significant catalytic reduction results demonstrate how unique the produced nanoparticles are in treatment of the contaminated water in a short span of time.</p>
4.	<p><b>ADVANCES IN BIOWASTE FABRICATED GREEN NANOMATERIAL FOR PESTICIDE REMEDIATION FROM AQUEOUS MEDIUM</b></p> <p><u>Lovepreet Kaur, Harminder Pal Singh</u>  <i>Department of Environment Studies, Panjab University, Chandigarh.</i></p> <p>The need to eliminate chemical pesticide pollution of the environment is what motivates the search for removal techniques that are efficient, affordable, and environmentally benign. This review examines a variety of environmentally friendly materials and technologies used to remove pesticides from aquatic environments. The efficacy of carbon-based adsorbents, adsorbents derived from agricultural waste, industrial by-products, clay minerals, polymeric adsorbents, organic adsorbents, and nanomaterials is examined. Developments in nanocomposites and nano-bio composites are also discussed, highlighting their potential for effective pesticide remediation. In order to combat pesticide pollution, the review emphasizes the need for sustainable approaches and stresses the importance of using green materials and technologies. The production of bio-waste-derived nanoparticles and the creation of environmentally friendly pesticide detection techniques are two examples of how green nanotechnology can revolutionize environmental problems. Using bio-waste materials promotes resource conservation and waste reduction in addition to offering sustainable routes for the synthesis of nanomaterials. To further protect ecosystems and public health, green pesticide detection techniques that make use of nanomaterial-based sensors enable quick, accurate, and economical detection. Green nanotechnology and environmental science are coming together to create a promising new direction in environmentally sustainable management practices. This will require more research, innovation, and cross-disciplinary cooperation.</p>
5.	<p><b>LATERAL VARIATION IN THE NATURE OF OUT-OF-SEQUENCE DEFORMATION ALONG THE MAIN BOUNDARY THRUST IN NW HIMALAYA (INDIA)</b></p> <p><u>Sarabjeet Singh<sup>1</sup>, Tejpal Singh<sup>2</sup>, Seema Singh<sup>3</sup></u>  <sup>1</sup><i>Department of Geology, Panjab University Chandigarh,</i> <sup>2</sup><i>CSIR Central Scientific instruments organisation, Chandigarh,</i>  <sup>3</sup><i>Department of Geology, Panjab University, Chandigarh.</i></p> <p>This study investigates the lateral variation and segmentation along the Main Boundary Thrust (MBT) in the Beas Basin of the NW Himalayas, focusing on</p>



	<p>out-of-sequence deformation and its impact on landscape evolution and seismicity. While the MBT has traditionally been studied for its in-sequence thrust propagation, this research explores two distinct segments within the study area: the Dhaula Dhar Segment (DS) in the west and Uhl Segment (US) in the east. The analysis employs data from satellite imageries and GIS based platforms to extract geomorphic proxies such as topographic elevation, relief, normalized steepness index (KSN), and precipitation patterns to decipher relative tectonic activity in these segments. Results indicate that the DS segment is characterized by higher topographic relief and steepness index values. This segment is also characterised by high seismicity and strong precipitation gradient, thereby signifying a more intense tectonic uplift. In contrast, the US segment exhibits relatively diffused patterns for topography, steepness, precipitation and seismicity. The study concludes that tectonic segmentation along the MBT significantly influences both landscape evolution and seismic hazard distribution. The segmentation is likely driven by interactions between tectonic processes and precipitation gradients, influencing erosion rates and strain accumulation patterns. The presence of distinct uplift patterns between the DS and US segments highlights the importance of non-uniform tectonic activity along the MBT. These findings offer critical insights into the relationship between tectonic deformation, surface processes, and hazards in the Himalayas, emphasizing the need for further research on segment boundaries and their role in moderating earthquake propagation.</p>
6.	<p><b>GEOMORPHIC INVESTIGATION OF THE ALLUVIAL FANS OF DEHRADUN VALLEY, NW HIMALAYA, INDIA</b></p> <p><u>Shefali Thakur</u>, Mahesh Thakur  <i>Department of Geology, Panjab University, Chandigarh.</i></p> <p>Dehra Dun one of the largest synclinal intermontane valleys is bounded by significant fault systems, including the Himalayan Frontal Thrust (HFT) to the south, the Main Boundary Thrust (MBT) to the north, the Yamuna Tear Fault (YTF) to the west, and the Ganga Tear Fault (GTF) to the east. The valley contains three prominent alluvial fans—the Donga Fan in the west, the Principal Dun Fan in the centre, and the bhogpur fan in the east—formed around 50,000 years ago due to the uplift along the MBT. Both the HFT and MBT are neo tectonically active, south of the MBT, the Santaurgarh Thrust (ST) and the out-of-sequence Bhauwala Thrust (BT) both represents other active faults in the study area. Geomorphic mapping of Dehra Dun was carried out using topographic maps, satellite imagery, and elevation data. Field studies revealed several Quaternary deformed surfaces and faults, including vertical beds with embedded pebbles in the Principal Dun Fan. Investigating these surfaces will enhance understanding of the tectonic and geomorphic evolution of the valley's fan systems. Optically Stimulated Luminescence (OSL) dating will determine the age of deformation and deposition events, clarifying whether the deformation is linked to the Majahaun Fault (MJF) or Bhauwala Thrust (BT). The fractured</p>

	pebbles suggest recent fault activity, likely postdating the vertical tilting of the beds. This study will help to constrain the seismotectonic activity in the Dehra Dun.
7.	<p><b>THE SPATIAL CORRELATION BETWEEN GEOTHERMAL ACTIVITY AND ASSOCIATED STRUCTURES IN THE KINNAUR REGION OF THE NORTH WESTERN HIMALAYA, INDIA</b></p> <p><u>Shubham Choudhary</u>, Mahesh Thakur <i>Department of Geology, Panjab University, Chandigarh.</i></p> <p>The nature and characteristics of the geothermal system such as heat source, temperature, permeability and fluid flow are intricately linked to structural (faults) or geological factors (such as lithology) of the region. The Kinnaur region of North-Western Himalayas is known to have several geothermal systems. Due to collision of Indian –Eurasian plates, region is dominantly affected by NE-SW shortening, in Kinnaur region NE-SW, NW-SE and E-W extension systems results in various sets of thrust, strike- slip and normal faults. In the present study, we investigate the geothermal systems of the Kinnaur district and its related fault structures. The geological investigation was conducted to find the locations of hot springs and to map faults/ lineaments in the field. Remote sensing data were used to find the spatial correlation between hot springs and faults. Therefore, as a result of our study three new hot springs were identified in the village areas of Ralli, Panvi, and Thopan village. The newly reported hot springs and previously reported hot springs all are located close to major fault structures, such as the Munsiri Thrust, Chaura Thrust, Jeori Thrust, Raura Gad Fault, Karcham Normal Fault System, and Kaurik Chango Fault system. Hence, it is concluded that the occurrence of every hot spring is <math>\approx 500</math> m in proximity to the major fault structure. Further research is necessary to investigate the potential of geothermal resources and to characterize permeability distribution for proper utilization of this renewable energy resource in the study area.</p>

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<b>S.No.</b>	<b>Abstract</b>
8.	<p><b>SYNTHESIS, EFFECTS AND APPLICATIONS OF CURCUMIN.</b></p> <p><u>Ambika Kumari</u>, Rajeev Kumar, Arshdeep Kaur Sahi <i>Department of Environmental Studies, Panjab University, Chandigarh.</i></p> <p>Curcumin, a naturally occurring substance originating from <i>Curcuma longa</i>, is commonly referred to as the active ingredient in turmeric or "Haldi." Although this molecule has been utilized for hundreds of years in traditional medicine and</p>

	<p>cuisine, its vast range of biological actions have recently brought it substantial attention. Curcumin is a prospective option for medicinal uses because to its significant antibacterial, anti-inflammatory, and antioxidant characteristics, as demonstrated by recent scientific investigations. Curcumin's low solubility and poor bioavailability, however, have restricted its therapeutic application. These restrictions have been overcome by recent developments in nanotechnology, which synthesized this substance as a nanoparticle. As a result, curcumin-loaded nanoparticles that increase their therapeutic potential have been developed. This research poster aims to provide a thorough understanding of curcumin nanoparticles, with particular attention to their synthesis, characterisation, and uses in the treatment of central nervous system disorders, antimicrobial therapy, and wound healing. This evaluation also pertains to CHASCON 2024's "Indigenous Technologies for Viksit Bharat" theme because haldi has been employed in numerous traditional and modern Ayurvedic procedures for thousands of years due to its antibacterial, anti-inflammatory, and antioxidant qualities. This review highlights the promise of curcumin nanoparticles, which are generated from turmeric and haldi, as an adaptable treatment approach for a variety of medical conditions.</p>
9.	<p><b>CORRELATION BETWEEN ON-GROUND INVESTIGATIONS AND REMOTE SENSING DATA IN THE MINING REGIONS OF ODISHA</b></p> <p><u>Arushi Thakur</u>  <i>Department of Geology, Panjab University, Chandigarh.</i></p> <p>The integration of remote sensing and fieldwork has emerged as a vital methodology in mining, significantly enhancing both exploration accuracy and environmental management. This poster focuses on the correlation between on-ground investigations and remote sensing data in the mining regions of Odisha, a key area for India's mineral resources. By combining high-resolution satellite imagery with field-based observations, the study seeks to provide a more detailed understanding of mineral distribution, land use changes, and environmental impacts from mining activities. Remote sensing offers an expansive view of mining landscapes, but it often requires fieldwork for validation and accuracy. Ground truthing enables the verification of satellite data, offering insights into geological features, mine operations, and environmental degradation that may be difficult to detect through satellite imagery alone. This correlation improves the precision of resource mapping and the monitoring of ecological impacts like deforestation and soil erosion. The synergy between remote sensing and fieldwork enhances decision-making in mining operations, ensuring more responsible resource extraction and minimizing environmental harm. The study underscores the importance of combining these methodologies to optimize the use of remote sensing in effective and sustainable mining management in Odisha's mining districts.</p>

10.	<p style="text-align: center;"><b>NANOPARTICLE-IMMOBILIZED MEMBRANE FOR PHOTOCATALYTIC DYE BREAKDOWN IN INDUSTRIAL EFFLUENT</b></p> <p><u>Chahat</u><sup>1</sup>, Bunt Sharma<sup>2</sup>, Rajeev Kumar<sup>1</sup>, Ganga Ram Chaudhary<sup>3</sup>  <sup>1</sup><i>Department of Environment Studies, Panjab University, Chandigarh,</i>  <sup>2</sup><i>CIL/SAIF/UCIM, Panjab University, Chandigarh,</i><sup>3</sup><i>Department of Chemistry and Centre for Advance Studies in Chemistry, Panjab University, Chandigarh.</i></p> <p>Dye plays a significant role in plenty of industries, primarily, textile and paper industries. These dyes are either non-biodegradable or take decades to degrade thus slowly depositing and contaminating the rivers and wastewater. Dyes present in the effluent cause environmental pollution which eventually affects the entire ecosystem. This work discusses the degradation of dyes using the principle of photocatalysis. A photocatalyst can be defined as a substance that uses light to alter the rate of reaction. Photocatalyst is generally made of metal oxides and their composites which are exposed to UV or visible light. The energy absorbed must be equal to or greater than the band gap energy of the photocatalyst used. Once on the surface, electrons in the conduction band give out the negative charge to the molecules to be absorbed on the photocatalyst, reducing the molecule, whereas, holes on the valence band accept the electrons from the molecules nearby thereby giving out an oxidative reaction. The products formed after this interaction give out highly oxidative compounds like hydroxyl radical or hydrogen peroxide which react with the contaminants hence degrading them. This poster discusses how with the use of fabric membrane made of <i>Sansevieria trifasciata</i>, Methylene Blue (MB) can be degraded under UV irradiation. The fabric is functionalized using ZnO nanoparticles via sol gel method. This organic membrane is highly porous and can take up a lot of chemically synthesised nano particles of chemically synthesised nano particles on its surface, which catalyses the process of dye degradation.</p>
11.	<p style="text-align: center;"><b>SUSTAINABLE HYDROGEN PRODUCTION FROM AGRICULTURAL STUBBLE WASTE</b></p> <p><u>Eishrat Panjeta</u>, Gaurav Verma  <i>University Institute of Chemical Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>The utilization of agricultural waste into hydrogen is a vital step towards promoting clean energy. The aim is to develop an indigenous, sustainable technology to produce high-purity hydrogen from stubble waste. The aim strongly aligns with Sustainable Development Goals and addresses environment concerns and curbs stubble burning. This research project in collaboration with a well-established industry aims to contribute in overcoming the problem of stubble burning which leads to environment problems therefore, benefitting environment and promoting environment friendly farmer practice, also</p>

	<p>contributing to the nation's Aatmanirbhar Bharat initiative. The process starts with drying stubble waste; the dried material further undergoes pyrolysis followed by gasification leading to syn gas which is used to produce hydrogen. The entire process ensures efficient conversion of agricultural residue into hydrogen offering an environment friendly alternative. Hence, this unique set-up which we call Low Energy and Affordable Future (LEAF). Here are some key questions – 1. Can we efficiently convert stubble waste into zero-emission hydrogen through novel thermochemical processes? 2. Can we significantly contribute to reducing air pollution and align with Sustainable Development Goals? 3. Will this technology offer a sustainable solution to stubble burning while ensuring commercial viability?</p>
12.	<p><b>MICROBIAL BIOREMEDIATION OF PLASTICS: UNLOCKING NATURE'S POTENTIAL FOR WASTE REDUCTION.</b></p> <p><u>Ms. Gurnoor Kaur</u>, Rajeev Kumar  <i>Department of Environmental Studies, Panjab University, Chandigarh.</i></p> <p>Plastic pollution has been one of the major challenges in our life with millions of tons of it accumulating in almost every area be it in terrestrial land or marine ecosystems. The conventional methods for disposal have proven to be quite inefficient and time, cost consuming. Bioremediation where we use microorganisms to degrade the complex plastics has been a promising and sustainable approach for disposal and management. This review explores how we can dispose plastics via bioremediation, its mechanisms, which organisms are capable of plastic degradation. Furthermore, this review addresses the various challenges that come and suggests potential strategies to overcome them.</p>
13.	<p><b>GNSS OBSERVATIONS OF NORTHWEST HIMALAYA</b></p> <p><u>Lovedeep Singh</u>, Sajanjeet Singh  <i>Department of Geology, Panjab University, Chandigarh.</i></p> <p>Abstract - Himachal region of Northwest Himalaya exhibits the widest structural re-entrant in Kangra region and significant strain partitioning along the frontal and hinterland out-of-sequence faults. We report results of continuous GPS measurements from 10 new sites in the region and analyse them along with the previously published results to constrain the ongoing arc-normal and arc-parallel convergence rates at <math>16.5 \pm 1.1</math> and 4–5 mm/yr respectively. Thus, the ongoing convergence is oblique by <math>15^{\circ}</math>–<math>20^{\circ}</math>. The Main Himalayan Thrust (MHT) is strongly coupled up to ~100 km from the Main Frontal Thrust but displays significant variation in coupling in the transition zone across the Kangra re-entrant and the adjoining western salient. Joint analysis of the coupling variation, the geologically inferred MHT geometry variations and the local topographic anomaly pattern strongly suggest the possibility of a potentially active, strain</p>

	<p>accumulating segment of MBT along the southern margin of Dhauladhar ranges in Western Himalachal region, which is also proposed to be influencing the long-term topographic growth in the region. Although a general agreement is observed between the long-term shortening rates along the active faults and the estimated geodetic convergence in this region, the ensuing discussion highlights their complex relationship in terms of temporal and spatial variability in the fault activity and elastic-inelastic deformation. We use the fault orientation and the estimated convergence rate to geometrically constrain a mean dextral slip-rate of 4.4–5.7 mm/yr along a recently discovered Khetpurali-Taksal fault, which is proposed to partition the majority of ongoing arc-parallel deformation along it.</p>
<p>14.</p>	<p><b>BAMBOO AS A SUSTAINABLE MATERIAL IN THE CONSTRUCTION INDUSTRY: AN OVERVIEW.</b></p> <p>Madhura Yadav<sup>1</sup>, Arushi Mathur<sup>1</sup>, <u>Nandini Khurana</u><sup>2</sup>  <sup>1</sup><i>Manipal University Jaipur, Jaipur, Rajasthan,</i> <sup>2</sup><i>Department of Environment Studies, Panjab University, Chandigarh.</i></p> <p>India is the second-largest producer of bamboo worldwide. The increasing dependence on conventional construction materials has contributed to environmental degradation and a decline in wood resources, prompting consideration of bamboo as a substitute for wood and steel. Bamboo is recognized as a sustainable, rapidly renewable, and economically viable material. This investigation aims to validate the selection of bamboo as a suitable resource for efficient and judicious construction practices while evaluating existing literature on its potential applications in the construction industry. As a composite material, bamboo can be utilized for various interior and exterior purposes in buildings, including foundations, flyovers, residential dwellings, multi-story structures, large-span constructions, and the interiors of airports and recreational facilities.</p>

# Engineering Sciences

- University Institute of Engineering & Technology (UIET)
- University Institute of Chemical Engineering and Technology (UICET)

## **CO-ORDINATORS**

*Sectional President*

**Prof. (Dr.) Mamta Juneja**

**9878677624**

*Sectional Secretary*

**Prof. (Dr.) Rajesh Madan**

**950101937**

**CHASCON– 2024**  
**National Conference on**  
**"Indigenous Technologies for Viksit Bharat"**

SECTIONAL PROGRAMME (November 7, 2024)

SECTION – Engineering and Management Sciences

Venue: Block 1, University Institute of Engineering and Technology, Panjab  
University, Chandigarh

Timings	Program	Venue
8:30 - 9:30	Registration	Registration Desk
9:30 - 10:00	Inauguration	SH
10:00 - 10:45	<b>Speaker Session by Dr Narendar Singh Jassal</b> Sr. Principal Scientist & Head, Business Development Group(BDG) Coordinator, DSIR-TePP Outreach cum Cluster Innovation Centre (DSIR-TOCIC) (DSIR-PRISM) Coordinator, CSIR Integrated Skill Initiative (CSIR-ISI) Programme CSIR-Central Scientific Instruments Organisation (CSIR-CSIO) (Ministry of Science & Technology, Govt of India) , Sector 30-C, Chandigarh-160030 (India)	SH
10:45 - 11:30	<b>Speaker Session by Prof. Mohsen Rahmani</b> School of Science and Technology Leader of the Advanced Optics and Photonics (AOP) Lab Nottingham Trent University, Nottingham, United Kingdom (UK)	SH
11:30 - 12:00	High Tea	Block 1
12:00 - 1:00	Oral Presentations	SH, CH, CL1, CL2
1:00 - 2:00	Lunch	Law Auditorium
2:00 - 4:00	Oral Presentations	CH, CL1, CL2
	Poster Presentations	SH
4:00 - 4:30	Closing Ceremony	SH
4:30 -5:00	High Tea	Block 1
(SH - SEMINAR HALL CH - CONFERENCE HALL CL1 - CSE LAB 218 CL2 - CSE LAB 219)		



## KEY SPEAKERS

S.No.	Name of Participant	Affiliating Institution	Title of Abstract
1.	Er Narendar Singh Jassal	Sr. Principal Scientist & Head, Business Development Group (BDG).	Crucial Role of Innovation & Startup Ecosystem for Self-Sustainability, Development and Growth of India.
2.	Prof. Mohsen Rahmani	Prof, School of Science & Technology, Nottingham Trent University, UK.	Engineered Nanoscale Particles: Building Blocks Of Tomorrow's Optical Technologies

# CRUCIAL ROLE OF INNOVATION & STARTUP ECOSYSTEM FOR SELF-SUSTAINABILITY, DEVELOPMENT AND GROWTH OF INDIA



DR. NARINDER SINGH JASSAL

CSIR-Central Scientific Instruments  
Organization (CSIR-CSIO)  
Chandigarh, India.

## ABSTRACT

India is aspiring to become a developed nation by the year 2047, marking the 100th anniversary of its independence. Five key factors play a pivotal role in boosting the nation's economy: Research, Innovation, Technology, Entrepreneurship, and Skill Development. Research and innovation lead to technology development, which in turn fosters the establishment of startups for the commercial launch of new technologies. This innovation and startup ecosystem is essential for increasing employment opportunities. The Government of India is actively promoting an innovation culture, with the DSIR-PRISM scheme providing unique funding opportunities of up to ₹20 lakh for product development and ₹50 lakh for launching startups.

# ENGINEERED NANOSCALE PARTICLES: BUILDING BLOCKS OF TOMORROW'S OPTICAL TECHNOLOGIES



PROF. MOHSEN RAHMANI

School of Science & Technology,  
Nottingham Trent University, United  
Kingdom (UK).

## ABSTRACT

Recent advancements in nanofabrication, characterisation, and computer modelling have facilitated the generation of engineered nanoparticle arrays, known as meta-surfaces, which can extraordinarily control light characteristics. These meta-surfaces can replicate functions of bulky geometrical optics, such as lenses, mirrors, and filters, while also providing functionalities, such as tunability, unattainable by traditional methods. This talk will briefly review the research activities of the Advanced Optics and Photonics Group at Nottingham Trent University focused on light-matter manipulation for real-life applications. Key discussions will include how engineering metallic, dielectric, and semiconductor nanoparticles enables control over light intensity, frequency, and propagation direction. Examples will be presented, including the development of optical nano-switches with switching times faster than the human eye's response and the engineering of nanoparticles to convert near-infrared images into the visible spectrum. Additionally, the latest results on the use of nanostructures for monitoring individual proteins over time will be showcased, demonstrating the centrality of photonics in 21st-century technology.

ABSTRACTS OF  
ORAL  
PRESENTATIONS

<b>Oral Presentation: Engineering Sciences</b>			
<b>S.No.</b>	<b>Name of participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>			
1.	Dr. Anu Jhamb	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Integrating Value-Based Education in Technical Education for Sustainable Development and Inclusive Growth Towards Viksit Bharat.
2.	Dr. Charu Madhu	University Institute of Engineering and Technology, Panjab University, Chandigarh.	RISC-V: A Strategic Catalyst for India's Semiconductor Self-Reliance.
3.	Mr. Gagandeep Singh	University Institute of Engineering and Technology, Panjab University, Chandigarh.	A review on the tribo-mechanical properties of metal matrix composites: Insights and applications.
4.	Dr. Garima Joshi	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Multi-Floor Positioning System (MPS): A Hybrid Approach with Bluetooth and Wi-Fi Technologies.
5.	Dr. Makhan Singh	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Skin disease classification by optimize feature classification with xgboost.
6.	Dr. Nirmal Kaur	Department of Computer Science and Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Contention Aware Energy Efficient Scheduling of DAG Applications on Heterogeneous Computing System.
7.	Dr. Nishima Wangoo	Department of Applied science, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Recent advances in nanotechnology based applications.

8.	Dr. Preeti Gupta	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Next-Gen Cockpit Displays: Pathway for Indigenous Aviation Development.
9.	Dr. Preeti Singh	Department of Electronics and Communication Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Visible light communication using RIS.
10.	Professor Shankar Sehgal	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Microwave hybrid heating-based processing of metals and alloys.
11.	Dr. Sukesha	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Mitigation of Cyber Attacks on Utility Grid.
12.	Dr. Sukesha	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Utilizing smoteen to overcome class imbalance in EEG-Based MCI Detection for Parkinson's disease
13.	Dr. Suresh Kumar	Department of Applied Sciences, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Development of MnO <sub>2</sub> -decorated graphene sheets for enhanced supercapacitor performance.
14.	Dr. Tukesh Soni	University Institute of Engineering and Technology, Panjab University, Chandigarh.	IoT in Mechanical Engineering: Enhancing Efficiency, Predictive Maintenance and Automation.
15.	Professor Veenu Mangat	Department of Information Technology, University Institute of Engineering and Technology, Panjab University, Chandigarh.	A context-aware robust Intrusion Detection System using Reinforcement Learning: Enhancing Model Longevity with Fewer Updates.
16.	Er. Vishal Sharma	University Institute of Engineering and	Modeling of Current gain and early voltage of SiGe HBT

		Technology, Panjab University, Chandigarh.	
17.	Er. Vishal Sharma	University Institute of Engineering and Technology, Panjab University, Chandigarh.	High frequency performance of a SiGe HBT.
<b>Faculty/Scientists from Colleges and Other Institutions</b>			
18.	Dr. Abhijeetsinh Jadeja	Sankalchand Patel University, Mehsana, Gujarat.	Adoptive Learning for Higher Education Using AI.
19.	Dr. Kiran Lata Bhaskar	Punjab Engineering College, Chandigarh.	Phase and Morphology change during Coke based reduction of Chromite Overburden.
20.	Dr. Uma Sheokand	P P Savani University, Surat, Gujarat.	Artificial Intelligence and Good Governance: Navigating Indigenous Innovative Technologies for India's Future.
<b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b>			
21.	Ms. Amanpreet Kaur	Department of Information Technology, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Security Assessment Framework for Cyber-Physical Systems in Critical Infrastructures.
22.	Ms. Aneesha	Department of Laws, Panjab University, Chandigarh	Biocultural Rights of Indigenous Peoples with special reference to the Protection of the Indigenous Technologies in India: An Analysis.
23.	Ms. Archita	University Institute of Engineering and Technology, Panjab University, Chandigarh.	A study on comparison of various Machine Learning models for EMG signal classification.
24.	Ms. Gulbadan Khehra	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Multi-Stage Computational Framework for Diabetic Retinopathy Detection Focusing on Biomarker Segmentation in Retinal Fundus Imaging.

25.	Mr. Gurbinder Singh Dhanoa	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Next-Gen Cockpit Displays: A Pathway for Indigenous Aviation Development.
26.	Ms. Jaskiranjit Kaur	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Optimizing Resource Management in 5G Network Slicing with Blockchain and Smart Contracts.
27.	Dr. Kamaljit Kaur	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Phone camera Nano-biosensor using mighty sensitive transparent reusable up conversion paper.
28.	Mr. Kawalpreet Singh	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Eco-Friendly Pulping of Paddy Straw: A Sustainable Strategy for Paper Production and Environmental Preservation.
29.	Ms. Kirti	University Institute of Fashion Technology & Vocational Development, Panjab University, Chandigarh.	A Comparative Study on the Acceptance of Hand-made and Machine-made Canvases for Promoting Circular Fashion through Applique Work.
30.	Mr. Mankirat Singh Mann	University Institute of Engineering and Technology, Panjab University, Chandigarh.	A review of smart dressing for wound healing.
31.	Ms. Meena Kumari	Department of Computer Science and Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Enhancing Soccer Action Recognition through a Novel Spatiotemporal Encoder and the Soccerdb10 Dataset.
32.	Ms. Nitin Bhatia	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Anomaly detection in credit card fraud detection using machine learning (ml) and deep learning (dl).
33.	Ms. Paridhi Naithani	University Institute of Engineering and	Vision guided navigation for autonomous UAVs.



		Technology, Panjab University, Chandigarh.	
34.	Mr. Prashant Prakash	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Revolutionizing Prosthetic Design: Advanced 3D Scanning and Additive Manufacturing for Anatomically Accurate Hand Prostheses.
35.	Ms. Priyanka	Department of Computer Science and Engineering University Institute of Engineering and Technology, Panjab University, Chandigarh.	Automatic Annotation of IOPA Dental Radiographs for Detecting Furcation Radiolucency Using Segment Anything Model.
36.	Ms. Priyanka Thakur	Department of Computer Science and Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Unimodal and multimodal facial and speech emotion detection.
37.	Er. Rajneesh	University Institute of Engineering and Technology, Panjab University, Chandigarh.	RISC-V: A Strategic Catalyst for India's Semiconductor Self-Reliance.
38.	Mrs. Rashmi Bhatia	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Layered Feature Optimization Framework for Efficient ddos Attack Detection Using Machine Learning and Deep Learning Models in Anomaly Detection Systems.
39.	Mr. Sahil Pathak	University Institute of Engineering and Technology, Panjab University, Chandigarh.	DT-CAD: A web based application for the analysis and detection of furcation in dental radiographs.
40.	Ms. Samriti Sharma	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Acoustic Emission (AE) signal waveform categorization through fastdtw range partitioning.
41.	Er. Satwinder Kaur	Department of Electronics and Communication Engineering, University	Evaluating Vision Transformers Performance on PU-ISL Dataset.

		Institute of Engineering and Technology, Panjab University, Chandigarh.	
42.	Ms. Sumindar Kaur Saini	University Institute of Engineering and Technology, Panjab University, Chandigarh.	An analysis of denoising techniques for Prostate Cancer Imaging.
43.	Ms. Swaranjeet Kaur	University Institute of Engineering and Technology, Panjab University, Chandigarh.	A Critical Study Multilingual Plagiarism Checker in Text.
44.	Ms. Veerpal Kaur	Department Of Computer Science And Applications, University Institute of Engineering and Technology, Panjab University, Chandigarh.	A Review of Methods to Recognize Degraded Gurmukhi Text along with Challenges and Advances.
<b>UG/PG Students of Panjab University Campus and Regional Centres</b>			
45.	Mr. Abhishek Rana	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Identification of Polarized Content on Social Media using Machine Learning.
46.	Ms. Aditi	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Citizen Powered Cleanliness Reporting system with Hotspots detection and alert system.
47.	Mr. Aditya Poddar	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Designing Cranial helmets for pre/post-surgical craniosynostosis using AI based techniques.
48.	Mr. Akshay Dhiman	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Stability-Aware Offloading in MEC: A Lyapunov-Guided Deep Reinforcement Learning Approach.
49.	Mr. Ananay Aggarwal	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Empowering Farmers with Crop-Hawk: Precision Agriculture for a Greener Tomorrow.

50.	Er. Anu Mahindru	National Institute of Technical Teachers Training & Research, Chandigarh.	Current Trends in Deep Learning for Multi-Object Tracking: A Review of MOT Datasets.
51.	Mr. Arnesh Jindal	Department of Computer Science and Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Indian Sign Language Recognition using Mediapipe and Yolo-nas.
52.	Mr. Aryan Kamboj	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Optimising Fuel Cell Performance and Evaluation Using AI/ML Techniques: A Genetic Algorithm Approach.
53.	Mr. Banipreet Singh	University Institute of Engineering and Technology, Panjab University, Chandigarh.	A survey on Generative and Explainable AI for Internet Traffic Analysis.
54.	Mr. Devvrat	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Reviewing the Game Pattern study Of "Rock Paper Scissor" with AI.
55.	Ms. Diksha	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Designing a Sustainable Fashion Ensemble from Textile Waste with Temple-Saffron Flower and Turmeric Dyes.
56.	Er. Dipanshu Gomra	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Heart failure prediction using machine learning model.
57.	Ms. Divyanshi Sharma	University Institute of Engineering and Technology, Panjab University, Chandigarh.	UAV Operations in GPS Denied Environment.
58.	Er. Gourav Kashiv	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Conversational AI for Mental Health Support.

59.	Er. Gunjan	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Sign Connect: An interactive conference platform for hard of hearing and speech impaired.
60.	Ms. Harleen Kaur	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Early Screening of Cancerous tissues by Computer Aided Diagnostic Systems.
61.	Mr. Harsh Bassal	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Comparison of CNC milled versus rapid prototyped medical implants.
62.	Ms. Harsimran Kaur	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Deep Learning based Segmentation in Diabetic Retinopathy – A Comparative Overview.
63.	Ms. Ira Bhatia	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Vision-Language Models: A New Era of Image Classification.
64.	Ms. Ishwarpreet Kaur	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Sustainable Party Decor - Utilizing Natural Palm Leaves, Pampas Grass, and Oversized Paper Flowers Crafted from Recycled Project Files for Mindful Celebrations.
65.	Ms. Jahnvi	Department of Biotechnology Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.	“Broad Spectrum Anti-Bacterial Effect of Biosurfactant: Non-invasive analysis using Thermal Camera and Python Software.
66.	Mr. Jasjit Singh Dhanoa	University Institute of Engineering and Technology, Panjab University, Chandigarh.	AI in Early Liver Disease Detection: A Comprehensive Review.
67.	Ms. Komal	University Institute of Engineering and	Comparative Analysis of Generative AI Models for Text-to-Video Generation.

		Technology, Panjab University, Chandigarh.	
68.	Ms. Lipakshi	Department of Computer Science and Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Implementation of XAI assisted Uterine Cancer Tumor Classification System.
69.	Ms. Mallika Raj	University Institute of Engineering and Technology, Panjab University, Chandigarh.	A BERT-based technique on IMDB movie reviews.
70.	Ms. Maanya Kharbanda	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Early diagnosis of heart disease using machine learning: A performance evaluation.
71.	Ms. Pragya Thakur	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Enhancing Cervical Cancer prediction with Machine Learning and SMOTE: A Balanced Approach.
72.	Dr. Priyanka Rana	Postgraduate Institute of Medical Education & Research, Chandigarh.	Deep Learning-Based Automated Detection of Mandibular Fractures in Panoramic Radiographs.
73.	Er. Ravneet Sharma	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Classification of EMG signals for Hand Gesture Recognition using Hybrid Deep Learning techniques.
74.	Ms. Saanvie Dadwal	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Online Queuing in opds and Simplified insurance claims.
75.	Mr. Sameer Thakur	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Forecasting Financial Trends: Integrating Machine Learning and Deep Learning Techniques for Improved Stock Market Predictions.

76.	Ms. Shagun	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Spacecraft Anomaly Detection using AA_TCN (Attention-Autoencoder-TCN)
77.	Mr. Shammi	University Institute of Engineering and Technology, Panjab University, Chandigarh.	An aspect-level sentiment analysis dataset for therapies on twitter.
78.	Ms. Shivani Verma	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Performance optimization through Artificial Neural Network (ANN) based algorithm/model in the conventional fuzing system.
79.	Ms. Shruti Yadav	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Sustainable Accessory Design: Exploring the Role of Upcycling, Recycling, and Circular Fashion in Modern Accessories.
80.	Ms. Simar Atwal	Chandigarh College of Engineering and Technology, Chandigarh.	AI powered tax management and verification system.
81.	Ms. Vidushi Sharma	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Fourth generation solar cells.
82.	Mr. Vinay Sharma	Department of Computer Science and Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Sentiserve : Enhancing Public Service Bots with Emotion Detection Through Vocal Cues.

**UG/PG Students from Colleges and Other Institutions**

83.	Mr. Abhay Sounkhla	Department of Engineering, Shoolini University, Solan, Himachal Pradesh.	Evaluation of Military Weapon System.
84.	Ms. Priyanka Kalsi	Yogananda School of AI, Computers and Data Science, Shoolini	Recent improvements on the use of artificial intelligence based technologies for detection of breast cancer: A review

		University, Solan, Himachal Pradesh.	
85.	Mr. Ramandeep Singh	Department of Computer Science and Engineering, Chandigarh University, Gharuan, Punjab	P vs Np problem.
86.	Mr. Vaibhav Kheriwal	Shoolini University, Solan, Himachal Pradesh.	Evaluation of game engines: A review of the past, present, and future of game engines.

<b>List of Abstracts</b>	
<b>Oral Presentation</b>	
<b>S.No.</b>	<b>Abstract</b>
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>	
1.	<p><b>INTEGRATING VALUE-BASED EDUCATION IN TECHNICAL EDUCATION FOR SUSTAINABLE DEVELOPMENT AND INCLUSIVE GROWTH TOWARDS VIKSIT BHARAT</b></p> <p><u>Anu Jhamb</u><sup>1</sup>, <u>Garima Joshi</u><sup>1</sup>, <u>Sheveta Aggarwal</u><sup>1</sup>, <u>Kalpana Sharma</u><sup>2</sup>  <sup>1</sup><i>University Institute of Engineering and Technology, Panjab University, Chandigarh,</i> <sup>2</sup><i>Directorate of Higher Education, Shimla, Himachal Pradesh.</i></p> <p>This paper explores the integration of value-based education in technical education as a key driver for sustainable development and inclusive growth, aligning with India’s vision of Viksit Bharat (Developed India). While technical education equips students with industry-relevant skills, value-based education ensures that graduates are not only technically proficient but also possess ethical reasoning, social responsibility, and environmental awareness. Despite having a vast network of engineering institutions, only about 50% of Indian engineering graduates are employable, according to the India Skills Report 2023. Many institutions still focus predominantly on technical training, overlooking the importance of essential soft skills and ethical learning. As noted by the All India Council for Technical Education (AICTE), the integration of value-based education into curricula remains limited. The National Education Policy (NEP) 2020 emphasizes the need for value-based education in reshaping India’s technical education landscape to address this gap. Surveys and reports from AICTE, NITI Aayog, and UNESCO underscore the deep interconnection between value-based education and the Sustainable Development Goals (SDGs). Both frameworks aim to foster a more equitable, responsible, and sustainable society, paving the way for Viksit Bharat by 2047. This paper highlights how value-based education serves as a core component in promoting sustainable and inclusive development. By instilling a strong moral foundation, it empowers individuals and societies to achieve the SDGs, ensuring a balanced focus on people, planet, and profit for a sustainable future.</p>
2.	<p><b>RISC-V: A STRATEGIC CATALYST FOR INDIA'S SEMICONDUCTOR SELF-RELIANCE</b></p> <p><u>Rajneesh</u>, <u>Nidhi Garg</u>, <u>Charu Madhu</u>  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Background: India heavily depends on foreign technology for semiconductors, making critical sectors like defense, telecommunications, and healthcare vulnerable to external supply chain disruptions. RISC-V provides a unique opportunity to reduce this</p>



	<p>dependence by empowering indigenous development. Objective: This paper investigates how RISC-V can be leveraged to foster a self-reliant semiconductor ecosystem in India, enabling the creation of custom hardware designs tailored to various applications, from defense to IoT. Method: The study examines global case studies of RISC-V implementations, explores its role in designing System-on-Chip (SoC) architectures, and proposes a roadmap for adopting RISC-V in India's semiconductor strategy. Special attention is given to security enhancements and cost-effective innovation. Result: RISC-V's open architecture facilitates the design of secure and customizable processors, accelerators, and microcontrollers, reducing India's reliance on foreign technologies. Architecture also lowers development costs and fosters collaboration among academia, industry, and government. Conclusion &amp; Future Scope: RISC-V holds immense potential to drive India's semiconductor self-reliance, ensuring security, innovation, and economic growth. Future research could focus on optimizing performance for specific Indian needs and scaling domestic semiconductor manufacturing to meet both local and global demand. Keywords: RISC-V, Semiconductor Self-Reliance, Open-Source Architecture, Customizable ISA.</p>
<p>3.</p>	<p><b>A REVIEW ON THE TRIBO-MECHANICAL PROPERTIES OF METAL MATRIX COMPOSITES: INSIGHTS AND APPLICATIONS</b></p> <p><u>Gagandeep Singh</u>, Amit Chauhan, Amandeep Singh Wadhwa  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Metal matrix composites (MMCs) have garnered significant attention due to their superior mechanical and tribological properties compared to conventional materials. This study investigates the tribo-mechanical behavior of metal matrix composites reinforced with ceramic particles. The focus is on understanding the influence of reinforcement types, particle sizes, and volume fractions on tribo-mechanical properties such as hardness, tensile strength, impact strength, wear resistance, and coefficient of friction. The composites were fabricated using an economical stir casting method, ensuring uniform distribution of the reinforcement within the metal matrix through material characterization techniques such as SEM and EDS. Mechanical properties were evaluated through tensile, hardness and impact tests while tribological performance was assessed using pin-on-disk wear testing under varying loads and sliding speeds. The review of the relevant literature indicated that the incorporation of ceramic particles significantly improves both wear resistance and mechanical strength of the MMCs, with higher volume fractions and smaller particle sizes contributing to enhanced performance. Microstructural analysis reveals strong bonding at the interface between the matrix and reinforcement, which further contributes to the improved properties. Overall, the review of the literature highlights the potential of MMCs for applications where a combination of high strength and superior wear resistance is required, such as in automotive, aerospace, and manufacturing industries.</p>

<p>4.</p>	<p><b>MULTI-FLOOR POSITIONING SYSTEM (MPS): A HYBRID APPROACH WITH BLUETOOTH AND WI-FI TECHNOLOGIES</b></p> <p><u>Aakarsh Prasad</u>, Sukhwinder Kour, Krishan Kumar Chauhan, Manjeet Kaur, Garima Joshi  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>This project introduces a multi-floor positioning system that integrates Bluetooth, Wi-Fi, and barometer sensors to achieve precise indoor navigation across various levels. Traditional GPS fails indoors, particularly in multi-story buildings, prompting the need for alternative solutions. By utilizing Bluetooth Low Energy (BLE) and Wi-Fi for horizontal positioning and a barometer for vertical identification, the system significantly enhances location accuracy and continuity. BLE operates in the 2.4 GHz ISM band, deploying beacons at 10-20 meter intervals to establish specific signal zones on each floor. Complementing this, Wi-Fi access points utilize both 2.4 GHz and 5 GHz bands to provide broader coverage and improved signal robustness, with bandwidths ranging from 20 to 160 MHz. The system calculates the Received Signal Strength Indicator (RSSI), typically between -30 dBm and -90 dBm, allowing for horizontal positioning accuracy of 1 to 3 meters. For vertical positioning, the integrated barometer measures air pressure changes with an accuracy of 0.1 to 1 meter. By detecting subtle pressure differences between floors, it enables precise floor-level identification. The combined data from Bluetooth, Wi-Fi, and barometers enhances overall navigation accuracy. Filtering algorithms mitigate signal interference and environmental noise, ensuring smooth floor transitions and reliable positioning. This hybrid system is suitable for mobile applications, enabling real-time navigation for users in shopping malls, hospitals, and multi-story warehouses. The project showcases a scalable, energy-efficient solution that addresses the limitations of GPS in indoor environments.</p>
<p>5.</p>	<p><b>SKIN DISEASE CLASSIFICATION BY OPTIMIZE FEATURE CLASSIFICATION WITH XGBOOST</b></p> <p>Makhan Singh  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Skin diseases are more common than other types of diseases. Skin illnesses can be caused by a variety of aspects, including fungi, bacteria, allergies, viruses, and so on. The rapid advancement of medical technology based on photonics and lasers has made it possible to identify skin disorders in a more accurate and timely manner. However, the cost of such a diagnostic remains extremely limited and prohibitively expensive. As a result, the use of image processing methods is beneficial in the early stages of developing an automated dermatology screening system. The extraction of characteristics is an extremely important step in classifying skin disorders. The use of computer vision may play an important role in the diagnosis of a variety of skin conditions using a variety of approaches. The strategy we have proposed is straightforward and quick, and requires no expensive equipment other than a camera and a computer. When applied to the inputs of a colored picture, the method is successful. After that, resize a portion of the image to</p>

	<p>extract features with a pretrained convolutional neural network. The feature was then classified using the Multiclass XG BOOST program.</p>
<p>6.</p>	<p><b>CONTENTION AWARE ENERGY EFFICIENT SCHEDULING OF DAG APPLICATIONS ON HETEROGENEOUS COMPUTING SYSTEM</b></p> <p>Nirmal Kaur  <i>Department of Computer Science and Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>In pursuit to green computing demands, energy efficient scheduling along with high performance of an application is gradually gaining research attention. High performance computing systems with performance of teraflops and petaflops is drawing enormous power consumption. The performance increase of such systems has dramatically raised power dissipation resulting in more operational costs, poor system reliability, more packaging and cooling costs, as well as global warming due to CO2 emissions. The negative outcome of power consumption drawn by computing infrastructure, network systems, and embedded systems has raised a serious matter of concern for the society trusting on information technology. Many of the large-scale scientific applications executed on present-day computing are modelled as Directed Acyclic Graph (DAG). Varying scheduling heuristics such as list, duplication, and clustering are available for the classical model (CM), but without consideration of bandwidth contention for communication resources. It is generally accepted that CM is unrealistic, and does not provide realization of precise and efficient schedules. To cope with it, some investigators suggested scheduling techniques in Realistic model (RM) to improve on make span frontage, but they too have sidelined the critical energy consumption problem. As a result, there is a wide-ranging scope of designing the energy efficient solutions in view of contention awareness for scheduling DAG applications in Realistic models.</p>
<p>7.</p>	<p><b>RECENT ADVANCES IN NANOTECHNOLOGY BASED APPLICATIONS</b></p> <p>Nishima Wangoo  <i>Department of Applied science, University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>“Nanoscience” is the emerging science of materials with dimensions ranging from a few nanometers to less than 100 nanometers. In chemistry, these dimensions have historically been related to colloids, micelles, polymer molecules etc. More recently, structures such as nanorods, buckytubes, semiconductor quantum dots, carbon dots etc. have emerged as particularly new and intriguing classes of these nanomaterials. In physics, nanoscience is particularly associated with quantum behaviour, and the behaviour of electrons and photons in nanoscale structures. Biotechnology also has a profound interest in nanostructures as components of the cell; many of the most interesting structures in biology—from DNA and viruses to subcellular organelles and gap junctions— can be considered as nanostructures. But, it is indeed interesting for the chemists to realize that chemistry is already playing a pivotal role in nanotechnology. Chemistry and chemical</p>

	<p>engineering play an essential role in developing processes and methods to design and synthesize materials for their further use in nanotechnology. Although the first interest in nanotechnology revolved essentially on nanoelectronics, and materials science; applications of nanoscience in general and nano chemistry in particular, is acquiring increasingly dominant effect on the applications in nanobiotechnology.</p>
8.	<p><b>NEXT-GEN COCKPIT DISPLAYS: PATHWAY FOR INDIGENOUS AVIATION DEVELOPMENT</b></p> <p>Gurbinder Singh Dhanoa, Nidhi Garg, <u>Preeti Gupta</u>  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Background: The aviation sector is experiencing a transformative shift due to the introduction of next-generation cockpit displays that incorporate cutting-edge technologies such as OLED, augmented reality (AR), micro-LED, 3D holographic visuals, digital light engines, artificial intelligence (AI), and touch-based controls. These advancements not only enhance pilot situational awareness but also open avenues for domestic development in aviation technology. Objective: This paper seeks to investigate the potential of next-gen cockpit displays as a driver for domestic aviation advancement, evaluating their effects on pilot performance, safety, and the larger aerospace landscape. Method: A mixed-methods strategy was employed, including comparative analyses to evaluate the effectiveness of OLED, micro-LED, AR, digital light engines, and 3D displays. Additionally, case studies of current next-gen cockpit systems were reviewed to assess their functionality and integration in various aircraft. Result: The results demonstrate that next-gen cockpit displays markedly enhance situational awareness and decision-making capabilities for pilots. The incorporation of local technologies within these systems can strengthen domestic manufacturing capabilities and diminish dependence on foreign solutions, thus promoting economic development in the aviation sector. Conclusion &amp; Future Scope: Next-gen cockpit displays signify not just a technological advancement but also a strategic opportunity for fostering domestic aviation growth. By prioritizing investments in these technologies, nations can cultivate local expertise and build a self-sustaining aerospace industry. Further research is required to find an optimal balance between technological innovation and human factors design, ensuring both usability and safety in aviation operations. Keywords: Next-Generation Cockpit Displays, Domestic Aviation Development, Situational Awareness.</p>
9.	<p><b>VISIBLE LIGHT COMMUNICATION USING RIS</b></p> <p>Prince, <u>Preeti Singh</u>, Nidhi, Pardeep Kaur  <i>Department of Electronics and Communication Engineering , University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Visible Light Communication (VLC) is a promising and popular approach that has potential of solving major challenges of Radio Communication. Communication using radio waves suffers from various challenges including Spectral Congestion, Speed, Cost, Limited Bandwidth and Interference. VLC in turn has the potential to overcome these</p>

	<p>problems having its unlicensed visible light spectrum from 400nm-700nm with no EM interference. Visible Light Communication can be used in various applications like under-water communication, hospitals, Li-fi and vehicle-to-vehicle communication providing high speed connectivity where communication using radio waves is difficult to deploy. However, VLC also has some significant issues like line of sight and multipath fading. Reconfigurable intelligent surfaces (RISs) can be used to overcome these problems [1]. It has introduced a VLC Receiver using RIS and transmitter for light steering and improving strength of the signals and data rate [2]. A normal radio network can be converted into a smart Radio network [3] using RIS in visible light communication where every part of the network will be capable of adapting itself to the changes in the signal which in turn will mitigate the problem of line of sight and multipath fading. In this, the identification of the best setup technique for RIS to get the better results in case of line of sight and data rate will be done.</p>
10.	<p><b>MICROWAVE HYBRID HEATING-BASED PROCESSING OF METALS AND ALLOYS</b></p> <p>Shankar Sehgal  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Microwave hybrid heating combines the use of both conventional heating methods and microwave energy heating method. Metals and alloys are heated to a critical temperature using conventional heating; after which the metallic materials start directly absorbing the microwaves leading to huge rise in temperature which leads to melting of the metallic specimen. Microwave hybrid heating-based processing of metals and alloys have garnered significant attention due to its major benefits related to lesser environmental hazards, lower energy consumptions, reduced thermal stresses, smaller heat affected zones, and better productivity due to the volumetric and efficient hybrid-heating mechanism. Major breakthroughs in microwave hybrid heating-based processing includes the new developments related to experimental assembly procedures, tailor-made microwave susceptors and insulators, and optimizing the processing parameters. These developments, in future, will pave the way for more sustainable metal processing techniques in industrial applications.</p>
11.	<p><b>MITIGATION OF CYBER ATTACKS ON UTILITY GRID</b></p> <p>Kshitij, Krishan Kumar, <u>Suksha</u>  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>The mitigation of cyber-attacks on utility grids is crucial due to the advancements in wireless and wired closed loop control systems in power grid infrastructure. Research has focused on developing frameworks and strategies to address cyber threats in smart grids and microgrid systems. A framework for modeling cyber-physical switching vulnerabilities in smart grids highlights the importance of understanding the local structure of the power grid. Reputation-based topology configuration schemes have been used by researchers to mitigate denial of service attacks. In cloud computing, Distributed Denial of Service (DDoS) attack mitigation solutions emphasize prevention, detection,</p>

	<p>and mitigation mechanisms. Differential game frameworks for smart grid security analysis showcase strategies to counter distributed energy resource attacks and maintain transient stability. There has been significant focus on developing testing platforms and test beds for analyzing vulnerabilities in microgrid controllers and power utility automation networks. These studies elaborate about the significance of hardware-in-the-loop simulations in understanding cyber risks and implementing effective mitigation strategies. Emphasis is placed on the need for a holistic attack-resilient framework to protect distributed energy resources and smart inverters from cyber-attacks, ensuring grid reliability and stability. Control strategies and resiliency approaches for cyber-physical systems of microgrids highlight the complexity of securing communication and control systems in modern microgrid environments.</p>
12.	<p><b>UTILIZING SMOTEEN TO OVERCOME CLASS IMBALANCE IN EEG-BASED MCI DETECTION FOR PARKINSON'S DISEASE</b></p> <p>Aanchal Sharma<sup>1</sup>, Anu Gupta<sup>1</sup>, <u>Sukesh</u><sup>2</sup></p> <p><sup>1</sup><i>Department of Computer Science and Applications, Panjab University, Chandigarh,</i>  <sup>2</sup><i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Accurate detection of mild cognitive impairment (MCI) in Parkinson's Disease (PD) is essential for early intervention and treatment. However, imbalanced EEG datasets often hinder the performance of machine learning models in identifying MCI patients. In this study, the San Diego EEG dataset (31 subjects, 93 minutes) has been used and SMOTEEN—a hybrid technique that combines the Synthetic Minority Over-sampling Technique (SMOTE) and Edited Nearest Neighbors (ENN)—has been applied to address the class imbalance between MCI and non-MCI groups. SMOTEEN has oversampled the minority class (MCI) and removed noisy instances from the majority class (non-MCI), resulting in a more balanced training set. The present analysis has shown that models trained on the balanced dataset have performed better than those trained on the imbalanced data, achieving significantly higher classification accuracy and sensitivity in distinguishing MCI from non-MCI patients. The balanced data approach has provided a more accurate representation of the minority MCI class, reduced misclassification and improving the overall reliability of EEG-based detection of cognitive impairment in PD patients. These results have shown that SMOTEEN, when applied to EEG data, effectively enhances the identification of early cognitive decline, offering a promising method for developing reliable diagnostic tools for PD.</p>
13.	<p><b>DEVELOPMENT OF MnO<sub>2</sub>-DECORATED GRAPHENE SHEETS FOR ENHANCED SUPERCAPACITOR PERFORMANCE</b></p> <p>Anjali<sup>1</sup>, Twinkle<sup>2</sup>, Sonal Rattan<sup>3</sup>, Manpreet Kaur<sup>2</sup>, <u>Suresh Kumar</u><sup>2</sup>, J. K. Goswamy<sup>2</sup></p> <p><sup>1</sup><i>Rayat Bahra University, Kharar, Punjab,</i> <sup>2</sup><i>Department of Applied Sciences, University Institute of Engineering and Technology, Panjab University, Chandigarh,</i> <sup>3</sup><i>Department</i></p>

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Graphene and its derivatives are receiving significant attention due to their exceptional structural and physico-chemical characteristics. As both the global population and technological advancements drive increasing energy needs, finding sustainable solutions for energy generation and storage becomes crucial. Renewable energy sources, combined with efficient storage systems, offer a path forward. Among various storage technologies, electrochemical batteries and supercapacitors stand out, with supercapacitors providing distinct advantages over batteries. In this study, we developed a reproducible and efficient chemical method for growing flower-like MnO<sub>2</sub> nanostructures on chemically reduced graphene sheets. The resulting graphene-MnO<sub>2</sub> composites were used to prepare supercapacitor electrodes and the specific capacitance was evaluated using PVA-H<sub>2</sub>SO<sub>4</sub> gel electrolyte. The fabricated device exhibited excellent specific capacitance and cyclic stability. Moreover, this method holds promise for scaling up and commercialization, advancing the development of high-performance supercapacitors.

14. **IOT IN MECHANICAL ENGINEERING: ENHANCING EFFICIENCY, PREDICTIVE MAINTENANCE AND AUTOMATION**

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The integration of the Internet of Things (IoT) into mechanical engineering has revolutionized the way mechanical systems are designed, operated, and maintained. This paper explores the role of IoT in enhancing efficiency, enabling predictive maintenance, and advancing automation within mechanical engineering environments. IoT technologies, such as sensors, actuators, and cloud-based analytics, allow real-time monitoring and control of mechanical systems, providing engineers with critical data to optimize performance and reduce downtime. One key application of IoT in mechanical engineering is predictive maintenance, where sensors continuously monitor equipment health to predict failures before they occur. By leveraging machine learning algorithms and data analytics, engineers can perform maintenance based on real-time conditions rather than fixed schedules, reducing operational costs and minimizing unexpected breakdowns. Furthermore, IoT facilitates automation by enabling seamless communication between machines, robotic systems, and control platforms. This connectivity optimizes production processes, reduces human intervention, and improves the flexibility and scalability of mechanical systems in smart manufacturing environments. The paper also highlights the challenges associated with IoT adoption in mechanical engineering, such as cybersecurity risks, data management, and system integration. Despite these challenges, the potential benefits of IoT—improved efficiency, reduced costs, and enhanced system reliability—make it a crucial technological advancement for the future of mechanical engineering. In conclusion, IoT serves as a key enabler for transforming traditional mechanical systems into intelligent, data-driven,

	<p>and automated solutions, offering significant opportunities for innovation and growth in the industry.</p>
<p>15.</p>	<p><b>A CONTEXT-AWARE ROBUST INTRUSION DETECTION SYSTEM USING REINFORCEMENT LEARNING: ENHANCING MODEL LONGEVITY WITH FEWER UPDATES</b></p> <p><u>Prabjot Singh</u>, Veenu Mangat  <i>Department of Information Technology, University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Machine Learning algorithms are often classified under one of three broad categories: supervised learning, unsupervised learning and reinforcement learning (RL). Supervised learning algorithms are based on inductive inference where the model is typically trained using labelled data to perform classification or regression, whereas unsupervised learning encompasses techniques such as density estimation or clustering applied to unlabelled data. In RL paradigm an autonomous agent learns to improve its performance at an assigned task by interacting with its environment. Over the past few years, numerous studies have employed machine learning techniques for network-based intrusion detection. While these methods have demonstrated high detection accuracy, they often fail to account for changes in network traffic behaviour over time. Researchers typically assume that models can be updated periodically as needed, but this is not always feasible in real-world settings. RL based novel intrusion detection model can function for extended periods without frequent updates. The model employs two key strategies: first, it treats the machine learning task as a reinforcement learning problem to ensure long-term reliability and high classification accuracy. Second, it incorporates model updates through a transfer learning technique combined with a sliding window mechanism, significantly reducing the need for computational resources and human intervention. Experiments using a new dataset reveal that proposed technique, even without regular updates, achieves accuracy comparable to traditional models, reduces false positives by significant percentage, and uses nearly five times less computational resources than conventional approaches.</p>
<p>16.</p>	<p><b>MODELING OF CURRENT GAIN AND EARLY VOLTAGE OF SIGE HBT</b></p> <p><u>Vishal Sharma</u>, Amit Chaudhry, Nikhil Dubey  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>The performance of a silicon-germanium heterojunction bipolar transistor (<i>SiGe</i> HBT) has been studied with three different Ge doping profiles in the base region. These profiles are triangular (graded), trapezoidal (graded and box combination) and box (constant). The parameters studied are current gain and early voltage. Additional effects such as temperature, base pushout, low collector current injection effect, bandgap narrowing and collector voltage variations have been included in the model. The modelled results show that in box profile, current gain is highly improved whereas in the triangular profile, the parameters early voltage and current gain early voltage product are highly improved. The trapezoidal approach has intermediate results between the other two approaches. The</p>



	<p>results obtained from the developed model show good agreement with the existing reported results.</p>
17.	<p><b>HIGH FREQUENCY PERFORMANCE OF A SIGE HBT</b></p> <p><u>Vishal Sharma</u>, Amit Chaudhry, Nikhil Dubey  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>The cutoff frequency and maximum frequency of oscillation are the two most important high frequency performance parameters of a SiGe HBT. These parameters have been studied with three different Ge doping profiles (triangular, box and trapezoidal) in the base region. Some effects such as <i>kirk effect</i>, bandgap narrowing and collector voltage variations have been included in the model. The modeled results show that in box profile, emitter delay is improved whereas in the triangular profile, base transit time is highly improved. The trapezoidal approach has intermediate results between the other two approaches. The cutoff frequency and maximum frequency of oscillation are highly improved as compared to Si BJT in all the three Ge profile cases.</p>
<p><b>Faculty/Scientists from Colleges and Other Institutions</b></p>	
18.	<p><b>ADOPTIVE LEARNING FOR HIGHER EDUCATION USING AI</b></p> <p><u>Abhijeetsinh Jadeja</u><sup>1</sup>, Shailesh Iyer<sup>2</sup>, Darshna Pandya<sup>1</sup>  <sup>1</sup><i>Sankalchand Patel University, Mehsana, Gujarat, </i><sup>2</sup><i>Rai University, Ahmedabad, Gujarat.</i></p> <p>This research explores the transformative possibilities of using innovation and artificial intelligence (AI) in the field of adaptive learning. With AI's rapid advancement, personalized learning experiences are becoming more and more feasible. This makes it possible to create dynamic, personalized learning paths that adjust to the needs of every student. Methodology: The study focuses on how AI-powered tools like machine learning, natural language processing, and predictive analytics may improve learning outcomes, provide students with real-time feedback, and raise student engagement. By integrating innovation and artificial intelligence (AI) into adaptive learning systems, educators can address a range of learning styles (VARK), fill in knowledge gaps, and provide targeted interventions. Scope: The paper examines case studies of AI-enabled adaptive systems and focuses on how they function in various learning environments. Challenges: Given the emphasis on ethical concerns, data privacy and protection, and the digital divide, a well-rounded implementation strategy is required. Discussion: This study concludes by arguing that innovation and AI may transform education, encourage lifelong learning, and equip students with the abilities they will need in the future. Keywords: Data privacy, adaptive learning, visual audacity read-write kinaesthetic (VARK), personalized learning, and artificial intelligence (AI).</p>
19.	<p><b>PHASE AND MORPHOLOGY CHANGE DURING COKE BASED REDUCTION OF CHROMITE OVERBURDEN</b></p>

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Nickel, a valued metal, mainly associated with the iron rich goethite in a low grade chromite overburden (COB). In this paper, the carbothermic reduction of oxides of iron and nickel were analyzed by reducing chromite overburden at different reduction temperatures and time. The morphology of reduced COB was investigated by X-Ray diffraction (XRD), scanning electron microscopy (SEM) attached with energy dispersive spectroscopy (EDS). Experimental results indicate that with increase in temperature from 1200°C to 1300°C, more metallic Fe-Ni particles are produced and its purity is increased may be due to the higher temperature favours the fluidity and cohesion between nickel and iron leads to the formation of Fe-Ni alloy. A clear boundary between metallic particles and slag matrix is observed with increase in reduction time (2-6 hours) and the size and purity of Fe-Ni particles increase. It is found that at higher temperature, oxides of iron and nickel is almost reduced to Fe-Ni metallic particle by CO released by carbon gasification process. The entire reduction process is comprised of oxide reduction and metallic phase growth.

20. **ARTIFICIAL INTELLIGENCE AND GOOD GOVERNANCE: NAVIGATING INDIGENOUS INNOVATIVE TECHNOLOGIES FOR INDIA'S FUTURE**

Uma Sheokand  
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AI is revolutionizing and upbringing a transformative wave of innovation, change and growth. This revolution could be called the “fourth revolution” in the history of mankind. This research delves into the dynamic landscape of AI and the governance system in India particularly in the context of “Good Governance”. Citizen engagement, participation, responsiveness, transformation, citizen-centric and people-oriented approaches are the key principles of good governance. When good governance ideals and missions connect with technology they can revolutionise this sector to a great extent. This study navigates the vitality of AI technologies in good governance with special reference to India. AI can easily streamline government operations improving the overall economy, efficiency and effectiveness of public service delivery through automation and predictive analytics. This research paper explores the challenges of the governance system in India. These days disruptive technologies pose a challenge to a good governance system. This study also delves into the need for regulatory measures for transparency, accountability safe, secure and people-oriented technologies for a Viksit Bharat. Drawing insights from a literature review, policy papers, and surveys, the research advocates for a transparent, citizen-centric policy framework to understand the exclusive socio-economic dynamics contexts of emerging India. Experiences and insights from technologically advanced nations will be explored for a comprehensive holistic approach to AI-driven governance system. This study will explore concerns over data privacy and misuse of AI for surveillance while navigating legal safeguards and transparency in data handling systems and digital literature.

**Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)**

21. **SECURITY ASSESSMENT FRAMEWORK FOR CYBER-PHYSICAL SYSTEMS IN CRITICAL INFRASTRUCTURES**

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Cyber-Physical Systems (CPS) represent a transformative integration of computational and physical processes, interacting with human elements in ways that redefine traditional systems. These systems are not isolated entities but are instead networks of interconnected components that incorporate both physical inputs and outputs. They have direct connections to computational intelligence-based sensor networks, which are increasingly utilized in diverse fields such as robotics, aerospace, automotive, transportation, and manufacturing. The unique blend of physical and computational aspects in CPS necessitates a holistic approach to their design and management, incorporating transdisciplinary strategies from fields like cybernetics, mechatronics, and process science. The complex interplay between the hardware and software elements in CPS results in systems that can operate across various geographical and temporal dimensions, exhibit diverse behavioural modalities, and interact in context-specific ways. This complexity is further compounded by the integration of embedded systems, sensors, actuators, and other components that enable CPS to interact dynamically with their physical environments. This research proposes the development of an Adaptive Zero Trust Security Assessment Framework tailored specifically for Cyber-Physical Systems within critical infrastructures. The framework aims to enhance security by adopting a Zero Trust Architecture, which assumes that threats can arise both inside and outside the network perimeter, requiring continuous verification of every entity involved in the system. By focusing on adaptive mechanisms, the proposed framework will address the dynamic nature of CPS, ensuring that security measures are continuously updated and refined in response to emerging threats.

22. **BIOCULTURAL RIGHTS OF INDIGENOUS PEOPLES WITH SPECIAL REFERENCE TO THE PROTECTION OF THE INDIGENOUS TECHNOLOGIES IN INDIA: AN ANALYSIS**

Aneesha

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The biocultural rights protect the cultural, social, economic and occupational interests. The development of such biocultural rights depends upon the protection given by State. The biocultural rights in the modern economies face challenges from the import of the technologies and international finance capital inflow. The success and survival of biocultural rights depend upon the sustainable use of indigenous technologies. The

	<p>indigenous technologies have been developed centuries ago in India. The essence of the traditional knowledge systems further depends upon the protection and promotion of indigenous technologies. The indigenous technologies in the field of agriculture, health care and medicine, construction, storage, art, handloom, weather forecasting etc. should be protected and promoted to achieve aim of Viksit Bharat 2047. The Indian-ness of the development is possible when the indigenous people are encouraged to employ the indigenous technology. The sustainability of the indigenous technologies depends upon the legislative and institutional framework. The research paper is an attempt to find out the legislative and policy framework for the protection and promotion of the indigenous technologies in India.</p>
<p>23.</p>	<p><b>A STUDY ON COMPARISON OF VARIOUS MACHINE LEARNING MODELS FOR EMG SIGNAL CLASSIFICATION</b></p> <p><u>Archita, Mamta Juneja</u>  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>The classification of electromyography (EMG) signals is essential for controlling bionic prosthetic arms, enabling the conversion of muscle activity into functional hand movements. This study investigates the use of machine learning algorithms for classifying EMG signals. The dataset is sourced from the UCI Machine Learning repository. It consists of files with 10 columns: time in milliseconds, eight EMG channels recorded using the MYO Thalmic bracelet, and a gesture class label. The table of gestures include unmarked data , hand at rest, clenched fist, wrist flexion, wrist extension, radial deviations, ulnar deviations, and extended palm. Various machine learning models, including Support Vector Machines (SVM), k-Nearest Neighbors (k-NN), Random Forest, and Convolutional Neural Networks (CNN), were explored and employed to classify gestures based on the EMG signals. To improve model performance, various Feature extraction techniques were applied in both the time and frequency domains. The models underwent cross-validation for training and evaluation, ensuring robustness and reducing the risk of overfitting. The study demonstrates the potential of different machine learning models to enhance the precision and responsiveness of bionic prosthetic arms. Future work aims to expand the dataset , and to refine the models for improved generalisation by dynamic time-series parameters and seamless control of prosthesis.</p>
<p>24.</p>	<p><b>MULTI-STAGE COMPUTATIONAL FRAMEWORK FOR DIABETIC RETINOPATHY DETECTION FOCUSING ON BIOMARKER SEGMENTATION IN RETINAL FUNDUS IMAGING</b></p> <p><u>Gulbadan Khehra, Ajay Mittal, Ravreet Kaur</u>  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Retinal diseases are a major contributor to global vision loss, necessitating precise automated detection methods. Despite the importance of accurately detecting biomarkers for diabetic retinopathy, challenges persist due to variability in appearance and subtlety</p>

	<p>of features such as microaneurysms and hemorrhages. This study introduces a multistage computational framework utilizing a CNN-based architecture for feature extraction and classification in fundus images. In this work, the publicly available diverse datasets have been utilized, providing segmented images across multiple classes of biomarkers that enhances the capability for accurate detection. The framework achieved an accuracy of around 97.89% on the test data, validating its effectiveness for diabetic retinopathy diagnosis.</p>
25.	<p><b>NEXT-GEN COCKPIT DISPLAYS: A PATHWAY FOR INDIGENOUS AVIATION DEVELOPMENT</b></p> <p><u>Gurbinder Singh Dhanoa</u>, Nidhi Garg, Preeti Gupta  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Background: The aviation sector is experiencing a transformative shift due to the introduction of next-generation cockpit displays that incorporate cutting-edge technologies such as OLED, augmented reality (AR), micro-LED, 3D holographic visuals, digital light engines, artificial intelligence (AI), and touch-based controls. These advancements not only enhance pilot situational awareness but also open avenues for domestic development in aviation technology. Objective: This paper seeks to investigate the potential of next-gen cockpit displays as a driver for domestic aviation advancement, evaluating their effects on pilot performance, safety, and the larger aerospace landscape. Method: A mixed-methods strategy was employed, including comparative analyses to evaluate the effectiveness of OLED, micro-LED, AR, digital light engines, and 3D displays. Additionally, case studies of current next-gen cockpit systems were reviewed to assess their functionality and integration in various aircraft. Result: The results demonstrate that next-gen cockpit displays markedly enhance situational awareness and decision-making capabilities for pilots. The incorporation of local technologies within these systems can strengthen domestic manufacturing capabilities and diminish dependence on foreign solutions, thus promoting economic development in the aviation sector. Conclusion &amp; Future Scope: Next-gen cockpit displays signify not just a technological advancement but also a strategic opportunity for fostering domestic aviation growth. By prioritizing investments in these technologies, nations can cultivate local expertise and build a self-sustaining aerospace industry. Further research is required to find an optimal balance between technological innovation and human factors design, ensuring both usability and safety in aviation operations.</p>
26.	<p><b>OPTIMIZING RESOURCE MANAGEMENT IN 5G NETWORK SLICING WITH BLOCKCHAIN AND SMART CONTRACTS</b></p> <p><u>Jaskiranjit Kaur</u>, Sakshi Kaushal, Harish Kumar  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Network slicing allows operators to create virtual isolated segments of the network; each slice designed according to specific application requirements and allocates resources to it. Optimizing resource management on network slicing in 5G networks is vital for delivering effective customized services that meet user demands. Blockchain technology</p>

	<p>ensures that resource allocation is immutable and auditable, facilitating trust among all stakeholders. Smart contracts enable real-time automation of resource distribution, dynamically adjusting allocations based on current network conditions and demands. This reduces manual oversight and operational inefficiencies, while providing a clear audit trail for performance analysis. The proposed architecture for optimized resource management in 5G network slicing with blockchain integrated environment consists of five significant layers. The Application Layer collects user demands and service requirements, ensuring precise data capture for tailored service delivery. The Resource Management Layer employs smart contracts to automate real-time resource allocation based on predefined policies that align with user expectations. The Blockchain Layer maintains an immutable ledger of all transactions, enhancing both transparency and security throughout the network. The AI Optimization Layer utilizes predictive analytics to forecast demand patterns, enabling proactive resource adjustments that improve responsiveness. Finally, the Game Theory Layer effectively manages competition among network slices, ensuring equitable resource distribution and maximizing overall network efficiency. This comprehensive architecture creates a dynamic and adaptive ecosystem capable of meeting the evolving needs of users and applications in a 5G environment. This approach not only streamlines processes but also provides a transparent audit trail for performance analysis and accountability.</p>
27.	<p><b>PHONE CAMERA NANO-BIOSENSOR USING MIGHTY SENSITIVE TRANSPARENT REUSABLE UPCONVERSION PAPER</b></p> <p><u>Kamaljit Kaur</u>  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Lycopene, an antioxidant found in tomatoes, is highly susceptible to photo/thermal degradation which demands real time sensors. Therefore, a transparent upconversion nanoparticles strip containing upconversion nanoparticles was prepared that shows peak emission at 475 nm upon 980 nm laser irradiation. This strip has been found sensitive to lycopene with a detection limit of 10 nM using a smartphone camera. A comparison has been made to the paper strips. The transparent strip has minimal scattering with maximum sensitivity in spite of not using any metal quencher. An increase in strip hydrophobicity due to incorporation of UCNPs during the fabrication complements strip to selectively permeate and this study presents an extraction free substitute analysis for chromatography. The strip prepared using CNC: PVA is reusable with 100 % luminescence recovery.</p>
28.	<p><b>ECO-FRIENDLY PULPING OF PADDY STRAW : A SUSTAINABLE STRATEGY FOR PAPER PRODUCTION AND ENVIRONMENTAL PRESERVATION</b></p> <p><u>Kawalpreet Singh, Amit Chauhan</u>  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>The growing environmental challenges of deforestation and air pollution demand urgent solutions. The paper and cardboard industry heavily depends on wood, driving large-</p>

	<p>scale deforestation. Simultaneously, farmers burn surplus paddy straw after harvest due to a lack of viable disposal methods, contributing significantly to air pollution, especially in agricultural regions. Addressing these two interconnected issues calls for an innovative sustainable approach to resource utilization. One promising solution is the use of agricultural residues, such as paddy straw, as an alternative raw material. Shifting away from wood and repurposing paddy straw can reduce deforestation and minimize the environmental impact of straw burning. Although several methods have explored non-wood alternatives, the efficient and viable use of paddy straw remains a challenge. In our research, we investigate the potential of paddy straw for paper and composite board production through a fusion of chemical, mechanical, and biochemical processes. The study aims to develop an eco-friendly method that addresses both the disposal problem of paddy straw and the paper industry's reliance on wood. By converting paddy straw into high-quality pulp, the authors presented an alternate raw material for the paper industry, supporting environmental conservation and sustainable agricultural waste management. The findings reveal that paddy straw can be successfully used to produce paper and composite boards with comparable strength and quality to wood-based products. This shift not only provides a practical solution to environmental problems but also promotes a circular economy by turning agricultural waste into valuable products, contributing to a more sustainable future.</p>
29.	<p><b>A COMPARATIVE STUDY ON THE ACCEPTANCE OF HAND-MADE AND MACHINE-MADE CANVASES FOR PROMOTING CIRCULAR FASHION THROUGH APPLIQUE WORK</b></p> <p><u>Ishdeep Singh</u>, Kirti, Ramandeep Bawa  <i>University Institute of Fashion Technology &amp; Vocational Development, Panjab University, Chandigarh.</i></p> <p>This comparative study looks at the consumer acceptance of handmade and machine-made canvases as products for promoting circular through applique work. As the fashion industry majorly focuses on sustainability, both handmade and machine-made canvases offer different advantages in textile upcycling. Hand-made canvases, known for their artisanal craftsmanship and connection to old fashion, are often associated with the sustainability and uniqueness of the product. On the other side, machine-made canvases provide consistency, scalability, and cost-effectiveness, making them easily accessible for larger-scale manufacturing. This study compares these two types of canvases based on key factors which are quality, environmental impact, pricing, and aesthetic value, evaluating their role in bringing up consumer interest in a circular fashion. By exploring how traditional hand-crafted techniques and modern manufacturing approaches can match with each other, the research provides valuable insights into promoting circularity through the applique work. The findings aim to look at the likeability of handmade canvases or machine-made canvases among consumers and whether they are promoted sustainably. Keywords- Circular Fashion, Applique Work, Consumer acceptance and Environmental Impact.</p>
30.	<p><b>A REVIEW OF SMART DRESSING FOR WOUND HEALING</b></p>

	<p><u>Mankirat Singh Mann</u><sup>1</sup>, Amrinder Pal Singh<sup>1</sup>, Rupinder Singh<sup>2</sup>  <sup>1</sup><i>University Institute of Engineering and Technology, Panjab University, Chandigarh,</i>  <sup>2</sup><i>Mechanical Engineering Department, National Institute of Technical Teachers Training &amp; Research, Chandigarh.</i></p> <p>Wound healing and its management presents a challenge in patient healthcare. The research is going on to develop wound dressings that can facilitate faster healing. Conventional dressings are not of much help since they cannot respond to the healing process efficiently. Smart wound dressings are designed and developed to interact with wounds, detecting and responding to changes in the wound condition or environment using embedded sensors and smart materials like stimuli-responsive and self-healing materials. These dressings aim to enhance the healing process effectively. In this review paper, a summary of smart wound dressing for patient healthcare and associated future challenges in this field have been presented.</p>
31.	<p><b>ENHANCING SOCCER ACTION RECOGNITION THROUGH A NOVEL SPATIOTEMPORAL ENCODER AND THE SOCCERDB10 DATASET</b></p> <p><u>Meena Kumari</u>, Makhan Singh, Sarbjeet Singh  <i>Department of Computer Science and Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Understanding broadcast videos presents significant challenges in computer vision, particularly due to the complex reasoning needed to interpret diverse human activities. The inherent variability of human behavior complicates the development of a universal framework for activity recognition. Unlike static images, videos capture sequences of frames that reveal changes in activities over time, making them richer for analysis. In this study, we introduce Soccerdb10, a large-scale corpus comprising 1,629 original football videos and 5,500 augmented videos, categorized into 10 distinct activity classes. These high-resolution videos are recorded at 30 frames per second with a resolution of 1280x720 pixels, providing a valuable resource for researchers in human activity recognition in sports. To enhance action recognition capabilities, we propose a novel spatiotemporal encoder that utilizes both the SoccerNetv2 dataset and the new Soccerdb10 for benchmarking against existing state-of-the-art methods. Our model integrates a transformer encoder with a temporal network to effectively capture essential spatial and temporal features. By employing multi-head attention, the model partitions input features and calculates attention scores that underscore contextual significance. The temporal encoder operates across various time scales to learn dynamic changes within action sequences. This research not only aims to improve classification accuracy while minimizing computational demands but also addresses limitations typically faced by CNN-based models in action recognition tasks. Through extensive experimentation, our proposed spatiotemporal encoder shows promising results in accurately identifying and classifying soccer actions in videos, paving the way for advancements in sports video analysis and human activity recognition.</p>



<p>32.</p>	<p><b>ANOMALY DETECTION IN CREDIT CARD FRAUD DETECTION USING MACHINE LEARNING (ML) AND DEEP LEARNING (DL)</b></p> <p><u>Nitin Bhatia</u>, Deepti Gupta, Preeti Singh  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Fraudulent credit card transactions pose a significant threat to financial institutions and consumers alike, necessitating the development of effective anomaly detection systems. We explore the application of Machine learning &amp; Deep learning techniques for anomaly detection in credit card transactions and to enhance the detection of fraudulent transactions. We employ traditional ML algorithms, such as LR, RF, XGBoost, GBM, LightGBM &amp; ensemble methods to identify fraudulent activity, alongside advanced DL architectures, including Autoencoders, RNN &amp; CNN to capture complex patterns in transaction data. Also, we explore advanced techniques like GANs for synthetic data generation. Reinforcement learning for adaptive fraud detection. Our main Objective to detect fraudulent transactions while minimizing false positives. A dataset comprising millions of transaction records is analyzed, leveraging feature engineering to enhance model performance. Model is proposed for the anomaly detection of credit card transactions that are fraudulent using different combinations of Machine learning &amp; Deep learning. Our approach addresses key challenges such as class imbalance and high dimensionality through innovative data preprocessing, feature engineering, and augmentation strategies. We evaluate the performance of the model using metrics such as precision, recall, and the F1 score, ensuring a balanced approach to minimizing false positives while maximizing fraud detection rates. By leveraging a combination of ML &amp; DL techniques, you can build a robust anomaly detection model for fraudulent credit card transactions. Regular updates and monitoring will help maintain the model's effectiveness over time. Keyword: Anomaly Detection, Machine Learning, Deep Learning, Credit card fraud.</p>
<p>33.</p>	<p><b>VISION GUIDED NAVIGATION FOR AUTONOMOUS UAVS</b></p> <p><u>Paridhi Naithani</u>, Akashdeep, Sakshi Kaushal  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>One of the key challenges in UAV (Unmanned Aerial Vehicle) navigation is the ability to autonomously navigate in unknown environments and avoid obstacles. To address this challenge, vision-based techniques can be adopted. Traditional methods of mapping and surveying are time-consuming and can be expensive as most of them are LIDAR (Light Detection and Ranging) based. Vision based autonomous navigation systems can enable UAVs to map large areas with high accuracy and efficiency, making it an attractive option for surveying and mapping applications. The research aims to develop an advanced navigation system for UAVs based on Visual SLAM (Simultaneous Localization and Mapping) using a camera as the primary sensor. Visual SLAM is used to generate a detailed occupancy grid map of the environment. This technology processes visual data captured by the UAV's camera to identify key features and landmarks within the environment, allowing the system to distinguish between free spaces, which the UAV can navigate through, and obstacles that need to be avoided. By continuously analyzing</p>

	<p>the visual information, Visual SLAM updates the map, ensuring it accurately represents the surroundings and the UAV's position within them. The generated map is utilized by path planning algorithm to determine the most efficient and safe route for the UAV to follow. Visual SLAM algorithm will be tested in simulated environment using Gazebo simulator.</p>
34.	<p><b>REVOLUTIONIZING PROSTHETIC DESIGN: ADVANCED 3D SCANNING AND ADDITIVE MANUFACTURING FOR ANATOMICALLY ACCURATE HAND PROSTHESES</b></p> <p><u>Prashant Prakash</u>, Prashant Jindal, Mamta Juneja  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Advancements in 3D scanning and 3D printing technologies are transforming the design and fabrication of prosthetics, enabling unparalleled customization and precision. This paper presents a robust, quantitative approach to replicating prosthetic hand geometry, combining high-resolution 3D scanning with the versatility of additive manufacturing. Utilizing a state-of-the-art white light scanner, the digital capture of the hand's geometry is achieved with an accuracy of up to 50 microns, preserving even the most intricate anatomical details. The scanned data is processed through advanced CAD modeling, where refinements are made to accommodate actuation components and functional design. This digital model is subsequently translated into a physical prosthetic hand via Fused Deposition Modeling (FDM), providing a layer resolution as fine as 100 microns, ensuring high fidelity and durability. Materials such as Nylon 12 and carbon-fiber-reinforced polymers are employed, offering tensile strengths ranging from 50 to 100 MPa, providing structural integrity capable of withstanding the rigors of daily use. This process significantly reduces production timelines, achieving 50% faster fabrication than traditional methods, with fully functional prosthetics produced in under 72 hours. Furthermore, combining biocompatible materials and high-resolution printing ensures superior patient outcomes by delivering prosthetics with an anatomically precise fit, enhanced comfort, and increased functional capacity. This integration of precision scanning and high-performance 3D printing underscores the future of prosthetic design, offering a personalized, efficient, and scalable solution for upper-limb amputees.</p>
35.	<p><b>AUTOMATIC ANNOTATION OF IOPA DENTAL RADIOGRAPHS FOR DETECTING FURCATION RADIOLUCENCY USING SEGMENT ANYTHING MODEL</b></p> <p><u>Priyanka</u>, Mamta Juneja, Naveen Aggarwal  <i>Department of Computer Science and Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Furcation radiolucency is a significant concern in pediatric dentistry, as it often indicates advanced periodontal disease and requires prompt attention. Early detection of furcation involvement can lead to effective management, reducing the risk of complications such as tooth loss. This research paper focuses on preprocessing and annotating a comprehensive dataset of 5000 Intraoral Periapical Radiographs (IOPA) that include</p>

	<p>both deciduous and non-deciduous teeth with furcation radiolucency. Dental experts were consulted for accurate classification of the dataset into two main groups and further categorization into four distinct grades (grade 0 - 3) based on the severity of furcation involvement. In this study we proposed an approach to automate the annotation process using Segment Anything Model (SAM) to enhance the accuracy and efficiency in detecting furcation radiolucency. The proposed approach is robust with segmentation capabilities for precise isolation of regions of interest within the radiographs, streamlining the classification process. This automated approach significantly reduced manual effort, minimized human error, and improved consistency, resulting in more accurate classification models for diagnosing and planning treatment. The findings of this study provide a well-structured dataset and a reliable framework for classifying furcation radiolucency, emphasizing the importance of early detection and accurate grading. This research contributes to pediatric dentistry by advancing diagnostic precision and facilitating more effective patient care in preventing severe outcomes, such as tooth loss.</p>
36.	<p><b>UNIMODAL AND MULTIMODAL FACIAL AND SPEECH EMOTION DETECTION</b></p> <p><u>Priyanka Thakur</u>, Nirmal Kaur, Naveen Aggarwal, Sarbjeet Singh  <i>Department of Computer Science and Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Emotion detection plays a pivotal role in enhancing human-computer interaction, enabling more intuitive and adaptive systems across various domains, including healthcare, education, customer service, and entertainment. Traditional unimodal approaches, which rely solely on single modality such as facial expressions or speech signals, have been extensively explored. However, these methods often struggle with ambiguity or missing information inherent in a single modality, especially in complex real-world environments. Recent advancements in emotion detection emphasize the advantages of multimodal methods, where the integration of multiple modalities results in more accurate, robust, and context-aware emotion recognition. This work provides an analysis of state-of-the-art techniques for unimodal and multimodal emotion detection, with a focus on facial and speech modalities, covering advancements from 2019 to 2024. It highlights the transition from traditional machine learning models to advanced deep learning architectures, including Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), and attention-based mechanisms. A comparative analysis between unimodal and multimodal approaches is presented, showcasing the superior performance of multimodal systems in real-world scenarios while addressing the challenges of data fusion, computational complexity, data imbalance, and noise handling. It also examines benchmark datasets for both approaches and aims to highlight key trends, limitations, and future directions in multimodal emotion detection, thus guiding the development of adaptive systems for diverse applications.</p>

<p>37.</p>	<p><b>RISC-V: A STRATEGIC CATALYST FOR INDIA’S SEMICONDUCTOR SELF-RELIANCE</b></p> <p><u>Rajneesh</u>, Nidhi Garg, Charu Madhu  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Background: India heavily depends on foreign technology for semiconductors, making critical sectors like defense, telecommunications, and healthcare vulnerable to external supply chain disruptions. RISC-V provides a unique opportunity to reduce this dependence by empowering indigenous development. Objective: This paper investigates how RISC-V can be leveraged to foster a self-reliant semiconductor ecosystem in India, enabling the creation of custom hardware designs tailored to various applications, from defense to IoT. Method: The study examines global case studies of RISC-V implementations, explores its role in designing System-on-Chip (SoC) architectures, and proposes a roadmap for adopting RISC-V in India’s semiconductor strategy. Special attention is given to security enhancements and cost-effective innovation. Result: RISC-V’s open architecture facilitates the design of secure and customizable processors, accelerators, and microcontrollers, reducing India’s reliance on foreign technologies. Architecture also lowers development costs and fosters collaboration among academia, industry, and government. Conclusion &amp; Future Scope: RISC-V holds immense potential to drive India’s semiconductor self-reliance, ensuring security, innovation, and economic growth. Future research could focus on optimizing performance for specific Indian needs and scaling domestic semiconductor manufacturing to meet both local and global demand. Keywords: RISC-V, Semiconductor, Self-Reliance, Open-Source, Architecture, Customizable ISA.</p>
<p>38.</p>	<p><b>LAYERED FEATURE OPTIMIZATION FRAMEWORK FOR EFFICIENT DDOS ATTACK DETECTION USING MACHINE LEARNING AND DEEP LEARNING MODELS IN ANOMALY DETECTION SYSTEMS</b></p> <p><u>Rashmi Bhatia</u>, Rohini Sharma  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>This paper introduces a layered feature optimization framework designed to improve both the efficiency and accuracy of attack detection in network security. The framework integrates preprocessing, data balancing, filtering, and embedding techniques for effective feature selection, providing a comprehensive solution for data handling challenges while systematically reducing dimensionality. The performance of the selected features is assessed using various machine learning and deep learning models, including Random Forest (RF), Multi-Layer Perceptron (MLP), K-Nearest Neighbor (KNN), Long Short-Term Memory (LSTM), and Extreme Gradient Boosting (XGB). After achieving the minimum number of features using this framework, we applied various feature reduction techniques, such as Linear Discriminant Analysis (LDA), Principal Component Analysis (PCA), AutoEncoder, and Sparse AutoEncoder, to assess the potential for further optimization. However, the framework consistently yielded superior results in terms of training and classification time, as well as accuracy. The</p>

	<p>findings indicate that the layered feature optimization process alone delivers optimal performance, rendering further dimensionality reduction unnecessary. This framework substantially improves attack detection capabilities while minimizing computational costs.</p>
<p>39.</p>	<p><b>DT-CAD: A WEB BASED APPLICATION FOR THE ANALYSIS AND DETECTION OF FURCATION IN DENTAL RADIOGRAPHS</b></p> <p><u>Sahil Pathak</u>, Naveen Aggarwal, Mamta Juneja  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Periodontal disease is a growing concern in dental health, making it essential to develop effective diagnostic tools. The web application, DT-CAD is proposed for dental furcation detection, to support dental professionals in identifying and evaluating furcation involvement, enabling in understanding a patient's periodontal health. The early detection of dental issues can lead to significantly improved treatment outcomes and overall health. By utilizing advanced image processing and machine learning techniques, the app allows users to easily upload dental images, annotate areas of concern, and receive automated feedback that aids in diagnosis. The incorporation of technology into dental diagnostics not only enhances accuracy but also streamlines the evaluation process, enabling practitioners to dedicate more time to patient care. The app features a user-friendly interface with options for user authentication, image enhancements, manual analyzer and detailed report generation. By simplifying the diagnostic workflow, the application empowers dentists and practitioners to identify problems early, facilitating timely interventions that can lead to better patient outcomes.</p>
<p>40.</p>	<p><b>ACOUSTIC EMISSION (AE) SIGNAL WAVEFORM CATEGORIZATION THROUGH FASTDTW RANGE PARTITIONING</b></p> <p><u>Samriti Sharma</u>, J.C. Kapil, Shivam Paliwal, Ajay Mittal  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>The sub-categorisation of raw acoustic emission (AE) signal waveforms generated during physical processes is critical for training machine learning models to retrieve relevant waveforms from a large AE database. This study presents a novel method for partitioning raw AE waveforms into sub-categories of waveforms that are virtually identical. Fast Dynamic Time Warping (FastDTW) was utilised to determine distance ranges between AE waveforms, resulting in an 81-waveform comparison matrix. Pairwise comparisons were carried out, and the resulting FastDTW distances divided the waveforms into ranges such as 0-20, 20-40 and so on. The minimum distance value indicates greater resemblance. The 0-20 range implies strong resemblance between waveforms, while 20-60 indicates moderate similarity, with similarity decreasing as the range grows. In a prior approach, waveforms were grouped using a specified threshold that was selected after a comprehensive visual evaluation of possible threshold values. While this method efficiently grouped similar waveforms from a single source, it had a drawback: if the FastDTW distance fell below a certain threshold, the waveform was placed in a separate cluster, and only the remaining waveforms were considered. In some</p>

	<p>circumstances, this inhibited complete intercomparison, resulting in inadequate grouping. An improved technique is proposed, with waveforms organised by FastDTW distance ranges for each comparison. This technique records various levels of similarity over multiple ranges, allowing for complete comparisons. This results in a structured, matrix-based representation that can be used to categorise AE waveforms and train machine learning algorithms to automatically detect important AE signals of interest.</p>
<p>41.</p>	<p><b>EVALUATING VISION TRANSFORMERS PERFORMANCE ON PU-ISL DATASET</b></p> <p><u>Satwinder Kaur</u>, Garima Joshi, Sumit Budhiraja, Sunil Agrawal  <i>Department of Electronics and Communication Engineering , University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Deaf and mute individuals communicate using a combination of hand movements, facial expressions, and visual cues, collectively referred to as sign language. However, a significant communication barrier arises as most people do not understand it. Developing a robust sign language recognition system could help overcome this challenge. While progress has been made in automatic sign language recognition, a fully reliable solution remains elusive due to various complexities. This paper introduces a vision-based transformer architecture that excels in recognizing sign gestures even in cluttered backgrounds, outperforming existing deep learning models. The model is evaluated on 2 diverse datasets of Indian Sign Language (ISL) developed at Panjab University, termed as PU-ISL datasets. The images are superimposed on four varied backdrops to make this dataset complex by using the pixel library and dataset is split into 80:20 ratio. These datasets include PU-ISL complex and PU-ISL mixed. There are 16,900 images in PU-ISL complex dataset and 18,859 images in PU-ISL mixed. The proposed model achieves remarkable training accuracy of 99.09% and 95.76% testing accuracy on PU-ISL mixed. In case of the PU-ISL complex dataset, training accuracy achieved is 98.85% and testing accuracy is 95.62%.</p>
<p>42.</p>	<p><b>AN ANALYSIS OF DENOISING TECHNIQUES FOR PROSTATE CANCER IMAGING</b></p> <p><u>Sumindar Kaur Saini</u>, Mamta Juneja, Naveen Aggarwal  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>In the field of medical imaging, particularly in the detection of prostate cancer (PCa), the imaging modalities as magnetic resonance imaging (MRI), ultrasound and computed tomography (CT) are often affected by noise that degrades image quality. The most common noises such as Gaussian, Rician and Poisson obscure critical details in MRI scans of PCa which is the second most terrible cancer in men. This leads to challenges in accurate segmentation and classification. The state-of-the-art paradigms used were hand operated, consumed more time and susceptible to errors. Traditional MRI denoising methods face challenges such as information loss, compression-related data loss, and difficulty in preserving edge features. Therefore denoising filters are used to reduce noise</p>

	<p>in images while preserving essential details and improving image quality for accurate diagnosis. The choice of filter depends on the noise characteristics, the need for edge preservation, and the specific requirements of the imaging modality. For PCa MRI, various filters such as median, weiner, gaussian, total variation, wavelet and bilateral were used to denoise the MRI of the prostate gland. As per the analysis, the median filter turned out to be the best filter with the values of Peak signal to noise ratio (PSNR), Mean squared error (MSE), Structured similarity index (SSIM) as 27.17, 45.39 and 0.85 respectively whereas the bilateral filter gave the poorest results as 26.16, 0.80 and 50.31 for PSNR, SSIM and MSE respectively.</p>
43.	<p><b>A CRITICAL STUDY MULTILINGUAL PLAGIARISM CHECKER IN TEXT</b></p> <p><u>Swaranjeet kaur</u><sup>1</sup>, Manish Jindal<sup>2</sup>, Vishal Gupta<sup>1</sup></p> <p><sup>1</sup>University Institute of Engineering and Technology, Panjab University, Chandigarh, <sup>2</sup>Panjab University Regional Centre, Sri Muktsar Sahib, Punjab.</p> <p>Multilingual Plagiarism checkers have been gaining more and more attention in recent years. The effectiveness of plagiarism detection is challenging because of the huge quantity of accessible words of multiple languages on the internet. This paper examines the current landscape of Multilingual Plagiarism detection tools, assessing their effectiveness in identifying and managing plagiarism across diverse linguistic contexts. The need for a robust plagiarism detection system that accommodates more than one language has become very critical. We analyze various tools, focusing on their algorithms, language support, and accuracy in detecting multiple forms of textual similarity, including direct copying and paraphrasing. Our findings reveal significant discrepancies in detection accuracy, with many tools performing exceptionally well in one language context but struggling in a multilingual context. We also explore the algorithm these tools employ and their ability to handle content. Several systems have been developed for plagiarism detection, but none of them deal with such documents that are written in Punjabi, English, and Hindi text format.</p>
44.	<p><b>A REVIEW OF METHODS TO RECOGNIZE DEGRADED GURMUKHI TEXT ALONG WITH CHALLENGES AND ADVANCES</b></p> <p><u>Veerpal Kaur</u><sup>1</sup>, Manish Kumar<sup>2</sup>, Munish Kumar<sup>3</sup></p> <p><sup>1</sup>Department of Computer Science and Application, University Institute of Engineering and Technology, Panjab University, Chandigarh, <sup>2</sup>Department of Computer Science and Application, Panjab University Regional Centre, Muktsar, Punjab, <sup>3</sup>Department of Computational Sciences, Maharaja Ranjit Singh Punjab Technical University, Bathinda, Punjab.</p> <p>The recognition of degraded Gurmukhi text is a significant area of research as preserving historical documents is important due to which improving OCR accuracy in Punjabi language is crucial. Gurmukhi script presents various challenges such as touching characters, diacritics and ligatures which becomes more difficult when text is blur or faded, paper is deteriorated, faded ink, and smudging. This review paper analyses various methods that are proposed to address these challenges and their limitations and strengths.</p>

Nowadays, machine learning and deep learning technologies are being used to tackle with various challenges in image processing field. Previously, Hidden Markov Models (HMM) and Support Vector Machines (SVM) were being used for character recognition tasks which improved accuracy on moderately degraded Gurmukhi text. As soon as, deep learning came into effect, various techniques like Convolutional Neural Network (CNN) and Long Short-Term Memory (LSTM) networks were used to significantly improve the accuracy of Gurmukhi text recognition by learning hierarchical features directly from data. CNN-based models came out to be effective in handling noise and distorted character shapes, as well as, beneficial in hybrid models that helped in advancing recognition accuracy by concentrating on key text features. Despite such techniques and methods there are significant challenges that needs to be addressed such as extremely faded text or touching or overlapping characters. This paper aims to identify research gaps and available techniques for future work for further improvements in recognizing degraded Gurmukhi text script.

**UG/PG Students Of Panjab University Campus And Regional Centres**

**45. IDENTIFICATION OF POLARIZED CONTENT ON SOCIAL MEDIA USING MACHINE LEARNING**

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Polarization has always been a worldwide concern that makes it difficult for a society to reach a consensus on various social and political issues. The advent and remarkable progress of social media have further redefined the meaning, scale, and diffusion of information. Social media content can be effectively exploited to analyse the behaviour of people, their opinions, interests and activities. However, these powerful communication platforms can be also used to manipulate conversation, polluting online content and altering the popularity of users, through spamming activities and misinformation spreading. The presence of social bots can influence discussions of any kind that prevents people from knowing the truth and fuels partisan social and political conflict. The current paper proposes a model to predict if the given digital content is polarized or not, using AI and machine learning. The data available in the public domain related to a specific domain or opinion under study is collected which is followed by a preprocessing phase. Sufficient knowledge base is gathered to identify the genuine inclination of the group under observation. Mechanism will be proposed to identify and omit artificial data generated bots to avoid biasing. Rules and constraints will be defined to categorise the degree of polarization in the society. In addition, measures to reduce polarization like correcting misinformation, and highlighting more positive inter party contact will also be analysed. The study is significant in determining the polarity of social media users on any social or political issue to maintain national stability.

**46. CITIZEN POWERED CLEANLINES REPORTING SYSTEM WITH HOTSPOTS DETECTION AND ALERT SYSTEM.**



Aditi, Aayush Gupta

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The persistent issue of overflowing landfills and inadequate waste management often arises from a lack of timely awareness among authorities. This results in inefficiencies and a lack of transparency in waste management operations. To address this gap, we propose a citizen-powered waste reporting system that encourages community participation in cleanliness efforts. Through a user-friendly web interface, individuals can report garbage accumulation, leveraging real-time location tracking to accurately identify problem areas. Additionally, a clustering algorithm identifies and creates zones based on the frequency of reports and predicts areas which are at higher risk of becoming a Hotspot, while a Real time Dashboard visually highlights high-risk areas. To enhance user engagement, the system features a chatbot that provides real-time status updates on submitted reports, ensuring transparent communication between citizens and municipal bodies. Moreover, tracking the time taken by municipalities to address issues clearly reflects their efficiency in resolving problems. This approach not only strengthens community involvement in waste management but also holds municipal bodies accountable by promoting transparency and timely interventions. By empowering citizens and fostering prompt action, this solution can prevent the transformation of beautiful landscapes into unsightly landfills, thereby improving public health and promoting a cleaner, more sustainable environment.

47. **DESIGNING CRANIAL HELMETS FOR PRE/POST-SURGICAL CRANIOSYNOSTOSIS USING AI BASED TECHNIQUES**

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Craniosynostosis, a congenital condition affecting infants through the premature fusion of cranial sutures, can lead to abnormal skull shapes and complications like increased intracranial pressure and developmental delays. Early diagnosis through physical examination and CT imaging is critical, followed by surgery to correct the fused sutures. The postoperative phase is equally important for proper skull reshaping. Cranial helmets play a key role in guiding skull growth and providing protection during recovery. This research integrates Artificial Intelligence based deep learning models and digital design and manufacturing to generate personalized cranial helmets for infants undergoing treatment for craniosynostosis. By processing 3D CT scan data, the deep learning model identifies specific cranial deformities, such as scaphocephaly, brachycephaly, and plagiocephaly. Using advanced generative models, the system generates a tailored helmet design, ensuring pressure is applied to the correct areas to guide reshaping while allowing space for healthy growth. Once the design is finalized, the helmet is 3D printed. The flexibility of 3D printing enables the creation of lightweight, cost-effective helmets that can be easily adjusted or replaced as the child's skull grows. Challenges such as obtaining high-quality annotated datasets and rigorous clinical validation are addressed to ensure the model and helmets meet safety and effectiveness standards. Ultimately, this research combines cutting-edge deep learning with innovative digital design and manufacturing to improve the quality of life for infants and their families.

<p>48.</p>	<p><b>STABILITY-AWARE OFFLOADING IN MEC: A LYAPUNOV-GUIDED DEEP REINFORCEMENT LEARNING APPROACH</b></p> <p><u>Akshay Dhiman</u>, Raj Kumari, Inderdeep Kaur Aulakh  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>The rapid growth of mobile applications and IoT devices has significantly increased the demand for efficient computation offloading in Mobile Edge Computing (MEC) networks. However, the dynamic and unpredictable nature of these networks poses challenges in achieving optimal resource allocation and stable task offloading. Opportunistic computation offloading has emerged as a powerful approach to enhance MEC performance. To address this, we propose a Lyapunov-Guided Deep Reinforcement Learning (LG-DRL) framework for stable online computation offloading in MEC networks. By combining Lyapunov optimization theory with deep reinforcement learning (DRL), this framework ensures system stability while optimizing key performance metrics such as energy consumption, latency, and resource utilization. The Lyapunov function is used to maintain queue stability, preventing congestion, while the DRL agent learns optimal offloading policies through continuous interaction with the MEC environment. The problem is formulated as a multi-stage stochastic mixed-integer nonlinear programming (MINLP) problem, jointly optimizing partial offloading decisions (allowing users to offload portions of tasks to the edge server) and resource allocation over multiple time frames. To manage decision dependencies across time frames, we introduce LyDROO, a novel framework that uses Lyapunov optimization to decouple the multi-stage MINLP into smaller, deterministic per-frame subproblems. LyDROO efficiently addresses these subproblems through a combination of model-based optimization and model-free DRL, significantly reducing computational complexity. Simulation results demonstrate that LyDROO achieves near-optimal partial offloading performance, stabilizes system queues, and reduces computation time, making it ideal for real-time applications in dynamic, fast-changing network environments.</p>
<p>49.</p>	<p><b>EMPOWERING FARMERS WITH CROP-HAWK: PRECISION AGRICULTURE FOR A GREENER TOMORROW</b></p> <p><u>Ananay Aggarwal</u><sup>1</sup>, Kartick Sharma<sup>2</sup>  <sup>1</sup><i>University Institute of Engineering and Technology, Panjab University, Chandigarh,</i> <sup>2</sup><i>Indian Institute of Technology, Madras.</i></p> <p>India's agriculture faces three big challenges: water scarcity, excessive pesticide use, and crop diseases. These problems result in wasted resources, higher costs for farmers, and harm to the environment. To solve this, Crop-Hawk uses modern technology, combining satellite data and drones to create a smarter way of farming. Crop-Hawk identifies "thirsty" areas in fields that need water using NDVI satellite data and directs drones to irrigate only those specific spots. It also helps detect unhealthy crop areas, allowing farmers to apply pesticides only where needed, saving money and reducing environmental impact. With Crop-Hawk, farmers can save water, reduce pesticide costs,</p>

	<p>and protect their crops from disease, ultimately increasing their profits while promoting sustainable agriculture. The project aims to make precision farming accessible to everyone, helping farmers overcome today's agricultural challenges.</p>
50.	<p><b>CURRENT TRENDS IN DEEP LEARNING FOR MULTI-OBJECT TRACKING: A REVIEW OF MOT DATASETS</b></p> <p><u>Anu Mahindru</u><sup>1</sup>, Amit Doegar<sup>1</sup>, Jugal Kishore Sewag<sup>2</sup>, Garima Joshi<sup>3</sup>  <sup>1</sup><i>National Institute of Technical Teachers Training &amp; Research, Chandigarh,</i> <sup>2</sup><i>Government Polytechnic College, Bikaner, Rajasthan,</i> <sup>3</sup><i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Multi-object tracking (MOT) is a crucial task in computer vision, involving the detection and tracking of multiple objects across frames in video sequences. In recent years, deep learning has revolutionized the field, providing powerful tools to address the challenges of occlusion, identity switches, and maintaining consistent tracking in complex environments. This paper reviews the current trends in deep learning approaches for MOT, with a particular focus on popular benchmarking datasets such as MOT17, MOT20, and KITTI. We explore the evolution of tracking algorithms, highlighting key developments like tracking-by-detection frameworks, which decouple the tasks of object detection and tracking, and end-to-end architectures that integrate detection and re-identification (ReID) into unified models. State-of-the-art algorithms, including Deep SORT, FairMOT, and others, are analyzed in terms of their performance on these datasets, addressing various metrics like precision, recall, and identity consistency. The review also discusses the critical role of MOT datasets in advancing the field, as they provide standardized benchmarks that facilitate algorithm evaluation under diverse conditions, such as different object densities, lighting environments, and motion patterns. By comparing performance across these datasets, we assess the strengths and limitations of current deep learning approaches. This paper aims to provide insights into the current landscape of MOT research, highlighting emerging trends and identifying areas for future improvement in algorithm robustness and generalization across diverse real-world applications, including autonomous driving, surveillance, and robotics.</p>
51.	<p><b>INDIAN SIGN LANGUAGE RECOGNITION USING MEDIAPIPE AND YOLO-NAS</b></p> <p><u>Arnesh Jindal</u><sup>1</sup>, Vivek Katoch<sup>1</sup>, Satwinder Kaur<sup>2</sup>, Gunjan<sup>1</sup>  <sup>1</sup><i>Department of Computer Science and Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh,</i> <sup>2</sup><i>Department of Electronics and Communication Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>This invention presents a novel system and method for real-time recognition of Indian Sign Language (ISL) gestures through advanced machine learning techniques and web-based technologies. Our system employs two parallel methodologies for feature extraction and model training, aimed at enhancing both the accuracy and efficiency of</p>

	<p>ISL recognition. In the first approach, MediaPipe is used for feature extraction, coupled with a Random Forest Classifier for gesture recognition, featuring live detection capabilities via the cv2 library to enable real-time interpretation of ISL signs. The second approach utilizes Roboflow for feature extraction and trains the model using the YOLO-NAS, which offers enhanced robustness against complex backgrounds and varying lighting conditions. The dataset consists of images representing digits 1 to 9 and alphabets A to Z, with each category comprising 1200 images. These comprehensive data inputs have enabled our models to achieve a training accuracy of 96.79% and a test accuracy of 93.36%, demonstrating high reliability and applicability for real-world uses. Both methods are designed to maximize accuracy, speed, and computational efficiency, rendering the system highly adaptable and setting a new benchmark for accessible communication technologies. Additionally, the system captures hand movements and gestures through a webcam, processes them using these sophisticated models, and translates them into text or speech. Built using React and Firebase for robust web integration, this scalable and cost-effective platform is accessible across various devices, facilitating seamless communication for the deaf and hard-of-hearing communities in India.</p>
52.	<p><b>OPTIMISING FUEL CELL PERFORMANCE AND EVALUATION USING AI/ML TECHNIQUES: A GENETIC ALGORITHM APPROACH</b></p> <p><u>Aryan Kamboj</u>, Sanjeev Gautam  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>In recent years, Artificial Intelligence (AI) and Machine Learning (ML) techniques have emerged as powerful tools in optimizing and evaluating fuel cell systems. This paper explores the successful application of AI/ML algorithms, specifically the Genetic Algorithm (GA), for the performance evaluation and optimisation of fuel cell systems. The use of AI techniques, particularly hybrid approaches integrating multiple algorithms, significantly reduces computation time while maintaining high accuracy in simulation and control. In fuel cells, AI-based models can detect patterns that traditional methods often overlook, thus improving fault diagnostics and durability predictions. This study presents the effectiveness of GA in evolving population-based solutions, leveraging parent selection, crossover, and mutation strategies to achieve optimal performance outcomes. The findings illustrate that AI/ML, notably Genetic Algorithms, offer significant potential for improving the overall efficiency and longevity fuel cell systems, addressing challenges in their real-world applications.</p>
53.	<p><b>A SURVEY ON GENERATIVE AND EXPLAINABLE AI FOR INTERNET TRAFFIC ANALYSIS</b></p> <p><u>Banipreet Singh</u>, Ravreet Kaur  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>The generation of realistic and diverse internet traffic datasets is crucial for advancing research in network analysis, cybersecurity, and AI-driven traffic management. It is</p>

	<p>cumbersome and time-consuming to capture and analyse real-time traffic. Hence, the use of Generative AI (Gen-AI) to create realistic and diverse internet traffic sets is being explored by researchers to create synthetic internet traffic datasets that capture the complexity of various network protocols, user behaviours, attack vectors, and dynamic network conditions. The generated traffic includes types such as HTTP requests, DNS queries, and peer-to-peer communication, reflecting a broad spectrum of real-world network activities. This approach improves the quality of the synthetic datasets and ensures their applicability to real-world scenarios, bridging the gap between dataset realism and model transparency in network research. But, the black-box feature of AI-based analysis leads to lower consumer reliability. This drawback has led to the application of Explainable AI (XAI). This paper provides a brief survey of Gen-AI and XAI methods used by various researchers for Internet Traffic Analysis.</p>
<p>54.</p>	<p><b>REVIEWING THE GAME PATTERN STUDY OF ROCK PAPER SCISSOR WITH AI</b></p> <p><u>Devvrat</u>  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>This presentation delves into the strategic intricacies of the game Rock, Paper, Scissors (RPS), illustrating its significance as a model for decision-making and competitive behavior. We will explore the game's simple mechanics while revealing the underlying complexities of player strategies, including randomness, pattern recognition, and psychological tactics. Utilizing different digital platforms developed for this study, we analyze data from various matches between human players and AI opponents employing different strategies. Key findings highlight the impact of randomness and adaptability on game outcomes, shedding light on optimal approaches to gameplay. By situating RPS within the broader context of game theory, this review emphasizes its relevance to fields such as psychology, economics, and artificial intelligence. Attendees will gain insights into how even simple games can inform our understanding of strategic interactions and decision-making processes in real-world scenarios.</p>
<p>55.</p>	<p><b>DESIGNING A SUSTAINABLE FASHION ENSEMBLE FROM TEXTILE WASTE WITH TEMPLE-SAFFRON FLOWER AND TURMERIC DYES</b></p> <p><u>Diksha, Kirti</u>  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>This study attempts to discuss the design process of the ensemble made by the use of waste textile fabric and natural colours. Floral waste from nearby temples, such as marigold flowers and turmeric, was utilized to dye fabric scraps at home using the tie and die process. This resulted in the fabric scraps having beautiful, natural colours and reducing their impact on the environment. Making the skirt and top out of the waste fabric by meticulously assembling these parts that have been coloured utilizing the waste fabric. To construct the skirt and the top, the garment required the careful assembly of all the parts of the garment. Wooden buttons contributed to the overall appearance of the</p>

	<p>clothing as well as its sustainability. This study will discuss the design process the ensemble made. The primary objective of this research is to make fashion more sustainable by reducing textile waste, using local materials, and bringing back traditional dyeing techniques. By using eco-friendly methods to make clothes the research shows that sustainable fashion is possible and helps people value Indian craftsmanship. In the end, this research is a real-life example of how creating a design and smart use of resources can make fashion more eco-friendly encouraging both consumers and designers to make greener choices. Keywords: Eco-friendly, Natural dyeing, Textile waste, Floral waste.</p>
56.	<p><b>HEART FAILURE PREDICTION USING MACHINE LEARNING MODEL</b></p> <p><u>Dipanshu Gomra</u>  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Heart failure is a major public health concern worldwide, affecting millions of people. It is a condition in which the heart is unable to pump enough blood, leading to symptoms such as shortness of breath, fatigue, and swelling in the legs and ankles. Heart failure can occur as a result of various underlying conditions, including coronary artery disease, hypertension, and diabetes. The ability to accurately predict heart failure risk in patients with cardiovascular disease is crucial for improving patient outcomes and reducing healthcare costs. Machine learning have the potential to aid health-care providers in identifying patients who are at higher risk of developing heart failure. The goal of this research is to develop a machine learning model that can predict the likelihood of heart failure in patients with cardiovascular disease using clinical and sensor data. This research will involve collecting data from electronic health records of patients with cardiovascular disease, including demographic information, clinical data such as blood pressure, ECG data, and medication history along with sensor and digital data from wearable devices, sensors, etc. Machine learning algorithms such as decision trees, random forests, and neural networks will be used to identify important features and predict the likelihood of heart failure. The model could be used to identify patients at high risk of developing heart failure, enabling healthcare providers to tailor treatment plans accordingly. The model could also be used to monitor patients' heart failure risk over time, allowing for early intervention and improved outcomes.</p>
57.	<p><b>UAV OPERATIONS IN GPS DENIED ENVIRONMENT</b></p> <p><u>Divyanshi Sharma, Sakshi Kaushal</u>  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Drone systems have gained significant importance globally in military and civilian usages because of the flexibility and functionality of UAVs under harsh circumstances. However, one difficulty for UAVs is that they are GPS-dependent for operation and navigation purposes. In GPS-degraded environments – where GPS signals are denied, degraded, or jammed — UAVs experience challenges on accurate position determination, control, and operation continuity. As for these limitations, diverse other techniques are now suggested, and some of them researched, to overcome these</p>

	<p>shortcomings. There are onboard sensors like INS, LiDAR, Cameras and ultra-wideband (UWB) system, these all works with UAVs through sensor fusion. Simultaneous Localization And Mapping (SLAM), machine learning and visual odometry are emerging as promising techniques that offer efficient ways to operate in systems with no GPS for navigation. Furthermore, awareness of different communication systems, multi-UAV cooperation, and self-organizing methods are being used to increase UAV efficiency and effectiveness in such circumstances. In this overview, the strategies and technologies for GPS challenged UAVs are investigated further based on sensor integration, navigation, and communication solutions.</p>
58.	<p><b>CONVERSATIONAL AI FOR MENTAL HEALTH SUPPORT</b></p> <p><u>Gourav Kashiv</u>  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>The increasing demand for mental health support has highlighted the need for accessible and scalable solutions. This thesis explores the development of a conversational AI chatbot specifically designed to provide mental health support. Leveraging large language models (LLMs), the chatbot aims to deliver empathetic, context-aware interactions that facilitate user engagement and promote emotional well-being. The research focuses on key aspects including the chatbot's ability to recognize emotional cues, maintain therapeutic conversation flow, and provide relevant coping strategies. Through a series of user studies, the effectiveness of the chatbot in reducing feelings of anxiety and depression is evaluated. Additionally, the thesis addresses ethical considerations such as user privacy, the potential for misinformation, and the importance of integrating human oversight. Ultimately, this work aims to demonstrate that LLM-driven chatbots can serve as a valuable tool in mental health support, complementing traditional therapeutic methods while making mental health resources more widely available.</p>
59.	<p><b>SIGN CONNECT: AN INTERACTIVE CONFERENCE PLATFORM FOR HARD OF HEARING AND SPEECH IMPAIRED</b></p> <p><u>Gunjan</u>, Naveen Aggarwal, Garima Joshi  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Effective communication is essential for success in personal, professional and social environments. It ensures the information is clearly understood for better relationships, collaborations and decision making. This facilitates teamwork, boosts productivity and minimizes misunderstandings, and enables smoother work execution at any workplace. This becomes a challenge for hearing and speech impaired person while interacting physically or in online platforms. This significantly limits their participation particularly in educational and professional domain which result in their growth resistance. The paper presents an approach to overcome this barrier by introducing an interactive conference platform, <i>Sign Connect</i> to assist such individuals. The proposed methodology integrates with <i>Jitsi Meet</i> an open-source platform for meetings and conferences. The proposed</p>

	<p>approach extracts ‘Keypoints ‘from frames captured through video on meeting platform using <i>Mediapipe</i> framework. Different signs detected by framework are further represented as textual data in real-time using Deep Learning model. The model is trained by using the samples from <i>INCLUDE</i> dataset which consists of 4287 videos of 262 classes, categorized in fifteen different categories. In this work, a sample of 14 classes is used train model which fall under the Adjective category. The data is augmented to increase the robustness of the model by randomly adding noise and mirroring the keypoints. The extracted keypoints data is given to ‘LSTM’ model to train over 150 Epochs, 16 Batch size, and ‘Learning Rate’ of 0.0001 is used and attained accuracy of 95.3%.</p>
60.	<p><b>EARLY SCREENING OF CANCEROUS TISSUES BY COMPUTER AIDED DIAGNOSTIC SYSTEMS</b></p> <p><u>Harleen Kaur</u>, Mamta Juneja, Ravreet Kaur  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Cancer is the most general term collectively used for a variety of diseases that can affect any part of the body. Malignant tumors and neoplasms are other words that are used for cancer. Cancer is the quick development of aberrant cells that proliferate outside of their normal borders and have the potential to move to other organs and infiltrate nearby bodily parts and is the leading cause of death worldwide. Medical experts may use Computer Aided Diagnosis(CAD) as a second opinion and to save their valuable time from manual analysis. Practitioners use various modalities as X-ray, Computed Tomography (CT) and Magnetic Resonance Imaging (MRI). X-Ray images are helpful in early diagnosis but for effective diagnosis and to pinpoint the malignant issues, MRI and CT Images are preferred. Even though MR Images are fine-grained and detailed images of organs, during the acquisition process some rician and gaussian noise may creep up. It is necessary for a diagnostic system to denoise the images before segmentation and classification to attain better accuracy for the models. This paper aims to provide insights into the machine learning algorithms used by various CAD systems which aim to detect and segment various types of cancers such as prostate, cervix, pancreas, colon, kidney.</p>
61.	<p><b>COMPARISON OF CNC MILLED VERSUS RAPID PROTOTYPED MEDICAL IMPLANTS</b></p> <p><u>Harsh Bassal</u>, Shankar Sehgal, Prashant Jindal  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Implants are needed to replace the defective or missing part or the organ of a human body, it must mimic the functionality of the organ. Demand of precise and high-quality implants keeps on increasing due to the lack of donors and right fitment. To ensure right fitment we require a reliable manufacturing process capable of producing high-quality implants with biocompatible material with an ability to manufacture complex shapes of the implant with sufficient accuracy and precision. There are mainly two manufacturing processes that are mainly used for implant manufacturing. The first one is subtractive</p>



	<p>manufacturing such as milling while the second one is additive manufacturing such as rapid prototyping. This research work aims at fabrication of the implant using two different methods, that is, computerised numerically controlled (CNC) milling versus rapid prototyping. Keywords: Implant, Manufacturing, CNC, Milling, Rapid prototyping.</p>
62.	<p><b>DEEP LEARNING BASED SEGMENTATION IN DIABETIC RETINOPATHY – A COMPARATIVE OVERVIEW</b></p> <p><u>Harsimran Kaur</u>, Mamta Juneja  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Diabetic Retinopathy (DR) is one of most prevailing causes of blindness among diabetic population nowadays. The risk of DR increases when the issue coexists with other health issues like high blood pressure, cholesterol, obesity. In DR, high blood sugar levels affect small retinal vessels and various coloured lesions start occurring on retinal surfaces. When existing vessels suffer from blockage, various abnormal blood vessels take roots. People may suffer from permanent blindness if not diagnosed and treated timely. But the manual detection process will be cumbersome and time taking when the number of patients increases. Therefore, the automatic segmentation process assists ophthalmologists to analyse the patient at the onset of DR. This paper presents a comparative analysis of various deep learning based vessel segmentation methods that isolates blood vessels from complex retinal images. The process starts with preprocessing the dataset in order to get rid of noisy images, followed by training the model and then testing. The output mask has white coloured vessels on black background. All the methods are tried and tested for their performance on the publicly available FIVES (A Fundus Image Dataset for AI-based Vessel Segmentation) dataset. Dataset has original images along with vessel masks, where vessel masks acting as ground truth. All the models have been compared based upon evaluation metrics of accuracy, sensitivity, specificity, dice coefficient, precision, mean square error, IoU and AUC.</p>
63.	<p><b>VISION-LANGUAGE MODELS: A NEW ERA OF IMAGE CLASSIFICATION</b></p> <p><u>Ira Bhatia</u>, Jasjit Singh Dhanoa, Archita  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Vision-language models (<i>VLMs</i>) have recently gained attention for their ability to fuse visual and textual information, making them highly applicable for advancing a wide range of image classification tasks critical to India's development. This paper provides a comprehensive comparison of several state-of-the-art <i>VLMs</i>, including <i>CLIP</i>, <i>ALIGN</i>, and others, in the context of image classification. We evaluate each model based on its accuracy, generalization capabilities, and performance across diverse datasets relevant to India's unique challenges, such as healthcare diagnostics, smart agriculture, and urban development. The study also explores the models' efficiency in zero-shot learning scenarios, crucial for India's diverse, data-scarce environments where labelled data for</p>

	<p>specific categories may be limited or unavailable. Furthermore, we investigate the impact of model architecture, training data scale, and multimodal fusion techniques on classification accuracy. Our findings highlight the strengths and limitations of each model, providing insights into their applicability to real-world challenges. The results of this study can guide the selection of <i>VLMs</i> for specific use cases in India's strategic sectors, driving technological progress and supporting India's journey toward becoming a global leader in AI-driven solutions.</p>
64.	<p><b>SUSTAINABLE PARTY DECOR - UTILIZING NATURAL PALM LEAVES, PAMPAS GRASS, AND OVERSIZED PAPER FLOWERS CRAFTED FROM RECYCLED PROJECT FILES FOR MINDFUL CELEBRATIONS.</b></p> <p><u>Ishwarpreet Kaur</u>, Kirti, Ramandeep Bawa  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>This research focuses on environmentally friendly alternatives to the usual party decorations that rely on single-use plastics and balloons, thereby contributing to degradation. The research was carried out by conducting two events at the University Institute of Fashion Technology (UIFT) of Panjab University in Chandigarh: the freshers' party and the farewell party, where natural and reused material was used to reduce the amount of waste produced. The objectives of the study are, therefore to assess whether or not decorations during events can be effectively done using natural and recycled materials, reduce dependence of decor on plastics, and encourage more sustainable practices in event planning. For the fresher's party, locally sourced natural materials, such as palm leaves and pampas grass, were used, whereas tissue paper flowers composed of biodegradable material took the place of plastic decorations. At the farewell party, old project files and discarded paper, which would otherwise be left in waste, were being transformed into beautiful flowers to decorate the venue. Data collection includes direct observation of waste reduction strategies; on top of that, 76 attendees gave feedback as to the aesthetic appeal and eco-friendliness of the decorations. The key findings point out the potential of replacing traditional plastic-based ornaments with sustainable materials at a lower aesthetic value. The respondents appreciated the environmental merits and uniqueness of the ornaments while appreciating the introduction of greener approaches for such events in the future. It, therefore, encourages event planners to choose more eco-friendly alternatives.</p>
65.	<p><b>BROAD SPECTRUM ANTI-BACTERIAL EFFECT OF BIOSURFACTANT: NON-INVASIVE ANALYSIS USING THERMAL CAMERA AND PYTHON SOFTWARE</b></p> <p><u>Jahnvi</u><sup>1</sup>, Mary Chatterjee<sup>1</sup>, Naveen Aggarwal<sup>2</sup>  <sup>1</sup><i>Department of Biotechnology Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh,</i> <sup>2</sup><i>Department of Computer Science and Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p>

	<p>The study investigates the antimicrobial efficacy of biosurfactants produced by <i>Lactobacillus rhamnosus</i> against <i>Escherichia coli</i> and <i>Staphylococcus aureus</i>, model organism to test antimicrobial effect of any agent known for antibiotic resistance. As antibiotic resistance continues to rise, biosurfactants offer a promising alternative for pathogen control. In the study, <i>E. coli</i> and <i>S. aureus</i> were cultured, with their growth tracked via optical density measurements and thermal imaging. Thermal imaging enabled real-time insights into bacterial metabolic activity, enhanced through Python-based image processing that generated heatmaps to visualize growth dynamics. It also provided valuable insights into how <i>E. coli</i> and <i>S. aureus</i> cultures respond to biosurfactant treatment, helping visualize bacterial behaviour. This approach, combined with image processing tools, enabled the creation of heatmaps, offering a clear, dynamic interpretation of antimicrobial effects. Biosurfactants were produced by cultivating <i>L. rhamnosus</i> in DeMan, Rogosa, and Sharpe Broth, followed by purification techniques like centrifugation, filtration, and lyophilization. The biosurfactant's surface activity was assessed through assays including Drop Collapse, Oil-Spreading, Emulsification, and Haemolytic tests. FTIR analysis identified functional groups that might contribute to its antimicrobial action. The antimicrobial properties were evaluated through the disc diffusion method, with biosurfactant solutions (20 mg/mL and 40 mg/mL) tested against <i>E. coli</i> and <i>S. aureus</i>, using ciprofloxacin and vancomycin as controls. The inhibition zones indicated that biosurfactants effectively inhibited bacterial growth, especially against antibiotic-resistant strains. Overall, the study underscores the potential of biosurfactants as potent antimicrobial agents, offering a sustainable alternative to conventional antibiotics and enhancing current antibacterial treatments.</p>
66.	<p><b>AI IN EARLY LIVER DISEASE DETECTION: A COMPREHENSIVE REVIEW</b></p> <p><u>Jasjit Singh Dhanoa</u>, Mamta Juneja  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Cirrhosis is a chronic liver condition where prolonged injury causes regenerative nodules and fibrosis, leading to complications like portal hypertension and end-stage disease. Advances in the understanding of cirrhosis, including its pathophysiology and natural progression, have revolutionized treatment approaches, resulting in significant improvements in both quality of life and life expectancy for affected individuals. This review assesses the effectiveness and limitations of machine learning techniques in early-stage chronic liver disease detection. By analyzing current research, including literature, experiments, and clinical applications, it identifies key gaps and challenges in applying machine learning for early diagnosis. The review highlights the strengths and weaknesses of existing models, offering insights to optimize these technologies for more accurate detection. Future research will refine models and validate them with larger, diverse datasets to enhance robustness and generalizability. The study underscores the potential of ML and DL in improving diagnostic accuracy and outcomes for liver cirrhosis patients.</p>
67.	<p><b>COMPARATIVE ANALYSIS OF GENERATIVE AI MODELS FOR TEXT-TO-VIDEO GENERATION</b></p>

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Generative Artificial Intelligence (GAI) is one form of AI that can generate new content like text, images, video, audio, and music. With the recent advancements in generative AI, there have been significant breakthroughs in text-to-video generation that translate written text into dynamic video content. This research aims to conduct a comparative analysis of leading generative AI models for text-to-video generation, focusing on their underlying architectures, performance, and the application scope. The analysis explores different deep learning models for text-to-video generation such as Generative Adversarial Networks (GANs), Variational Autoencoders (VAEs), Transformer-based models, and Diffusion models, which serve as the backbone of these systems. The main objective is to provide a critical assessment of the strengths and limitations of these models by evaluating them on parameters such as video quality, alignment with textual description, computational efficiency, and generalization capabilities. Preliminary evaluations indicate that these models perform well in generating videos from simple text but struggle with maintaining coherence and quality in the case of complex, multi-scene narratives. However, early findings suggest that combining different models could lead to better results by improving both quality and speed. Ultimately, this research seeks to provide a deeper understanding of how different GAI models handle text-to-video generation, with the aim of informing future developments in the field and highlighting areas for further research.

68. **IMPLEMENTATION OF XAI ASSISTED UTERINE CANCER TUMOR CLASSIFICATION SYSTEM**

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Uterine cancer or Endometrial Cancer is a malignant tumor that forms in the tissue of the uterus. It is of 2 types : Endometrium Cancer and Uterine Sarcoma. It is the 6th most common cancer in women. India is at the 5th position according to 2022 Global Endometrial cancer rates with an ASR of around 2.5 per 100,000. The purposed XAI assisted Uterine cancer classification system works in 2 phase the first classifies the tumor into 3 types – Uterine Endometrioid Carcinoma, Uterine Serous Carcinoma and Uterine mixed Endometrial Carcinoma with the help of K-nearest Neighbour algorithm. The second uses XAI on the output making the system more interpretable and trustworthy using Shap. The study makes use of Uterine Corpus Endometrial Carcinoma Kaggle dataset which consists of the genomic data of the patient. KNN is a supervised machine learning method employed to tackle classification problems. The system has an accuracy of 77%. XAI engenders appropriate user trust, provides insight into how a model may be improved, and supports understanding of the process being modeled. XAI understands the black-box nature of the model using Explainable Artificial Intelligence in the form of a python library cum package shap. or Shaply Additive explanations. The shap was used in the Unified Approach for Interpreting Model Predictions. The imposed study shows that the feature Fraction Genome Altered has a positive impact on the result

	<p>while features Mutation Count and Diagnosis age impact negatively. This study implies that more the diagnosis age is more harmful for patients.</p>
<p>69.</p>	<p><b>A BERT-BASED TECHNIQUE ON IMDB MOVIE REVIEWS</b></p> <p><u>Mallika Raj</u>, Makhan Singh, Mukesh Kumar  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>The fast expansion of social media platforms has changed the way people express themselves and share their experiences. With millions of people creating massive amounts of information every day, social media has become a great source of data for sentiment analysis. Understanding the mood behind social media reviews can provide useful information about public opinion, brand perception, and customer behavior. However, the unstructured, diverse, and frequently noisy nature of social media writing presents considerable problems for classic sentiment research tools. To address these issues, innovative natural language processing models such as Bidirectional Encoder Representations from Transformers (BERT) have developed as effective tools. BERT's capacity to understand context and subtle meanings inside text makes it ideal for analyzing the diverse and context-dependent language of social media. This proposed study seeks to apply BERT for sentiment analysis of social media reviews, proving its ability to extract relevant insights from complex, user-generated content. This work proposes and compares the <i>machine learning</i> model and the deep learning model, BERT. To classify IMDb fake reviews, the proposed model first utilizes data cleaning then feature extraction methods such as Word Frequency, TF-IDF, N-gram onto the pre-processed data. Afterwards, the extracted features are fed to the <i>machine learning</i> and deep learning models. The experimental results show that BERT outperforms typical <i>machine learning</i> models in accuracy. Specifically, BERT obtained 93.4% accuracy, which was much higher than the best-performing standard model. Furthermore, the model's capacity to recognise context enabled it to handle complex words more efficiently.</p>
<p>70.</p>	<p><b>EARLY DIAGNOSIS OF HEART DISEASE USING MACHINE LEARNING: A PERFORMANCE EVALUATION</b></p> <p>Maanya Kharbanda<sup>1</sup> , Mishty Kharbanda<sup>2</sup>  <sup>1</sup><i>University Institute of Engineering and Technology, Panjab University, Chandigarh,</i>  <sup>2</sup><i>Chitkara University, Punjab.</i></p> <p>Cardiovascular disease is one of the most known and leading causes of death worldwide, and early detection is crucial for improving patient outcomes. Machine learning (ML) offers a powerful, cost-effective method for early diagnosis. In this study, the authors explored the use of various ML models for heart disease prediction, utilizing the Cleveland Heart Disease dataset from the University of California, Irvine (UCI) Machine Learning Repository. The main goal was to evaluate and compare the performance of various ML algorithms in predicting heart disease at the earliest. The performance of each model was measured in terms of accuracy. Among the models tested, Random Forest and Decision Tree delivered the best results. The Random Forest model achieved</p>

	<p>the highest accuracy of 99.22%, and the Decision Tree model also performed well, with an accuracy of 98.83%. This comparative study demonstrates that Random Forest and Decision Tree models outperform other algorithms in predicting heart disease, highlighting their potential for early diagnosis and clinical decision-making.</p>
71.	<p><b>ENHANCING CERVICAL CANCER PREDICTION WITH MACHINE LEARNING AND SMOTE: A BALANCED APPROACH</b></p> <p><u>Pragya Thakur</u>, Preeti Aggarwal  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Cervical cancer remains a critical global health concern, emphasizing the importance of early and accurate detection. This study explores the use of machine learning algorithms combined with class balancing techniques to improve cervical cancer diagnosis. The imbalanced nature of medical datasets often biases models toward the majority class, risking misdiagnosis of minority cases. To address this, we apply the Synthetic Minority Over-sampling Technique (SMOTE) to ensure balanced representation of both positive and negative cases. We applied Chi-Squared Test (SelectKBest with chi2), Mutual Information (SelectKBest with mutual_info_classif), Recursive Feature Elimination (RFE), Lasso (SelectFromModel with LassoCV), Tree-Based Feature Importance (Random Forest), Sequential Feature Selection (SFS), Correlation Coefficient, using Classification Algorithms - Decision Tree Classifier, to find out the best feature selection model. While applying Logistic Regression, Decision Tree, Random Forest, Support Vector Machine (SVM), k-Nearest Neighbors (k-NN), Naive Bayes, using Feature Selection Algorithm Random Forest Classifier, to find the best classification model. We explore various combinations of feature selection and classification models, including ANOVA F-test with SVM, ANOVA F-test with Artificial Neural Networks (ANN), and Random Forest with Naive Bayes. The best-performing model uses univariate feature selection with SelectKBest (f_classif) and a Decision Tree Classifier after applying SMOTE. The model outperforms with an accuracy of 99.7%. Preliminary results demonstrate that class balancing with SMOTE significantly enhances performance, particularly for detecting positive cancer cases, suggesting an efficient, scalable approach for accurate cervical cancer prediction.</p>
72.	<p><b>DEEP LEARNING-BASED AUTOMATED DETECTION OF MANDIBULAR FRACTURES IN PANORAMIC RADIOGRAPHS</b></p> <p><u>Priyanka Rana</u>, Manojkumar Jaiswal  <i>Postgraduate Institute of Medical Education &amp; Research, Chandigarh.</i></p> <p>BACKGROUND - Mandibular fractures are among the most common injuries resulting from trauma. Panoramic radiography is traditionally used to diagnose these fractures, offering a single view of both arches and surrounding structures, which aids in detecting fracture lines or asymmetry. In this study, we present a deep learning-based approach to automatically detect mandibular fractures in panoramic radio-graphs. METHODOLOGY- We utilized CNN architectures, trained on 330 images and validated on 84. RESULTS &amp; CONCLUSION - Our method achieved an F1-score of 86%,</p>

	<p>outperforming existing fracture classification methods. Furthermore, the framework successfully categorized radio-graphs featuring plating, arch bars, and mixed or permanent dentition, providing essential support to healthcare professionals.</p>
73.	<p><b>CLASSIFICATION OF EMG SIGNALS FOR HAND GESTURE RECOGNITION USING HYBRID DEEP LEARNING TECHNIQUES</b></p> <p><u>Ravneet Sharma</u>, Mamta Juneja  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Prosthetics are artificial body parts designed to replace missing limbs lost due to trauma, disease or congenital conditions. Improving human-computer interaction (HCI) is crucial for the effective use of these prosthetic devices. Hand gesture recognition plays a vital role in this enhancement allowing for more intuitive control and interaction with prosthetic arms. Electromyography (EMG) signals that monitor muscle activity are essential for controlling prosthetics. Traditional methods of EMG signal classification often struggle to achieve the required accuracy and efficiency for effective gesture recognition. Our research proposes a novel hybrid deep learning model integrating Convolutional Neural Networks (CNN) and Bidirectional Long Short-Term Memory (BiLSTM) networks. Implemented in Python and trained on a large EMG dataset, this model achieved an impressive accuracy of 97%, approximately 5% higher than existing models. The proposed model incorporates various preprocessing steps to enhance data quality and reduce noise thus ensuring robust performance and good generalization to new data. This research demonstrates significant potential in improving hand gesture recognition. The proposed model enhances HCI and offers more effective and intuitive control of prosthetic devices. This advancement is expected to lead to more responsive and user-friendly prosthetic arms greatly improving functionality and integration into everyday life for individuals with limb loss.</p>
74.	<p><b>ONLINE QUEUING IN OPDS AND SIMPLIFIED INSURANCE CLAIMS</b></p> <p>Saanvie Dadwal  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>A Simpler Way to Consult a Doctor: Envision arriving at a hospital and knowing the precise wait time to see a doctor—no more uncertainty or stress about the duration. This is the convenience offered by the Smart Hospital Queuing System. It operates on: i) Real-time updates: View your queue position and estimated wait time on your phone or at the hospital. ii) Smart routing: The system directs you to the closest hospital with available slots, reducing your wait time. iii) Efficient management: Hospitals can better organize appointments, allocate resources effectively, and monitor bed availability. iv) Streamlined insurance claims: Receive an electronic bill post-visit, simplifying the insurance claim process. Its significance lies in: i) Reduced waiting: Minimize time spent in congested waiting areas. ii) Enhanced experience: Enjoy a more pleasant hospital visit. iii) Optimized resource utilization: Hospitals can achieve greater efficiency in resource deployment. iv) Simplified insurance process: Facilitate quicker reimbursement from</p>

	<p>insurance. The Future of Healthcare: The Smart Hospital Queuing System is merely the start. Picture a future where hospitals can anticipate patient influx, identify necessary resources, and provide tailored care. Such technology paves the way for a healthcare system that is more effective, accessible, and centered around the patient's needs.</p>
<p>75.</p>	<p><b>FORECASTING FINANCIAL TRENDS: INTEGRATING MACHINE LEARNING AND DEEP LEARNING TECHNIQUES FOR IMPROVED STOCK MARKET PREDICTIONS</b></p> <p><u>Abhi Chahar</u>, Sameer Thakur, Ravreet Kaur, Mamta Juneja  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>In recent years, the stock market has gained significant attention from researchers and investors due to the potential of predictive modeling to enhance trading strategies. This study explores the application of machine learning (ML) and deep learning (DL) techniques to forecast stock market trends and prices. By leveraging historical price data, trading volumes, and relevant financial indicators, various algorithms, including regression, decision trees, and neural networks, are employed for pattern recognition and predictions. The study aims to compare ML and DL in terms of their complexities and effectiveness in analyzing patterns, capturing dependencies, and predicting accuracy. Through rigorous validation and back-testing on diverse datasets, this research provides insights into the strengths and weaknesses of these approaches, contributing to the development of robust trading strategies in the dynamic financial market environment. By combining ML and DL techniques, the study seeks to improve prediction accuracy, paving the way for more sophisticated trading strategies. The findings highlight deep learning's potential as a transformative tool in financial analytics, which can inform investment practices. This study aims to establish software metrics for the models to ensure optimal outcomes, assisting investors in making informed decisions about stock investments, maximizing profits while minimizing risks.</p>
<p>76.</p>	<p><b>SPACECRAFT ANOMALY DETECTION USING AA_TCN (ATTENTION-AUTOENCODER-TCN)</b></p> <p><u>Shagun</u>, Makhan Singh  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Spacecraft anomaly detection is vital for the safety of crew, mission success, regulatory and operational efficiency etc. In this study, it has been discovered that due to increasing debris in space, the spacecraft telemetry is becoming anomalous, and certain anomalies can be identified by analyzing such telemetry data. Out of all the discovered methods, deep learning approaches such as TCN outperformed others with more than 90% accuracy to detect spacecraft anomalies. However, TCN is still lagging in meeting real-time analysis, with lower computational constraints. To handle such challenges, an advanced hybrid approach of Attention-Autoencoder-TCN is considered over just TCN in this study. After implementing the proposed approach, an accuracy 98%, precision 100%, recall 97.89%, and an F1score98.74% indicate the model's efficiency in detecting</p>



	<p>anomalies. The results show the effectiveness of the Attention-Autoencoder-TCN architecture for anomaly detection in spacecraft missions, highlighting the importance of recognizing complex anomalies for reliable operations. Later, the model is trained to classify the anomalies into 8 defined classes. The performance of the model is quantitatively indicated as exceptional, with a precision 100% for the and recall values ranging from 88% to 100% across all classes. The overall accuracy reached 96%, demonstrating the model's effectiveness in discerning both isolated outliers and context-sensitive anomalies. The model's high averages confirm its robustness, highlighting the importance of advanced anomaly detection in spacecraft operations for safety and decision-making. It outperforms existing research in detecting anomalies and can be applied for real-time analysis in the future.</p>
77.	<p><b>AN ASPECT-LEVEL SENTIMENT ANALYSIS DATASET FOR THERAPIES ON TWITTER</b></p> <p><u>Shammi</u>, Sukhwinder Singh  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Sentiment analysis, a branch of natural language processing (NLP), can play a crucial role in the Healthcare domain. A data set of tweets is available which has user-generated content on specific therapies. Each tweet is annotated based on its sentiment—positive, negative, or neutral—towards particular aspects of these therapies, such as their effectiveness, accessibility, and potential side effects. To perform sentiment analysis, various models of machine learning/deep learning could be employed. These methods allow sentiment analysis tools to process large volumes of text data efficiently and extract meaningful insights. It also has potential applications in healthcare research and policy, offering data-driven insights that can help improve patient care and inform treatment recommendations based on patient feedback and sentiment trends.</p>
78.	<p><b>PERFORMANCE OPTIMIZATION THROUGH ARTIFICIAL NEURAL NETWORK (ANN) BASED ALGORITHM/MODEL IN THE CONVENTIONAL FUZING SYSTEM</b></p> <p><u>Shivani Verma</u><sup>1</sup>, Roopali Garg<sup>1</sup>, Ashish Saini<sup>2</sup>  <sup>1</sup><i>University Institute of Engineering and Technology, Panjab University, Chandigarh,</i> <sup>2</sup><i>Terminal Ballistics Research Laboratory, Defence Research and Development Organisation, Chandigarh.</i></p> <p>A layer sensing and counting logic of the conventional fuzing system is required to be optimized for enhancing its performance/efficiency. Artificial Intelligence (AI) based framework has been incorporated for meeting this requirement. The basic principle of layer sensing involves obtaining a number of shock pulses through acceleration sensor based packaged systems impacting multiple concrete target(s).The threshold level of</p>

	<p>acceleration has been defined to distinguish between desired pulse and unwanted noise or noise signal due to interference layer. The implemented machine learning (ML) model helps to take accurate decisions further to generate final commands. To implement this, a data acquisition system consisting of an integrated ARM Cortex M7 Microcontroller along with a high ‘g’ accelerometer has been prepared for lab level testing and conducting various impact-based experiments. The acquired data is taken as dataset(s) as an input for computational analysis by a regression model of Artificial Neural Network (ANN). ANN works on the principle of biological neuron to predict and make choices according to activation functions given to it such as linear, tanh, sigmoid and ReLU etc. It consists of a number of computing neurons connected to each other in a three-layer system; one input layer, several hidden layers, and one output layer. Artificial Neural Networks (ANNs) can model complex, non-linear or hidden relationships between inputs and outputs.. The embedded code software development has been implemented with ANN Model, trained and tested by splitting in the ratio of 80:20; and also validated in the lab setup.</p>
79.	<p><b>SUSTAINABLE ACCESSORY DESIGN: EXPLORING THE ROLE OF UPCYCLING, RECYCLING, AND CIRCULAR FASHION IN MODERN ACCESSORIES</b></p> <p><u>Shruti Yadav</u>, Kirti  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>The paper discusses how upcycling, recycling, and circular fashion influence the design and creation of contemporary accessories. This particular research is aimed at reducing waste and having materials last longer. As consideration for the environment in the fashion industry grows, these processes are worthwhile ways to reduce damage to the environment and further decrease demand for new materials. Upcycling gives old or unused materials a new life and transforms them into fashionable accessories while recycling transforms materials as an attempt at avoiding waste. What circular fashion does is a design toward those accessories which are repairable, reusable, or recyclable to minimize the environmental effects. For a more in-depth review of these methods, the researcher developed five accessories from waste-generated textiles to illustrate how sustainable techniques can be practically implemented. Further, to learn more about these methods, the researcher designed five accessories from textile waste and showed how these sustainable techniques can be used. Moreover, the study also has a survey containing 45 people aged 20-25 years. to see what they think about sustainable accessories. From the results, it can be gathered that more people like eco-friendly brands and products because they are more aware of environmental issues. The study further demonstrates creative ways upcycling, recycling, and circular fashion could reshape accessories, enabling both consumers and designers to work toward a more circular economy where resources are used appropriately and less waste occurs with the demand for stylish, ethically produced items. Keywords -Upcycling, Recycling, Sustainability, Circular Fashion, Accessories.</p>
80.	<p><b>AI POWERED TAX MANAGEMENT AND VERIFICATION SYSTEM</b></p>

	<p>Bhumika Bijlwan, Harshita Sharma, <u>Simar Atwal</u>, Ritika Kalia <i>Chandigarh College of Engineering and Technology, Chandigarh.</i></p> <p>The AI-Powered Tax Management and Verification System aims to modernize tax management through advanced AI technologies and automation. The main features include automated document processing, predictive analytics for financial planning, cryptocurrency tax management, AI chatbot assistance, automated alerts and error detection. It simplifies tax filing, ensures compliance and minimizes manual effort. Other key features include life event tracking, profile customization, and role-based access control that offer a personalized and secure user experience. Real-time assistance via AI chatbots enhances system efficiency for faster tax filing and minimizing errors. It is likely to untangle complex tax scenarios like cryptocurrency transactions while providing personalized suggestions on the basis of a user’s profile and life events. With end-to-end encryption and secure authentication systems to protect the user's data, this builds trust, ensuring privacy. The basic software is capable of handling complex tax scenarios involving user transactions, such as investigations into businesses or companies, tax planning, and cryptocurrency, among others, while at the same time providing instant support to the user via AI chatbots in support of ease of the filing process.</p>
81.	<p><b>FOURTH GENERATION SOLAR CELLS</b></p> <p><u>Vidushi Sharma</u>, Charu Madhu, Preeti Singh <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Fourth-generation solar cells represent a significant evolution in photovoltaic technology, integrating innovative materials and designs to enhance efficiency and sustainability. This review explores the various types of fourth-generation solar cells, including two-dimensional material-based cells, quantum dot solar cells, perovskite solar cells, organic solar cells, and dye-sensitized solar cells. Each type is examined for its unique properties, working principles, and fabrication techniques. This research will highlight the importance of optimizing materials to improve performance such as power conversion efficiency and stability .The study reviews the history and the evolution of solar cells, the new structures that have been evolved, the new materials that have come into picture. Despite the promising advancements, challenges remain in the life cycle of material, cost-effectiveness, large-scale implementation power grid and effective energy storage. This comprehensive review aims to inform and inspire further research in the solar cell community, highlighting the potential of fourth-generation technologies to contribute to a sustainable energy future and reducing dependency on conventional energy sources like natural gas and oil, which will contribute in the reduction of carbon footprint.</p>
82.	<p><b>SENTISERVE : ENHANCING PUBLIC SERVICE BOTS WITH EMOTION DETECTION THROUGH VOCAL CUES</b></p>

	<p><u>Vinay Sharma, Naveen Aggarwal, Nirmal Kaur, Sarbjeet Singh</u>  <i>Department of Computer Science and Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>With advancements in technology, public service sectors rely on automated bots for inquiries and support, replacing human interaction. However, bots often fail to capture the user's emotional states, such as anger or disgust which leads to ineffective communication. This emotional unawareness aggravates unpleasant experiences, leading to unresolved issues. There is a need to incorporate emotion recognition approaches in the public service system for real time analysis. Over the years, old researchers have proposed many emotion recognition approaches to detect tonal variations and speech patterns that reveal emotional cues, allowing for more refined and empathetic dialogue. Most of the existing models train on english datasets. Relatively, limited work has been done on developing emotion detection systems tailored specifically for asian languages, despite their linguistic and cultural complexity. In this study, we proposed a public service bots equipped with emotion detection through vocal cues. This study investigates the incorporation of emotion recognition into automated public service systems, emphasizing the real-time analysis of vocal tones to detect emotions like anger, disgust and happy. In this study, we used several Indian datasets to train a model capable of detecting emotions through vocal cues, focusing on emotions rather than words. Our approach involved using spectrograms and Mel Frequency Cepstral Coefficients to extract features from speech. The model was trained using MFCC-based features derived from these datasets, allowing it to recognize emotional states more effectively. This study underscores the transformative potential of voice-based emotion recognition in modernizing public service systems, making them more responsive, empathetic, and emotionally intelligent.</p>
<b>UG/PG students from colleges and other institutions</b>	
83.	<p><b>EVALUATION OF MILITARY WEAPON SYSTEM</b></p> <p><u>Abhay Sounkhla</u>  <i>Department of Engineering, Shoolini University Solan, Himachal Pradesh.</i></p> <p>This review explore how AI play a crucial role in the development and enhancement of military weapon system and also in armed forces. Main key features of this review it can show how AI can change warfare. In this paper we will discuss a comparison of earlier weapon system and current weapon system. This paper also describe which technologies are used, such as machine learning, deep learning, neural network, Biometric, Real-time AI learning. Main advantage of these system help for reduce human risk. We will discuss about advantages and disadvantages of AI military weapon system. In this paper we will discuss about upcoming features that could change the future of military weapon system. With the help of this review we will show how AI is changing military weapon system and discuss about the evaluation of warfare.</p>
84.	<b>RECENT IMPROVEMENTS ON THE USE OF ARTIFICIAL</b>

	<p><b>INTELLIGENCE BASED TECHNOLOGIES FOR DETECTION OF BREAST CANCER: A REVIEW</b></p> <p><u>Priyanka Kalsi</u>, Ishani Sharma  <sup>1</sup><i>Yogananda School of AI, Computers and Data Science, Shoolini University, Solan, Himachal Pradesh.</i></p> <p>Breast cancer is the biggest cause of death among women worldwide, a fact that may decline with developments in early detection methods. Artificial intelligence has been working in healthcare for the last several years and has a strong impact on breast cancer screening. Analysis of imaging data, including mammograms, MRIs, ultrasounds, and genomic information, with AI algorithms, has been able to detect early-stage cancers more reliably and minimize diagnostic errors. However, it still requires humans to interpret the results. The most recent improvements regarding AI applications, machine learning, and deep learning for breast cancer screening are reviewed in this Paper/ study. In clinical practice, AI still needs some developments to overcome some challenges such as data scarcity, model explainability, and Reducing challenges. The training gained from this review that large, encrypted datasets are necessary for training interpretable AI models and for closer integration with conventional healthcare workflows are discussed. Finally, possible applications of AI are reviewed in precision medical techniques with a focus on the improvement of patient care for personalized detection and treatment of breast cancer. While AI has improved during the last years considering diagnosis related to breast cancer, some issues that remain are under consideration for resolution. By using AI for the detection and treatment of breast cancer, health outcomes for everyone can be improved.</p>
85.	<p><b>P VS NP PROBLEM</b></p> <p><u>Ramandeep Singh</u>, Ira Aditi, Divyansh Kumar  <i>Department of Computer Science and Engineering, Chandigarh University, Gharuan, Punjab.</i></p> <p>The P Vs Np problem, the biggest problem facing humanity to date and still unsolved, arises from the need to find two solutions to the many global issues of the modern era, such as cancer, ML algorithms, data security, and other issues. In our research, we have used Logistics and Transportation and analyzed how they can be used to solve the P Vs Np problem. As this is a review paper, we have compared L&amp;T with TSP which will assist us to decide whether a derivative is an efficient method to solve this problem. Moving further, topics like Sim-heuristics and Metaheuristics have been covered to initiate more innovative methods to overcome this problem. This paper is mainly centered towards the field of Logistics and Transportation, Traveller Salesman problem and derivatives.</p>
86.	<p><b>EVALUATION OF GAME ENGINES: A REVIEW OF THE PAST, PRESENT, AND FUTURE OF GAME ENGINES</b></p>

Vaibhav Kheriwal

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This review offers a detailed analysis of the evolution of game engines, from early pixel-based systems to modern photorealistic systems. It explores the crucial impact of AI in video game development, emphasising significant advancements and trends in AI methods employed in both older and current game design techniques. The review examines key features in the development of game engines, including game creation using early and modern engines. In addition, the paper discusses a comparison of earlier game engines and current game engines, with an emphasis on emerging technologies such as machine learning, procedural generation, real-time AI learning, and the integration of AR and VR. Additionally, this review describes how AR and VR technologies help us push the boundaries of interactive entertainment and enhance the player experience. It also addresses upcoming features that could change the future of game development. The aim is to show how AI is changing game development and to discuss the evolution of game engines.

ABSTRACTS OF  
POSTER  
PRESENTATIONS

<b>Poster Presentation: Engineering</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>			
1.	Dr. Amandeep Verma	Department of Information Technology, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Security of Biometric Systems.
2.	Professor Gargi Ghoshal	Dr. S.S. Bhatnagar University Institute of Chemical Engineering & Technology, Panjab University, Chandigarh.	Isolation, Modification, Characterization of Barnyard Millet Starch.
3.	Dr. Gaurav Sapra	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Tuning Graphene Photovoltaics: A DFT Study of Doped Materials for Advanced Solar Cells.
4.	Dr. Jagjit Singh	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Advancing Uncertainty Propagation in Neutron Cross-Section Measurements through the Improved Unscented Transformation Method.
5.	Dr. Madhu Khatri	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Toxicity evaluation of carbon quantum dots using zebra fish model: A Review.
6.	Dr. Parveen Goyal	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Synthesis, Characterization and In-vitro study of hydroxyapatite, silver substituted hydroxyapatite and iron substituted hydroxyapatite for bone tissue engineering applications.
7.	Professor Roopali Garg	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Security assessment framework.
8.	Professor Seema Kapoor	Dr. S.S. Bhatnagar University Institute of	From sacred petals to sustainable luxury: Transforming floral temple



		Chemical Engineering & Technology, Panjab University, Chandigarh.	waste into naturally fragrant candles for a greener tomorrow.
9.	Dr. Sunil Bansal	Department of Applied Sciences, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Multivariate predictions of the particle productions at hadron colliders.
<b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b>			
10.	Ms. Amita Chauhan	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Efficient computation offloading using uav-based mobile edge computing: a deep reinforcement learning approach.
11.	Mr. Amrit Pal	Department of Computer Science and Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.	A review on text-to-video generation techniques.
12.	Mr. Anuj Sharma	Department of Mechanical Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Investigation of impact of nanofluids on key machining parameters during processing of biocompatible alloys.
13.	Er. Bittu	University Institute of Engineering and Technology, Panjab University, Chandigarh.	FPGA-based edge detection and pattern recognition for real-time image processing.
14.	Ms. Divya Verma	Dr. S.S. Bhatnagar University Institute of Chemical Engineering & Technology, Panjab University, Chandigarh.	Study of silver nanoparticle reinforced starch and chitosan-antimicrobial packaging films preparation & application on perishable fruit guava ( <i>Psidium guajava</i> L.).
15.	Ms. Kanak Sharma	Dr. S.S. Bhatnagar University Institute of Chemical Engineering & Technology, Panjab University, Chandigarh.	Development of edible starch-based films with essential oil enhancing packaging properties.

16.	Ms. Kirti	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Comparative analysis of Biosurfactant produced from <i>Lactobacillus rhamnosus</i> using four different economical substrates.
17.	Ms. Sakshi Gupta	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Isolation, modification and characterization of barnyard millet starch.
<b>UG/PG Students of Panjab University Campus and Regional Centres</b>			
18.	Ms. Aditi	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Efficient Computation Offloading using UAV based mobile Edge server: Deep Reinforcement Learning Approach.
19.	Mr. Amandeep Singh	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Production of biosurfactant from <i>L. Rhamnosus</i> 1408 T and it's characterization.
20.	Ms. Aparna Goel	University Institute of Engineering and Technology, Panjab University, Chandigarh.	CFD analysis of graphene based nanofluid for automobile radiator cooling.
21.	Mr. Arulsham Bhasin	University Institute of Engineering and Technology, Panjab University, Chandigarh.	A hybrid serpentine robotic system for terrestrial and aerial locomotion.
22.	Ms. Divyanka Singh	Dr. S.S. Bhatnagar University Institute of Chemical Engineering & Technology, Panjab University, Chandigarh.	From conflict to climate: chemical engineering's transformative power.
23.	Ms. Geetanjali Negi	Department of Biotechnology Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Synthesis of copper sulfide nanoparticles using corn starch, their characterization and antimicrobial analysis.

24.	Mr. Karanpreet Kumar	Department of Information Technology, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Enhancing Heart Disease Prediction with Machine Learning: Insights from the Cleveland Clinical Dataset.
25.	Mr. Madhur Saini	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Playing chess using decoder-only transformer models.
26.	Ms. Mansi Guleriya	Department of Biotechnology Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Green Synthesis of the silver nanoparticles using leaf extract of <i>Kalanchoe pinnata</i> .
27.	Ms. Nandini Nehra	Department of Electronics and Communication Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.	A Matlab/Simulink Computational Project Based Learning for Discrete System Realization of Digital Filter.
28.	Ms. Niharika Singh	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Detection of Breast Cancer Using AI and Machine Learning.
29.	Ms. Onkriti	Department of Biotechnology, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Microplastics in the environment: a review of degradation methods and future challenges.
30.	Palak Batra	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Exploring the Potential of PLA Filament in 3D-Printed Apparel.
31.	Er. Parul Gupta	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Survey of Machine Learning and Deep Learning Techniques for Parkinson's Disease Detection: A Review.

32.	Er. Puneet Kumar	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Dynamic Simulation and Material Evaluation for Prosthetic Socket Performance.
33.	Ms. Purvi Sharma	Department of Biotechnology, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Degradation of dye under UV irradiation.
34.	Ms. Rashmi	University Institute of Fashion Technology & Vocational Development, Panjab University, Chandigarh.	Experimenting with Different Toning Agents on Muslin dyed with Cyanotype.
35.	Ms. Samardeep Kaur	Dr. S.S. Bhatnagar University Institute of Chemical Engineering & Technology, Panjab University, Chandigarh.	Biomimetic Innovations: Leveraging Indigenous Plant Properties for Sustainable Material Development.
36.	Ms. Sanskriti	Department of Biotechnology, Panjab University, Chandigarh	Microplastics in the environment: A review of degradation methods and future challenges.
37.	Ms. Shivangi Kaushal	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Fingerprint detection.
38.	Ms. Shruti Arora	University Institute of Engineering and Technology, Panjab University, Chandigarh.	Innovative Pressure Measuring Device for Industrial Product Quality Control and Analysis.
39.	Ms. Sukhmandeep Kaur Walia	Department of Biotechnology Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.	Probing Nanofibers in Chiral Drug Separation: A Review of Current Trends and Future Directions.
40.	Ms. Yoshita Sharma	Department of Biotechnology Engineering, University	Challenges in Microplastic Detection: A Review.

		Institute of Engineering and Technology, Panjab University, Chandigarh.	
<b>UG/PG Students from Colleges and Other Institutions</b>			
41.	Mr. Bhuvan Goyal	Punjab Engineering College, Chandigarh.	Carbon Dots: A Versatile Nanomaterial with Emerging Applications.
42.	Mrs. Sheenam	Department of Computer Science and Engineering, RIMT University, Mandi Gobindgarh, Punjab.	Synergizing Traditional and Deep Learning Techniques for Enhanced Forgery Detection.

<b>Poster Presentation</b>	
<b>S.No.</b>	<b>Abstract</b>
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>	
1.	<p><b>SECURITY OF BIOMETRIC SYSTEMS</b></p> <p><u>Manpreet Kaur, Amandeep Verma</u>  <i>Department of Information Technology, University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>After token-based and knowledge-based identification mechanisms, the physiological biometric is very reliable and popular. The template-based biometric systems are more secure than traditional methods for identification such as the Bertillon system and Dactyloscopy. At different levels of biometric identification and authentication, intruders use fake template generation and modification on the particular module or the channel between two modules. According to circumstances, a total of eight vulnerable points exist where the attackers can steal bio-information using different disruptions such as Spoofing, Zero-Effort-Attack, Replay Attack, Brute Force, Hill Climbing, DOS, Trojan Horse, Function Creep and Some Common Attacks of networks. Depending upon applications, the ISO/IEC 24745 Standard for biometric protection provides the terms and conditions of recoverability, irreversibility and unlink-ability for template generation, which can help patch the breaches in bio-information. In this study, various attacks have been addressed in different aspects. Although various researchers have tried to make the system secure using different template-based security techniques like Cryptographical and Cancelable, the system still faces security issues. Nowadays, with the help of deep learning, we can make the system more secure and reliable.</p>
2.	<p><b>ISOLATION, MODIFICATION, CHARACTERIZATION OF BARNYARD MILLET STARCH</b></p> <p><u>Sakshi Gupta, Gargi Ghoshal</u>  <i>Dr. S.S. Bhatnagar University Institute of Chemical Engineering &amp; Technology, Panjab University, Chandigarh.</i></p> <p>There has been considerable interest in utilizing polysaccharide-based coatings for creating food packaging materials. Barnyard millet, commonly referred to as sanwa, sawank, and sawa, is a lesser-known variety of millet that is cultivated and consumed in India. Barnyard millet is cultivated and used as a source of starch, serving as a viable replacement for cereal crops. It is inexpensive, with approximately 66% starch that can be extracted and used as a new starch source. Its gluten-free quality, low Glycemic Index, and high resistant starch content are also highly acknowledged. Barnyard native starch has limited uses due to its inadequate mechanical and barrier properties, high solubility in water, and tendency to be brittle. Enhancements to the constraints of natural barnyard starch can be made through physical alterations. Recently, researchers have been</p>

	<p>investigating how alterations affect the properties of starch. Nevertheless, there is still a lack of information regarding altered non-traditional starches such as millet starch. Hence, this study examined the changes in characteristics of starch from Indian barnyard millet. The changes in barnyard starch properties caused by ultrasonication and repeated freeze-thaw method were studied. Fourier Transform Infrared Spectroscopy, X-ray Diffraction, Scanning Electron Microscope, Differential Scanning Calorimeter techniques were used to analyze the native starch and modified starch. The oval structure of barnyard starch is revealed through SEM analysis. These substances are extensively used in the food packaging industry.</p>
3.	<p><b>TUNING GRAPHENE PHOTOVOLTAICS: A DFT STUDY OF DOPED MATERIALS FOR ADVANCED SOLAR CELLS</b></p> <p>Mansi Rana, <u>Preetika Sharma</u>, Gaurav Sapra  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Graphene-based solar cells offer a promising solution for enhancing solar energy conversion efficiency and addressing future energy demands. These cells function similarly to traditional silicon-based solar cells but utilise graphene derivatives in place of transparent electrodes/ hole-transport layers/electron-transport layers, forming heterojunction structures. The tunability of graphene, particularly through doping, plays a pivotal role in boosting operational efficiency. This study examines the effects of trivalent p-type and pentavalent n-type doping on critical solar cell parameters such as band gap, electrical conductivity, and open-circuit voltage (VOC). A detailed analysis of doped graphene materials, including boron, nitrogen, and phosphorus, is conducted using density functional theory (DFT) and MATLAB simulations. Their integration into solar cells is aimed at improving carrier transport and increasing VOC. The study also explores the electronic and electrical properties of doped graphene materials, demonstrating that graphene-based solar cells offer significant performance improvements and hold strong potential to address future challenges in solar energy research.</p>
4.	<p><b>ADVANCING UNCERTAINTY PROPAGATION IN NEUTRON CROSS-SECTION MEASUREMENTS THROUGH THE IMPROVED UNSCENTED TRANSFORMATION METHOD</b></p> <p><u>Jagjit Singh</u>  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>This paper explores the innovative application of the Improved Unscented Transformation (IUT) method for uncertainty propagation in neutron-induced cross-section measurements within the realm of Nuclear Science. The IUT method enhances the traditional Unscented Transformation (UT) technique by integrating additional non-random parameters, thereby increasing the number of sigma points and improving the overall accuracy. We applied the IUT method to conduct a comprehensive covariance analysis of cross-section measurements, comparing its performance against the first-order sensitivity analysis method and Monte Carlo simulations. Our findings</p>

	<p>demonstrate that the IUT method is not only straightforward to use but also simpler to implement compared to the conventional sandwich formula. Through extensive Monte Carlo simulations, we illustrate the superior performance of the IUT method in covariance analysis for neutron activation cross-section measurements. Our results indicate that the IUT method offers a robust and efficient alternative for uncertainty propagation in nuclear cross-section measurements, providing significant improvements in accuracy and implementation ease. This study highlights the potential of the IUT method to enhance the reliability of nuclear data, which is crucial for various applications in nuclear science and engineering.</p>
5.	<p><b>TOXICITY EVALUATION OF CARBON QUANTUM DOTS USING ZEBRA FISH MODEL: A REVIEW</b></p> <p><u>Madhu Khatri</u>, Vageesha Singh  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Carbon quantum dots (CQDs) are type of zero-dimensional nanomaterials that have sparked a widespread interest due to their excellent optical features. This review analyses the toxicity of CQDs employing the zebrafish model, a widely used in vivo system for toxicological research. A comprehensive research review illustrates an increasing interest in CQDs biocompatibility and potential environmental implications. The synthesis methods of CQDs, such as hydrothermal, microwave-assisted and electrochemical methods are briefly described, with a focus on the characteristics of the resultant nanoparticles. The toxicity assessment of CQDs in zebrafish includes a variety of outcomes, including mortality, developmental abnormalities and behavioural changes. Toxicology evaluation methods include fish embryo acute toxicity (FET) testing and long-term exposure studies. Based on existing data and estimates, three CQDs dosage concentrations for zebrafish toxicity research are used: 10 mg/L (low), 50 mg/L (moderate) and 100 mg/L (high). These concentrations are meant to cover a wide variety of possible exposure scenarios and assist the evaluation of dose-dependent effects. The review highlights the standardised procedures and the need for additional research to identify the mechanisms underlying the toxicity of CQDs in aquatic organisms, hence promoting the safe production and application of these nanomaterials.</p>
6.	<p><b>SYNTHESIS, CHARACTERIZATION AND IN-VITRO STUDY OF HYDROXYAPATITE, SILVER SUBSTITUTED HYDROXYAPATITE AND IRON SUBSTITUTED HYDROXYAPATITE FOR BONE TISSUE ENGINEERING APPLICATIONS</b></p> <p><u>Sonia Sharma</u><sup>1,2</sup>, Parveen Goyal<sup>2</sup>  <sup>1</sup><i>Dr. S.S. Bhatnagar University Institute of Chemical Engineering &amp; Technology, Panjab University, Chandigarh,</i> <sup>2</sup><i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Calcium phosphate-based biomaterials resemble the inorganic composition of bone, they have attracted attention for bone tissue engineering applications. These compositions</p>



	<p>tend to develop an interface with the target bone because they are bioactive, bioresorbable, and biocompatible. Hydroxyapatite (HA) is the most popular for orthopaedic and dental applications among calcium phosphates. Their ability to exchange ions in the lattice framework allows the substitution of different ions to improve the resorbability of the ceramics. This study used a water-based sol-gel approach to create nano-dimensional HA and substituted (with ions Ag<sup>+</sup> and Fe<sup>2+</sup>) nanopowders. X-ray fluorescence spectroscopy (XRF) was used for the compositional study, and X-ray diffraction (XRD) was used to ascertain the lattice parameters, phase transitions, purity, and crystallinity. FTIR, or Fourier Transform Infrared Spectroscopy, was used to identify functional groups. In-vitro study was performed by immersing the nanopowders at 37° C in SBF for 30 days. For every nanopowder, the crystallinity rose as the calcination temperature rose from 800° C to 1200° C. For calcined HA, Ag-HA, and Fe-HA, it was in the range of 85–98%, 77-89%, and 83–89%, respectively. As-synthesised HA, Ag-HA, and Fe-HA nanopowders have mean crystallite sizes of 17.23 Ao, 9.155 Ao, and 9.4363 Ao, respectively. The mean crystallite sizes of the nanopowders increases as the temperature of calcination increased.</p>
7.	<p><b>SECURITY ASSESSMENT FRAMEWORK</b></p> <p><u>Amanpreet Kaur</u>, Roopali Garg  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Cyber-Physical Systems (CPS) represent a transformative integration of computational and physical processes, interacting with human elements in ways that redefine traditional systems. These systems are not isolated entities but are instead networks of interconnected components that incorporate both physical inputs and outputs. They have direct connections to computational intelligence-based sensor networks, which are increasingly utilized in diverse fields such as robotics, aerospace, automotive, transportation, and manufacturing. The unique blend of physical and computational aspects in CPS necessitates a holistic approach to their design and management, incorporating transdisciplinary strategies from fields like cybernetics, mechatronics, and process science.</p>
8.	<p><b>FROM SACRED PETALS TO SUSTAINABLE LUXURY: TRANSFORMING FLORAL TEMPLE WASTE INTO NATURALLY FRAGRANT CANDLES FOR A GREENER TOMORROW</b></p> <p><u>Muskan Sihag</u><sup>1</sup>, Aayush Bhatt<sup>1</sup>, Seema Kapoor<sup>1</sup>, Isha Kamboj<sup>2</sup>, Vivek Trivedi<sup>3</sup>  <sup>1</sup><i>Dr. S.S. Bhatnagar University Institute of Chemical Engineering &amp; Technology, Panjab University, Chandigarh,</i> <sup>2</sup><i>Joint Commissioner, Municipal Corporation Chandigarh,</i> <sup>3</sup><i>Social Development Officer, Municipal Corporation Chandigarh.</i></p> <p>In an era where sustainability meets tradition, innovative solutions are emerging to repurpose waste into meaningful and eco-friendly products. Project Arpan shines as a symbol of eco-conscious creativity, converting temple floral waste into beautifully handcrafted essence candles. These aromatic creations not only honor cultural customs but also foster environmental stewardship and community engagement. Made from a</p>

	<p>variety of waxes, including beeswax, soy wax and coconut wax, these essence candles incorporate flower juice extracted from petals collected by the Municipal Corporation of Chandigarh from various temples. Infused with delightful ingredients like coffee and other natural aromas, each candle is vibrant and fragrant. For an added touch of luxury, some feature organic elements like clove and cardamom, enriching their scent with a warm, inviting depth. These candles offer a beautiful combination of visual appeal and captivating aromas. With no harmful chemicals, each product promotes sustainability while celebrating cultural traditions.</p>
<p>9.</p>	<p><b>MULTIVARIATE PREDICTIONS OF THE PARTICLE PRODUCTIONS AT HADRON COLLIDERS</b></p> <p><u>Sunil Bansal</u><sup>1</sup>, Ramandeep Kumar<sup>2</sup>, Monika Bansal<sup>3</sup>  <sup>1</sup><i>Department of Applied Sciences, University Institute of Engineering and Technology, Panjab University, Chandigarh,</i> <sup>2</sup><i>Department of Physics, Central University of Haryana, Mahendragarh,</i> <sup>3</sup><i>Department of Physics, DAV College, Chandigarh.</i></p> <p>Multivariate techniques are extensively applied across many scientific disciplines, particularly in high-energy physics. At the Large Hadron Collider (LHC) at CERN, a large number of particles are produced during collisions, driven by subatomic interactions within hadrons. These complex processes involve numerous variables, making it challenging to predict key outcomes. To tackle this, researchers increasingly rely on multivariate methods to predict important parameters, such as the number of multiple-parton interactions (MPI). This paper investigates the performance of several multivariate algorithms—Boosted Decision Trees, k-Nearest Neighbours, and Multi-Layer Perceptron—in estimating MPI. The study uses the number of charged particles detected in the experiment as an observable input for the regression models. By analysing the effectiveness of these algorithms, we aim to improve the accuracy of predictive models in high-energy physics, enhancing the understanding of particle production mechanisms.</p>
<p><b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b></p>	
<p>10.</p>	<p><b>EFFICIENT COMPUTATION OFFLOADING USING UAV-BASED MOBILE EDGE COMPUTING: A DEEP REINFORCEMENT LEARNING APPROACH</b></p> <p><u>Amita Chauhan</u>, Aditi  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Unmanned Aerial Vehicle (UAV)-Enabled Mobile Edge Computing (MEC) offers a promising solution for providing computational capabilities to remote, disaster-affected, or war-prone regions, as well as areas experiencing network shutdowns. By using UAVs to extend network bandwidth, MEC can provide stable and scalable services in it, which is very important for this kind of volatile environment. Reinforcement Learning (RL), with its ability to learn optimal actions in dynamic environments, is particularly well-</p>

	<p>suited for efficient computational offloading in this context. The proposed approach employs Hierarchical Deep Deterministic Policy Gradient (HDDPG) combined with Long Short-Term Memory (LSTM) networks to achieve effective offloading decisions. The High-Level DDPG Agent analyses the environment, considering factors like channel quality, to determine whether offloading is beneficial. If offloading is deemed necessary, the agent also selects the most suitable UAV for the task. The LSTM Refiners then refine the offloading decision by incorporating dynamic factors such as user and UAV mobility, user equipment requests, and UAV battery levels. These refiner agents provide a more nuanced assessment of the situation and adjust the offloading decision accordingly. Finally, the Low-Level DDPG Agent handles the actual offloading process by managing the transfer of tasks to the edge server. UAV-enabled MEC with hierarchical reinforcement learning demonstrates efficient, adaptive task offloading. The model rapidly adapts to dynamic environments, ensuring optimal resource allocation. This approach has significant potential for enhancing network coverage and service reliability in challenging conditions.</p>
<p>11.</p>	<p><b>A REVIEW ON TEXT-TO-VIDEO GENERATION TECHNIQUES</b></p> <p><u>Amritpal Kaur</u>, Sarabjeet Singh, Nirmal Kaur  <i>Department of Computer Science and Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>One of the recent state-of-the-art is the models used for text-to-video generation. These methods are based on deep learning models that produce videos from text inputs. Generative Adversarial Neural Networks, Generative Transformers, Diffusion Models, and Generative Auto-encoders are the main examples. The paper outlines a review of such AI based text-to-video generating methods. The review scrutinizes the major issues concerning preprocessing techniques, architecture of neural networks, and evaluation metrics widely used in the domain of generating content while providing more insight into the potency and drawbacks of such approaches. Also, a couple of challenges pertaining to the quality and continuity of the presented models are highlighted in this review, such as correspondence of the generated outputs and the input descriptions. Addressing such challenges, the paper discusses methods for enhancing video quality produced by using diffusion-based text-to-video. Diffusion models hold much promise but suffer from mostly poor quality outputs and low continuity of the video. Therefore, some methods are required which can adjust noise connections between frames with a few improvements in video quality and refine the correlation of noise during training. This corresponds to video continuity improvement, the representation of higher detail, and alignment of generated videos to their original text prompts. By analyzing the current literature this paper aims to advance the field of Text-to-Video generation. These advancements hold significant potential for practical applications such as video production, content creation, and digital marketing, paving the way for future research and development in AI-generated media.</p>
<p>12.</p>	<p><b>INVESTIGATION OF IMPACT OF NANOFLUIDS ON KEY MACHINING PARAMETERS DURING PROCESSING OF BIOCOMPATIBLE ALLOYS</b></p>

	<p><u>Anuj Sharma</u>, Jaswinder Singh Mehta, Rajesh Kumar  <i>Department of Mechanical Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Nanofluids have emerged as a promising cooling and lubricating agent in machining processes, particularly when working with biocompatible alloys such as titanium and cobalt-chromium. These alloys widely used in biomedical implants, present significant machining challenges due to their hardness and low thermal conductivity. This study investigates the impact of nanofluids on critical machining parameters, including cutting forces, surface finish, tool wear, and temperature control. By comparing machining performance with and without nanofluids, the research highlights their potential to improve machining efficiency and quality. The findings suggest that nanofluids can enhance the thermal stability of the cutting process, leading to better tool longevity and surface integrity of machined components. The results offer valuable insights into optimizing manufacturing processes for biocompatible alloys in medical applications.</p>
13.	<p><b>FPGA-BASED EDGE DETECTION AND PATTERN RECOGNITION FOR REAL-TIME IMAGE PROCESSING</b></p> <p><u>Bittu</u>, Naresh Kumar  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>This research explores FPGA-based edge detection and <i>pattern recognition</i> for <i>real-time image processing</i> in critical applications, such as medical imaging, satellite analysis, and autonomous vehicle systems. FPGAs provide high-speed parallel processing, making them ideal for applications that require rapid and reliable performance. However, challenges in algorithmic complexity, scalability, and robustness under diverse conditions remain significant. This study aims to optimize Sobel, Canny, and LoG algorithms for FPGA deployment, enhance scalability, and improve adaptability for high-resolution images. Applications such as automated toll collection systems where license plates need to be recognized quickly and autonomous vehicles, which require rapid edge detection for obstacle avoidance and navigation, highlight the effectiveness of FPGA-based image processing. Additionally, FPGAs are used in surveillance systems for real-time identification of potential threats, ensuring a high level of security with minimal latency. In medical imaging, FPGA-based systems enable real-time detection of tumors or abnormalities in X-rays and MRI scans, significantly reducing the processing time compared to traditional methods. Satellite image processing also benefits from FPGA technology, allowing for faster detection of geographical changes or natural disaster impacts, providing critical information for emergency response. The goal of this research is to make FPGA systems more efficient, scalable, and adaptable, expanding their applicability across various industries that demand real-time, accurate image processing. By addressing the challenges in complexity, scalability, and robustness, this study aims to push the boundaries of FPGA-based image analysis to support more dynamic and critical applications.</p>

14.	<p><b>STUDY OF SILVER NANOPARTICLE REINFORCED STARCH AND CHITOSAN- ANTIMICROBIAL PACKAGING FILMS PREPARATION &amp; APPLICATION ON PERISHABLE FRUIT GUAVA (<i>PSIDIUM GUAJAVOLA</i>.)</b></p> <p><u>Divya Verma</u>, Anupama Kaushik  <i>Dr. S.S. Bhatnagar University Institute of Chemical Engineering &amp; Technology, Panjab University, Chandigarh.</i></p> <p>Impact on environment waste problem caused by plastic used packaging materials and for the consumer's demand for high quality food products has caused increasing interest in developing antimicrobial biodegradable food packaging as sustainable food packaging. In this research work, we synthesized silver nanoparticle reinforced starch and chitosan based films by solvent casting method for antimicrobial food packaging applications. The synthesized films were characterized by XRD and TGA. The incorporation of silver nanoparticles led to improvement of mechanical properties and thermal ability. The experimental results show that silver nanoparticle reinforced starch and chitosan based films has potential to antimicrobial properties.</p>
15.	<p><b>DEVELOPMENT OF EDIBLE STARCH-BASED FILMS WITH ESSENTIAL OIL ENHANCING PACKAGING PROPERTIES</b></p> <p><u>Kanak Sharma</u>, Gargi Ghoshal  <i>Dr. S.S. Bhatnagar University Institute of Chemical Engineering &amp; Technology, Panjab University, Chandigarh.</i></p> <p>Nowadays, there is an increasing interest in edible films for fruits and vegetables due to the harmful effects of other packaging materials on health and the environment. These biodegradable films are made using materials such as polysaccharides, proteins, lipids, and their combinations. In this study starch (native/nano) based edible film was prepared, which incorporated essential oil. The starch can be derived from various bio-sources, while the essential oil has antioxidant and antimicrobial properties. The acid hydrolysis method was used in order to reduce the starch granule size. Both native and nano starch's physicochemical characteristics were identified. In comparison to native starch, nano starch demonstrated greater values for swelling power, solubility, and water and oil absorption capacity. According to the results, starch can be used to create packaging films, and adding nano starch to film formulations provides further benefits for enhancing film characteristics.</p>
16.	<p><b>COMPARATIVE ANALYSIS OF BIOSURFACTANT PRODUCED FROM <i>LACTOBACILLUS RHAMNOSUS</i> USING FOUR DIFFERENT ECONOMICAL SUBSTRATES</b></p> <p><u>Kirti</u>, Mary Chatterjee, Samridhi Kaul  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Biosurfactants are biological substances that are produced extracellularly or on the cell surface by microorganisms like fungus, yeasts, and bacteria, among others. <i>Lactobacillus</i></p>

*rhamnosus* was chosen for this investigation due to its low toxicity, non-pathogenic nature and biodegradability. The benefits and applications of Biosurfactant (BS) have been documented in a great deal of papers and patents; yet, commercialization of these chemicals is still challenging, expensive, and largely sporadic. This is mostly because microorganisms are grown using chemically manufactured media, which results in the production of items of desired quality. The most common substrates used for the synthesis of biosurfactants in this study are materials primarily derived from industrial and dairy waste. Thus, we used cheese whey, date syrup, molasses, and glycerol in the current experiment. In this study we used an optimized medium for the production of BS. The presence of biosurfactant production by *Lactobacillus rhamnosus* was confirmed by a variety of qualitative techniques, including the drop collapse assay, oil displacement, emulsification index (E24) and haemolytic activity. The characterization Fourier transform- infrared spectroscopy (FT-IR) indicates that the type of Biosurfactant produced by *Lactobacillus rhamnosus* is glycolipids. The GC-MS analysis shows the various compounds present in BS. NMR is performed to check various proteins and other components present in Biosurfactant. About 60–80% medium preparation costs reduction is achieved by use by these substrates. Also, the properties of the biosurfactant are described, and its isolation, preliminary chemical characterization and yield is also calculated.

17. **ISOLATION, MODIFICATION AND CHARACTERIZATION OF BARNYARD MILLET STARCH**

Sakshi Gupta, Dr Gargi Ghoshal

*Dr. S.S. Bhatnagar University Institute of Chemical Engineering & Technology,  
Panjab University, Chandigarh.*

There has been considerable interest in utilizing polysaccharide-based coatings for creating food packaging materials. Barnyard millet, commonly referred to as sanwa, sawank, and sawa, is a lesser-known variety of millet that is cultivated and consumed in India. Barnyard millet is cultivated and used as a source of starch, serving as a viable replacement for cereal crops. It is inexpensive, with approximately 66 percent starch that can be extracted and used as a new starch source. Its gluten-free quality, low Glycemic Index, and high resistant starch content are also highly acknowledged. Barnyard native starch has limited uses due to its inadequate mechanical and barrier properties, high solubility in water, and tendency to be brittle. Enhancements to the constraints of natural barnyard starch can be made through physical alterations. Recently, researchers have been investigating how alterations affect the properties of starch. Nevertheless, there is still a lack of information regarding altered non-traditional starches such as millet starch. Hence, this study examined the changes in characteristics of starch from Indian barnyard millet. The changes in barnyard starch properties caused by ultrasonication and repeated freeze-thaw method were studied. Fourier Transform Infrared Spectroscopy, X-ray Diffraction, Scanning Electron Microscope, Differential Scanning Calorimeter techniques were used to analyze the native starch and modified starch. The oval structure of barnyard starch is revealed through SEM analysis. These substances are extensively used in the food packaging industry.

**UG/PG Students Of Panjab University Campus And Regional Centres**

**18. EFFICIENT COMPUTATION OFFLOADING USING UAV BASED MOBILE EDGE SERVER: DEEP REINFORCEMENT LEARNING APPROACH**

Amita Chauhan, Aditi

*University Institute of Engineering and Technology, Panjab University, Chandigarh.*

Unmanned Aerial Vehicle (UAV)-Enabled Mobile Edge Computing (MEC) offers a promising solution for providing computational capabilities to remote, disaster-affected, or war-prone regions, as well as areas experiencing network shutdowns. By using UAVs to extend network bandwidth, MEC can provide stable and scalable services in it, which is very important for this kind of volatile environment. Reinforcement Learning (RL), with its ability to learn optimal actions in dynamic environments, is particularly well-suited for efficient computational offloading in this context. The proposed approach employs Hierarchical Deep Deterministic Policy Gradient (HDDPG) combined with Long Short-Term Memory (LSTM) networks to achieve effective offloading decisions. The High-Level DDPG Agent analyses the environment, considering factors like channel quality, to determine whether offloading is beneficial. If offloading is deemed necessary, the agent also selects the most suitable UAV for the task. The LSTM-Refiners then refine the offloading decision by incorporating dynamic factors such as user and UAV mobility, user equipment requests, and UAV battery levels. These refiner agents provide a more nuanced assessment of the situation and adjust the offloading decision accordingly. Finally, the Low-Level DDPG Agent handles the actual offloading process by managing the transfer of tasks to the edge server. UAV-enabled MEC with hierarchical reinforcement learning demonstrates efficient, adaptive task offloading. The model rapidly adapts to dynamic environments, ensuring optimal resource allocation. This approach has significant potential for enhancing network coverage and service reliability in challenging conditions.

**19. PRODUCTION OF BIOSURFACTANT FROM L. RHAMNOSUS 1408 T AND IT'S CHARACTERIZATION**

Aparjot Kaur, Amandeep Singh

*University Institute of Engineering and Technology, Panjab University, Chandigarh.*

Biosurfactants derived from different microbes are an alternative to chemical surfactants, which have broad applications in food, oil, biodegradation, cosmetic, agriculture, pesticide and medicine/pharmaceutical industries. This is due to their environmentally friendly, biocompatible, biodegradable, effectiveness to work under various environmental conditions and non-toxic nature. Lactic acid bacteria (LAB)-derived glycolipid biosurfactants can play a major role in preventing bacterial attachment, biofilm eradication and related infections in various clinical settings and industries.

	<p>Hence, it is important to explore and identify the novel molecule/method for the treatment of biofilms of pathogenic bacteria. In the present study, a probiotic <i>Lactobacillus rhamnosus</i> (<i>L. rhamnosus</i>1408) strain was received from IMTECH chandigarh. Firstly, its ability to produce biosurfactants, and its physicochemical and functional properties (critical micelle concentration (CMC), hemolysis on blood agar plate(No hemolysis shown), emulsification index (52% iin mustard oil), drop collapse test and oil spread test.) were evaluated. Secondly, inhibition of bacterial growth by cell-free biosurfactants from <i>L. rhamnosus</i> was performed against various biofilm-forming pathogens (<i>S. aureus</i> and <i>E. coli</i>). Finally, the physical appearance of the bacteria is checked using colony characterization and gram staining . As a result, <i>L. rhamnosus</i> was found to produce 3.89 g/L biosurfactant that displayed a CMC of 3.2 g/L and <i>L. rhamnosus</i> cell-bound crude biosurfactant was found to be effective against all the tested bacterial pathogens. It displayed a potential anti-growth agent by inhibiting the bacterial growth as compared to the control plate. Our results also confirm the ability of the <i>L. rhamnosus</i> cell free biosurfactant tested positive for the oil spread and drop collapse test. Our findings may be further explored as a green alternative/approach to chemically synthesized toxic antibiofilm agents for emulsifying the oils.</p>
20.	<p><b>CFD ANALYSIS OF GRAPHENE BASED NANOFLUID FOR AUTOMOBILE RADIATOR COOLING</b></p> <p><u>Aparna Goel</u>, Lalan Kumar, Yash Dhawan, Anjali Gupta, Amandeep Singh Wadhwa <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>The temperature of hot exhaust gases in an IC engine ranges from 2300°C-2500°C. It is vital to lower this temperature to maintain the engine's optimal efficiency for which the radiators are used. Radiators are heat exchangers which are used in cooling systems and its primary function is to transmit heat energy with the help of fluid or coolant. The traditional, affordable coolant consists of water and EG mixture which is commonly used in radiators but its efficiency in decreasing engine temperature is still a substantial impediment to maintain the targeted engine life. A nanofluid is made up of a base fluid, such as water, liquid EG and solid particles with nanometric dimensions suspended in the fluid. Nanoparticles like Al<sub>2</sub>O<sub>3</sub>, Graphene Nanoplatelets, MWCNT etc. have been used as nanoparticles to constitute nanofluids. The high surface area of nanoparticles, even at low concentrations resulting in enhanced thermal conductivity of nanofluids make them a suitable choice as a coolant. In this study, we propose to investigate the effect of using graphene based nanofluids for analysing the heat transfer in an automobile radiator by performing CFD simulations. CFD is the study of utilising computers to forecast liquid and gas flows using the mass, momentum, and energy conservation equations. The Fusion 360 and ANSYS-15 CFD program has been used for 3D-modelling and simulation in this analysis.</p>
21.	<p><b>A HYBRID SERPENTINE ROBOTIC SYSTEM FOR TERRESTRIAL AND AERIAL LOCOMOTION</b></p>



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*University Institute of Engineering and Technology, Panjab University, Chandigarh.*

We aim to develop a robot capable of seamless multimodal motion, enabling it to traverse terrestrial environments as well as execute sophisticated aerial maneuvers. Drawing inspiration from the serpentine locomotion of snake, our design seeks to integrate these diverse movement modalities into a single, cohesive system. Our approach focuses on achieving this versatility without overcomplicating the actuation mechanisms or relying on aggressive maneuvering. By carefully balancing control and actuation, we intend to enhance the robot's adaptability and efficiency in both land-based and aerial operations. Unlike existing robots that excel in either land or air but not both, our design aims to merge these capabilities seamlessly, leveraging the flexibility of snake-like locomotion and the agility of advanced drones. This integration is achieved through a novel approach that minimizes overactuation and avoids overly aggressive maneuvering, thus ensuring efficient and controlled transitions between movement modes.

22. **FROM CONFLICT TO CLIMATE: CHEMICAL ENGINEERING'S TRANSFORMATIVE POWER**

Divyanka Singh, Surinder Singh

*Dr. S.S. Bhatnagar University Institute of Chemical Engineering & Technology, Panjab University, Chandigarh.*

Our greatest global challenges—war and climate change—have far-reaching effects on human and natural systems. Armed conflicts affect economies, ecosystems, and communities and worsen global warming and climate change. War damages key infrastructure, increases greenhouse gas emissions, and depletes natural resources. Climate change, which causes extreme weather, rising temperatures, and resource scarcity, can also increase geopolitical tensions and water, energy, and land disputes. Chemical engineering helps mitigate conflict and climate change's environmental impacts. This field of engineers creates carbon capture, renewable energy, and waste management innovations. Chemical engineers design water purification systems, restore infrastructure, and manage hazardous waste in conflict zones. Chemical engineering innovations include sustainable materials and alternative energy sources cut military carbon emissions and aid post-war rehabilitation. Indigenous knowledge—such as soil regeneration techniques, natural water filtration, and waste repurposing—offers low-impact, eco-friendly methods developed through centuries of adaptation to diverse environments. Chemical engineering can enhance and scale these practices, creating hybrid technologies like biofuels from organic waste, biodegradable materials, and advanced carbon capture systems. These innovations can be used in post-conflict zones to rehabilitate damaged landscapes, restore water quality, and reduce carbon footprints. To summarize, this poster presentation explores how chemical engineering and indigenous technologies can play a pivotal role in reducing the environmental consequences of war and enhancing global initiatives to address climate change, offering pathways to a more resilient and sustainable future.

23. **SYNTHESIS OF COPPER SULFIDE NANOPARTICLES USING CORN STARCH, THEIR CHARACTERIZATION AND ANTIMICROBIAL ANALYSIS**

Geetanjali Negi<sup>1</sup>, Rupak Nagraik<sup>2</sup>

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This study investigates the synthesis of copper sulfide nanoparticles (CuS NPs) using cornstarch as a biotemplate, exploring their characterization and antimicrobial properties. The synthesis involves a simple and environmentally friendly method, utilizing cornstarch to stabilize the CuS NPs. The present work involves synthesis, characterization and antimicrobial activity of copper sulfide nanoparticles (CuS NPs) using cornstarch as a capping agent which is a biodegradable natural polymer easily available from renewable resources. The CuS NPs were prepared by using copper sulfide and thiourea as solid sources for S<sup>2-</sup> and also from hybrid system with corn starch employed like a stabilization agent; ammonia was used as a hydrolyzing agent at temperature of 70 °C for an hour into controlled environment of sulfidation. The nanoparticle characterization was done using UV-visible spectroscopy which shows the absorbance peak in the range of 400-600 nm indicates the presence of CuS NPs. The antimicrobial activity of the synthesized CuS NPs was evaluated against *Escherichia coli* using disk diffusion method. The results indicated that CuS NPs showed strong antimicrobial activity as the size of the inhibition zone was observed. This research highlights the potential of corn starch-mediated synthesis as a green approach to producing CuS NPs, with promising applications in biomedical fields, particularly in the development of antimicrobial agents.

24. **ENHANCING HEART DISEASE PREDICTION WITH MACHINE LEARNING: INSIGHTS FROM THE CLEVELAND CLINICAL DATASET**

Karanpreet Kumar, Roopali Garg, Neelam Goel

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Heart disease encompasses a variety of conditions affecting the heart, such as coronary artery disease and arrhythmias, and remains a leading cause of death worldwide. Early detection and intervention are crucial for reducing the risk of severe complications and improving patient outcomes. This study investigates the prediction of heart disease using a Cleveland Heart Disease dataset, which contains data from 303 patients and 13 key clinical attributes. In this research various machine learning algorithms are applied including Random Forest, XGBoost, Decision Tree, AdaBoost, K-Nearest Neighbours (KNN), and Support Vector Machines (SVM), to predict the presence of heart disease. To prepare the dataset for these models, One-Hot Encoding was employed to handle categorical features. The challenge of class imbalance was addressed using the Synthetic

	<p>Minority Oversampling Technique (SMOTE). To enhance model performance, hyperparameter tuning was performed using both Bayesian Optimization and Particle Swarm Optimization (PSO). The results were evaluated using metrics such as accuracy, precision, recall, and F1-score. XGBoost, when optimized using Bayesian Optimization, showed the best performance, achieving significant accuracy improvements. PSO also contributed to enhanced performance in other models. This study demonstrates the effectiveness of advanced machine learning models and optimization techniques for heart disease prediction, potentially aiding timely diagnosis and treatment strategies.</p>
25.	<p><b>PLAYING CHESS USING DECODER-ONLY TRANSFORMER MODELS</b></p> <p><u>Madhur Saini</u>, Kritika Kashyap  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p><i>Chess</i>, a game of strategy and intellect, is one of the world's most widely played board games. Its origins can be traced back to India, where it was first known as "Chaturanga" around the 7th century CE. <i>Chess</i> has long been a benchmark for artificial intelligence. Modern Engines such as Stockfish and AlphaZero are now able to perform better than even the current grandmasters. In recent years, decoder-only transformers have emerged as a powerful architecture, revolutionizing tasks that require sequential understanding and generation, with LLMs like ChatGPT and Gemini being the perfect examples of its capabilities. Given the sequential nature of chess, where each move depends on prior positions and strategies, decoder-only transformer models are well-suited for playing chess. We present a Llama-based decoder-only transformer model for chess play. Despite its small size of just 23 million parameters and being trained for just 10 epochs, the model achieves an impressive Elo rating of 800, significantly outperforming the global average of 620 on chess.com. The model is trained on 3 million authentic games played by elite players around the world, on Lichess. Using real-world games rather than computer-generated data has resulted in a more human-like play. The combination of the model's small size, fast inference speed, and human-like play makes it a good choice for use in resource-constrained environments such as mobile applications and websites. Future work will focus on further training the model and exploring its applications in chess education.</p>
26.	<p><b>GREEN SYNTHESIS OF THE SILVER NANOPARTICLES USING LEAF EXTRACT OF <i>KALANCHOE PINNATA</i></b></p> <p><u>Mansi Guleriya</u><sup>1</sup>, Somya Sinha<sup>2</sup>  <sup>1</sup><i>Department of Biotechnology Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh,</i> <sup>2</sup><i>Graphic Era Deemed University, Dehradun.</i></p> <p>This study presents an innovative approach to the green synthesis of silver nanoparticles (AgNPs) using the leaf extract of <i>Kalanchoe pinnata</i>, a plant renowned for its medicinal properties. The synthesis process leverages the rich array of phytochemicals in the leaf extract to reduce silver ions in an aqueous solution, resulting in the formation of AgNPs.</p>

	<p>Characterization of the synthesized nanoparticles was conducted through UV-Vis spectroscopy where the typical SPR peaks lie between 380 and 430nm, confirming successful nanoparticle formation. Additional analyses, including Zeta Potential with value of -26.7mV and the average AgNPs distribution in colloidal solution both point to greater stability for silver nanoparticles and hydrodynamic dispersion. Scanning electron microscopy (SEM), provided insights into the chemical composition and morphology of the AgNPs, revealing spherical shapes. In Nucleation of silver nanoparticles at various reaction rates, AgNPs are having an absorption maximum at nearly 400 nm, and the intensity of the absorbance units increased throughout time. Notably, these biosynthesized nanoparticles exhibited significant antimicrobial activity against a range of pathogenic bacteria. This research highlights the efficacy of <i>Kalanchoe pinnata</i> as a sustainable source for AgNPs synthesis, promoting an eco-friendly alternative to conventional chemical methods.</p>
27.	<p><b>A MATLAB/SIMULINK COMPUTATIONAL PROJECT BASED LEARNING FOR DISCRETE SYSTEM REALIZATION OF DIGITAL FILTER</b></p> <p><u>Nandini Nehra</u>, Neeraj Sharma  <i>Department of Electronics and Communication Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Matlab, its toolboxes and blocksets play an important role as a pedagogical tool and assist in teaching and learning as a leading simulation package across multiple domains of science and engineering. Digital filters play an indispensable role in the digital era for extracting the target signal from undesired ones. Designing and implementation of filters leads to processing of discrete signals. Filter design depends upon its type, structure and the method exploited. The present study describes the usage of textual and graphical programming application of Matlab/Simulink in discrete system realization of digital filters. Discrete systems can be modeled using difference equations, by transfer function, or the state variable approach. It can be implemented in different structures using summing, gain and delay elements. Scientific computing tools play a vital role in simulation of digital filters. The Matlab/Simulink computational project driven self-learning of students in discrete system realization of digital filters enables student centered active learning. Keywords: Signal Processing, Discrete System Realization, Digital Filter, Matlab, Simulink, Simulation.</p>
28.	<p><b>DETECTION OF BREAST CANCER USING AI AND MACHINE LEARNING</b></p> <p><u>Niharika Singh</u>, Mamta Juneja, Ravreet Kaur  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Breast cancer is a leading cause of mortality among women globally, and early detection significantly improves survival rates. Traditional diagnostic methods, such as mammography and biopsies, are often time-consuming and subject to human error. This paper explores the application of Artificial Intelligence (AI) and Machine Learning (ML) techniques in the detection and diagnosis of breast cancer, aiming to enhance the</p>

	<p>accuracy, speed, and reliability of the process. Various supervised and unsupervised learning algorithms, including Convolutional Neural Networks (CNNs), Support Vector Machines (SVMs), and Decision Trees, are evaluated for their performance in classifying breast cancer images and predicting malignancies. The dataset used for training includes mammogram images, histopathological slides, and clinical data, pre-processed to optimize feature extraction. Results indicate that AI and ML-based models outperform traditional methods, achieving accuracy rates exceeding 90%, with CNNs proving particularly effective in image-based diagnostics. The findings suggest that AI and ML have the potential to revolutionize breast cancer detection, leading to earlier and more precise diagnoses, which can significantly improve patient outcomes. The integration of AI and ML techniques in breast cancer screening shows promising results, potentially improving early detection rates and reducing false positives. This approach could serve as a valuable second reader in clinical settings, augmenting radiologists' expertise and enhancing overall diagnostic accuracy. Keywords Breast cancer, machine learning, mammography, early detection.</p>
29.	<p><b>DEVELOPMENT OF A TUNED IMPACT DAMPER SYSTEM FOR REDUCING MOTORCYCLE HANDLEBAR VIBRATIONS</b></p> <p><u>Nitin Kumar Gautam</u>, Harbhinder Singh, Anjali Gupta  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Motorcycle riders frequently experience significant handlebar vibrations, which, over extended periods, can result in Hand-Arm Vibration Syndrome (HAVS). This study aims to address this issue by analyzing and reducing handlebar vibrations to improve rider comfort without affecting the motorcycle's handling performance. A motorcycle (Bajaj V15) with an undersquare (long-stroke) engine is selected for testing, as this type of engine is known for generating higher vibrations. A tuned Impact Damper system was designed and implemented to minimize these vibrations. A detailed design of experiments (DOE) was conducted, focusing on key variables such as engine speed, handlebar mass, particle size, and packing ratio to understand their effects on vibration levels. The research developed a robust predictive model to estimate vibration attenuation under different operating conditions. The results showed significant reduction in handlebar vibrations, offering a practical solution for improving comfort, especially for riders exposed to prolonged vibrations.</p>
30.	<p><b>MICROPLASTICS IN THE ENVIRONMENT: A REVIEW OF DEGRADATION METHODS AND FUTURE CHALLENGES</b></p> <p><u>Sanskriti</u>, Onkriti  <i>Department of Biotechnology, University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Pollution levels have risen dramatically over the past 50 years due to the production and accumulation of plastic materials. Microplastics, or MPs, and non-biodegradable residual plastic films have become the two most pressing environmental concerns among</p>

	<p>the various forms of plastic pollution. These tiny plastic particles enter water systems from a variety of sources. In its 2021 report, From Pollution to Solution, UNEP issued a warning, stating that certain compounds found in microplastics have the potential to seriously affect health, particularly in women. These can involve, among other health problems, modifications to human DNA, brain development, and respiration rates. Because MPs can be consumed by aquatic and terrestrial species and eventually make their way up the food chain, they pose a serious threat to the environment. In some ways, conventional technologies can eliminate MPs. The urgent need to develop a long-term solution to the global pollution that MPs are producing is the primary focus of this review. Various strategies are employed to enhance the breakdown of organic pollutants, including the use of nanomaterials, advanced oxidative processes (AOPs), chemical oxidation, enzymatic degradation, and adsorption techniques utilizing materials such as zeolites and clay. Semiconductor catalysts generate reactive species like hydroxyl radicals, which are essential for the efficient decomposition of MPs. Here we compare the efficacy of some remediation strategies that have been widely studied in literature. Evaluating their advantages and limitations.</p>
31.	<p><b>EXPLORING THE POTENTIAL OF PLA FILAMENT IN 3D-PRINTED APPAREL</b></p> <p><u>Palak Batra</u>, Parneet Brar, Prabhdeep Brar <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>This research investigates the use of Polylactic Acid (PLA) filament in 3D printing for wearable apparel, emphasizing its potential in sustainable and customizable fashion. PLA, known for its biodegradability and structural rigidity, is considered a suitable material for creating intricate, structured components in fashion design. The study explores variations in PLA properties, focusing on their impact on the mechanical performance, aesthetics, and comfort of 3D-printed garments. Key aspects examined include material flexibility, print precision, and environmental impact, all crucial for assessing PLA's suitability for wearable technology applications. By experimenting with different printing techniques and PLA formulations, the research aims to optimize the filament's properties for various fashion elements, such as embellishments, structured parts, and flexible components. The study also explores how PLA's characteristics can be tailored to meet the demands of comfort and durability in wearable designs. This research addresses the limitations of traditional textile manufacturing, leveraging the advantages of 3D printing for rapid prototyping, mass customization, and reduced waste. The outcomes are expected to inform the development of eco-friendly and functional fashion solutions as 3D printing technology continues to evolve, offering new possibilities for sustainable apparel production.</p>
32.	<p><b>SURVEY OF MACHINE LEARNING AND DEEP LEARNING TECHNIQUES FOR PARKINSON'S DISEASE DETECTION: A REVIEW</b></p>

	<p><u>Parul Gupta, Deepti Gupta</u> <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Parkinson's Disease (PD) is a neurodegenerative disorder with significant clinical implications. Early and accurate diagnosis of PD is crucial for timely intervention and personalized treatment. In recent years, Machine Learning (ML) and Deep Learning (DL) techniques have emerged as promising tools for improving PD diagnosis. This review paper presents an analysis of the current state of ML and DL-based PD diagnosis for the screening and staging of PD as well as the identification of the biomarkers of the disease based on Electroencephalography (EEG), Magnetic Resonance Imaging (MRI), speech tests, handwriting exams and sensory data.. The discussion enumerates commonly employed ML and DL methods in PD diagnosis, providing a comprehensive overview of the field. This review serves as a roadmap for future research, guiding the development of ML and DL-based tools for PD detection.</p>
33.	<p><b>DYNAMIC SIMULATION AND MATERIAL EVALUATION FOR PROSTHETIC SOCKET PERFORMANCE</b></p> <p><u>Puneet Kumar, Rajesh Kumar, Gaurav Sapra</u> <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>The prosthetic socket is a critical component of lower-limb prostheses which is designed to securely interface with an amputee's residual limb. The socket directly influences an amputee's comfort, mobility and stability. This study presents a mathematical modeling and ANSYS simulation approach to optimise the materials and performance of prosthetic sockets. Dynamic simulations were conducted using the ANSYS toolbox to evaluate stress distribution, pressure points and deformation under various loading conditions replicating activities such as walking and running. Different socket materials including epoxy resin, carbon fiber composites, thermoplastics and silicone were examined to assess their impact on comfort and load-bearing efficiency. The results indicate that carbon fiber composites generally outperform the other materials in terms of load-bearing efficiency and comfort. These insights pave the way for developing more comfortable and durable sockets. This modeling and simulation approach provides prosthetists with a valuable tool for customising socket designs to meet the unique needs of individual amputees.</p>
34.	<p><b>DEGRADATION OF DYE UNDER UV IRRADIATION</b></p> <p><u>Purvi Sharma, Hema Setia</u> <i>Department of Biotechnology, University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Synthetic organic dyes are widely used for various application such as in paper, textiles, leather, and cosmetics industry. However, most of these dyes are non-biodegradable, posing a significant threat to the environment. Therefore, it is crucial to reduce their levels in industrial effluent to meet environmental safety standards before disposal. To</p>

	<p>address this issue, various innovative technologies have been developed and applied for dye treatment, including adsorption, filtration, sedimentation, and photo-catalytic degradation. Among these methods, photo-catalytic degradation of organic pollutants under UV irradiation has gained considerable attention for pollutant removal and environmental remediation. Various semiconductor nano-structured materials, such as TiO<sub>2</sub>, SiO<sub>2</sub>, ZnO, Fe<sub>2</sub>O<sub>3</sub>, CdS, ZnS, and others, have been employed for the photo-catalysis. Amongst these, TiO<sub>2</sub> has been widely accepted and used for the photo-catalytic degradation studies primarily because of its high photo-catalytic activity under UV, chemical stability, and non-toxicity. In the present study, we have reported the photo-catalytic degradation of alizarin yellow dye using TiO<sub>2</sub> as the photo-catalyst under UV irradiation. Various operational parameters such as, catalyst loading, pH, and substrate concentration have been studied to achieve the maximum degradation of the target compound. The kinetic studies have also been reported.</p>
35.	<p><b>EXPERIMENTING WITH DIFFERENT TONING AGENTS ON MUSLIN DYED WITH CYANOTYPE</b></p> <p><u>Rashmi</u>, Kulbir Kaur  <i>University Institute of Fashion Technology &amp; Vocational Development, Panjab University, Chandigarh.</i></p> <p>Cyanotype, discovered by Sir John Herschel in 1842, was initially used to create photographic prints using iron salts, resulting in images characterized by a deep blue hue known as Prussian blue. Traditionally, this process was employed for producing blueprints and reproducing images in the 19th century. In contemporary practices, artists apply the cyanotype technique to fabric, creating unique patterns and designs for clothing and home decor. Many artists today use cyanotype as a creative medium, experimenting with various subjects and styles, often integrating it with mixed media. This study explores the toning process, investigating the effects of different toning agents, specifically tea, coffee, and vinegar, to achieve a broader range of colors. The findings reveal that by utilizing these toning agents, a diverse palette can be achieved, thereby enhancing the visual impact of cyanotype prints. This process not only expands the creative possibilities of cyanotype but also fosters greater personal expression. Historically, cyanotype printing has been confined to monochromatic shades of blue; however, this study demonstrates that through the application of various toning agents, the color palette can be broadened to include families of yellow and brown. Consequently, this offers a versatile approach to transforming its classic blue aesthetic, allowing artists to push the boundaries of traditional cyanotype printing.</p>
36.	<p><b>BIOMIMETIC INNOVATIONS: LEVERAGING INDIGENOUS PLANT PROPERTIES FOR SUSTAINABLE MATERIAL DEVELOPMENT</b></p> <p><u>Samardeep</u> Kaur  <i>Dr. S.S. Bhatnagar University Institute of Chemical Engineering &amp; Technology, Panjab University, Chandigarh.</i></p>



	<p>The potential of using indigenous flora as inspiration for developing biomimetic materials presents a promising pathway for sustainable industrial applications. Biomimicry, which involves matching nature's designs, offers innovative approaches to creating materials that are efficient, durable, and environmentally friendly. Focusing on native plant species allows industries to draw on their unique adaptations to local environments, providing valuable insights for material development. Biomimicry covers various strategies, including functional mimicry, structural mimicry, and material mimicry. Functional mimicry involves replicating specific functions found in nature, such as the water-repellent properties of lotus leaves, which inspire self-cleaning surfaces. Structural mimicry focuses on geometric arrangements found in natural systems, like the lightweight yet strong structures of honeycombs and spider silk, leading to efficient building materials. Material mimicry examines the composition of natural substances, such as the combination of strength and flexibility in bamboo, informing the creation of sustainable composites. Indigenous plants such as neem, bamboo, and jute are adaptable to their environments and demonstrate beneficial properties. For instance, neem can be used to develop natural pesticides and sustainable coatings, while bamboo's rapid growth and carbon capture capabilities make it ideal for eco-friendly construction. By harnessing these characteristics, industries can create materials that enhance sustainability. The application of biomimetic materials encourages industries to utilize local resources, reducing dependency on non-renewable materials. This promotes innovations that support the circular economy, emphasizing renewable resource use and ultimately fostering a deeper connection between technology and nature. Keywords: Biomimicry, Indigenous Flora, Sustainable Materials, Circular Economy, Natural Resources, Material Science</p>
37.	<p><b>FINGERPRINT DETECTION</b></p> <p><u>Shivangi Kaushal</u>  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>The present study investigates the feasibility of finger-photo authentication as a biometric technique for mobile devices, with a focus on unconstrained environments where conventional authentication methods may not be as effective. It presents the UNconstrained FIngerphoTo (UNFIT) database, a novel collection of 3,450 finger-photo images obtained from 115 subjects under a variety of conditions, addressing issues like user cooperation, background variations, and finger orientation. The study assesses a number of techniques, including matching approaches using CompCode and ResNet50, deep learning-based segmentation algorithms, and no-reference image quality assessment methods. The results show that finger-photo authentication is a feasible option for secure user verification, despite the inherent difficulties of unconstrained environments. In order to improve the utility of finger photographs, the study also highlights the significance of quality improvement techniques such as deep blind image inpainting. This effort seeks to contribute considerably to the field of biometric authentication, promoting further research and practical implementations in real-world circumstances. Using a new benchmark database for touchless fingerprints, the study conducts a thorough comparative analysis between touchless and touch-based systems, evaluating their performance using three standard fingerprint matchers. This paper</p>

	<p>introduces a novel smartphone-based touchless fingerprint recognition system designed to overcome the limitations of traditional touch-based fingerprint identification methods. In addition to advancing biometric identification technologies, this research promotes greater investigation and growth in the area of touchless fingerprint recognition, opening the door to more effective and hygienic biometric solutions.</p>
38.	<p><b>INNOVATIVE PRESSURE MEASURING DEVICE FOR INDUSTRIAL PRODUCT QUALITY CONTROL AND ANALYSIS</b></p> <p>Aarish Garg, <u>Shruti Arora</u>, Dhwani Arora, Garima Joshi, Naveen Aggarwal<sup>1</sup>  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>In the manufacturing industry, accurately assessing the base pressure profile of various products is time-consuming and labour-intensive. To streamline this process, we have developed an innovative base pressure assessment device designed to analyse the base pressure profile of manufactured industrial products efficiently. The main objective was to enhance quality control and product analysis in various industries. The proposed device consists of two main components: an interactive display unit and a sensing pad. The sensing pad captures real-time pressure distribution. It incorporates an array of 16, 38.1mm <i>force pressure sensors</i>. The data captured is then pre- processed and the base pressure profile is visualised on the interactive display unit. The key applications of the technology are in quality control, weight distribution for load-bearing capability, and ergonomic assessments. The device’s ability to provide instant feedback on pressure profile enhances the efficiency and accuracy of industrial quality assurance processes. The methodology involves placing objects on a pressure measuring device to capture their base pressure profiles. Various models, including Support Vector Machines (SVM), Random Forest, and <i>Siamese Network</i>, are trained using both ideal and non-ideal base pressure profiles. This approach enables the system to differentiate between high-quality objects and those requiring further processing such as furnishing, milling, and more. Its versatile applications and real-time analysis capabilities offer valuable insights for manufacturers, potentially leading to improved product designs, reduced defects, and enhanced overall product quality across various industries.</p>
39.	<p><b>PROBING NANOFIBERS IN CHIRAL DRUG SEPARATION: A REVIEW OF CURRENT TRENDS AND FUTURE DIRECTIONS</b></p> <p><u>Sukhmandeep Kaur Walia</u>, Yoshita Sharma, Anupreet Kaur  <i>Department of Biotechnology Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>The prevalence of racemic drugs in the market, particularly in India where single-enantiomer drugs comprise only 15-20% of the chiral drug market, poses challenges in therapeutic efficacy and safety. Although single-enantiomer medications offer superior therapeutic benefits, their production involves complex and costly processes such as chiral chromatography, making racemates more appealing due to lower production costs. This study explores the importance of single enantiomers in enhancing</p>

therapeutic efficacy and safety, highlighting that one enantiomer may be pharmacologically active while the other could be inactive or harmful. Regulatory standards for enantiomeric purity drive the innovation of targeted therapies, yet racemates remain prevalent. Nanofibers emerge as a promising solution for the separation of racemic drugs, owing to their high surface area, customizable chiral functionalities, and porous structures, which enhance both efficiency and selectivity. Their scalability and eco-friendly characteristics further establish them as ideal candidates for chiral separation applications. The separation of racemic mixtures is facilitated through selective adsorption, where functionalized nanofibers preferentially interact with one enantiomer. Key components of this process include the nanofiber substrate, chiral selectors such as amino acids or cyclodextrins, and the separation system, all of which are crucial for effective enantiomer capture and elution. This review discusses current trends and future directions in utilizing nanofibers for chiral drug separation, emphasizing their potential impact on improving therapeutic outcomes.

40. **CHALLENGES IN MICROPLASTIC DETECTION: A REVIEW**

Yoshita Sharma, Sukhmandeep Kaur Walia, Anupreet Kaur  
*Department of Biotechnology Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh.*

Plastic – a polymer made by linking chains of small molecules together, has become an integral part of modern society due to its versatility, durability, and cost-effectiveness. However, its extensive use has led to significant environmental concerns. Microplastics (MPs) which are plastic particles smaller than 5 mm, have become a prevalent pollutant. MPs can get accumulated in soil, water, and air, leading to long-term environmental harm. Detecting and quantifying these remains a significant challenge. This review explores the methodologies currently used to identify MPs in the environment, including detection methods like Fourier-transform infrared spectroscopy (FTIR) and Raman spectroscopy. Despite the widespread use of these methods, there is no universally accepted protocol for MP detection, and the lack of a standard unit for reporting MPs concentrations, further challenges global efforts to assess their environmental impact. The review highlights the challenges faced in accurately detecting MPs, particularly in complex environmental matrices such as soil and sediment. Additionally, the degradation of MPs into nanoplastics complicates their detection, as traditional methods may not capture these smaller particles. Existing methodologies are not sufficiently equipped to differentiate biodegradable and non-biodegradable MPs and thus calls for the development of more sensitive and standardized techniques for MP detection. By improving detection and quantification methods, researchers will be better equipped to assess the environmental risks posed by MPs. Further, the review concludes by discussing the need for global action to mitigate the environmental threat posed by plastics and microplastics, particularly concerning their accumulation in oceans and terrestrial ecosystems.

<b>UG/PG STUDENTS FROM COLLEGES AND OTHER INSTITUTIONS</b>	
41.	<p><b>CARBON DOTS: A VERSATILE NANOMATERIAL WITH EMERGING APPLICATIONS</b></p> <p><u>Bhuvan Goyal</u>, Sandeep Kumar <i>Punjab Engineering College, Chandigarh.</i></p> <p>Carbon dots are ultra small nanoparticles with size below 10 nm, which have emerged in recent years, and have a wide range of applications. CDs have come out as a promising class of nanomaterials due to their exceptional properties. CDs were discovered during the purification of Carbon-Nanotubes in 2004. CDs can be prepared from any carbon source, such as food, food waste, plants, chemicals. Artificial methods include Laser ablation, Microwave, Arc discharge, Ultrasonic, Solvothermal methods. CDs can be classified into three categories: graphene quantum dots (GQDs), carbon nanodots (CNDs), and polymer dots (PDs). As one of the new allotropes of carbon, CDs show many remarkable advantages, such as low cytotoxicity, good biocompatibility, chemical inertness, efficient light harvesting and outstanding photo induced electron transfer, thus making them promising candidates for various applications in biosensors, bioimaging, photoelectronic devices and solar cells, etc. CD's have excellent tunable photoluminescence and photo stability. The optical properties of CDs, including their photoluminescence mechanisms and factors influencing emission, are explored. Carbon dots (CDs) have unique electrical and optoelectronic properties inherited from their intrinsic band gap as well as good grafting ability, low production cost, and dispersibility in various solvents. This poster delves into the synthesis, characterization, and applications of CDs. Furthermore, the applications of CDs in diverse fields, including bioimaging, sensing, drug delivery, and catalysis, are highlighted.</p>
42.	<p><b>SYNERGIZING TRADITIONAL AND DEEP LEARNING TECHNIQUES FOR ENHANCED FORGERY DETECTION</b></p> <p><u>Sheenam</u>, Jasmeen Gill <i>Department of Computer Science and Engineering, RIMT University, Mandi Gobindgarh, Punjab.</i></p> <p>The advancement in image processing and computer vision has been remarkable in recent years due to the growing availability of high resolution devices and escalating demand for intelligent visual systems. However, the rising prevalence of fake images in various domains such as journalism, social media, and legal proceedings has raised concerns about the reliability and authenticity of visual information. As digital manipulation tools become increasingly sophisticated, the need for robust and reliable forgery detection techniques emerges as a critical imperative to protect the credibility of visual content in the digital world. Traditional approaches frequently depend on</p>

	<p>manually crafted features and statistical analyses, which can be limited in capturing subtle tampering patterns and may struggle to adapt to emerging manipulation techniques. Deep learning, on the other hand, offers powerful tools for automated and highly accurate detection capabilities, yet faces challenges related to interpretability, computational cost, and robustness against adversarial attacks. This research highlights the distinct capabilities of both traditional and deep learning methods, showcasing how their integration can enhance detection accuracy while reducing computational complexity. In addition, the paper addresses emerging trends, challenges, and future directions in this rapidly evolving field, offering insights into how a hybrid approach can provide a more effective solution to the growing challenges of digital forgery detection.</p>
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# Life Sciences

- Botany
- Zoology
- Anthropology
- Forensic Science and Criminology

**CO-ORDINATORS**

*Sectional President*

**Prof. Kamaljit Singh**

**9815106644**

*Sectional Secretary*

**Dr. Indu Sharma**

**9592111622**

**CHASCON 2024**  
**NATIONAL CONFERENCE ON**  
**“Indigenous Technologies for Viksit Bharat”**  
**SECTION: LIFE SCIENCES**

Program (Thursday, November 07, 2024)  
 Venue: Department of Botany, Panjab University, Sector-14, Chandigarh

Sectional President Prof. Kamaljit Singh 9815106644		Sectional Secretary Dr. Indu Sharma 9592111622	
Time	Program		
09:00-9:45	Display of Posters by the Participants <i>Venue:</i> Department of Botany, Panjab University, Chandigarh		
9:45-10:00	Inauguration of Sectional Program <i>Venue:</i> Auditorium, Department of Botany, Panjab University, Chandigarh		
10:00-10:45	<b>Session Chair:</b> Dr. Ravinder Kumar <b>Speaker:</b> Dr. Anupam Mittal Department of Translational and Regenerative Medicine, PGIMER, Chandigarh <b>Lecture Title:</b> <i>Pluripotent Stem Cells for Cardiac Disease Modelling and Clinical Applications – Where are we standing?</i>		
10:45-11:30	<b>Session Chair:</b> Prof. Richa Puri <b>Speaker:</b> Prof. Ashok Bhatnagar Former Professor and Head, Department of Botany, University of Delhi, Delhi. <b>Lecture Title:</b> <i>Relevance of GM/GE Technology to Food, Economy and Environmental Security of India.</i>		
11:30-12:00	Tea Break		
12:00-1.00	Oral Presentations (Faculty) <i>Venue:</i> Seminar Hall, Department of Botany Poster Presentations (UG/PG) <i>Venue:</i> Department of Botany, Panjab University, Chandigarh		
1.00-2.00	Lunch Break		
2.00-5.00	Oral Presentations: UG/PG and Research Scholars <i>Venue:</i> Seminar Hall (GF) Botany <i>Venue:</i> Auditorium (Botany) Zoology <i>Venue:</i> Seminar Hall (TF-Botany) Anthropology & IFSC Poster Presentations (Research Scholars and Faculty) <i>Venue:</i> Department of Botany, Panjab University, Chandigarh		
3.30-4.00	Tea Break		

## KEY SPEAKERS

<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
1.	Dr. Ashok Bhatnagar	Former Professor & Head, University of Delhi, Delhi.	Relevance of GM/GE Technology to Food, Economy, and Environmental Security of India.
2.	Dr. Anupam Mittal	Assistant Professor, Department of Translational and Regenerative Medicine, PGIMER, Chandigarh.	Pluripotent Stem Cells for Cardiac Disease Modelling and Clinical Applications – Where are we standing?



# RELEVANCE OF GM/GE TECHNOLOGY TO FOOD, ECONOMY, AND ENVIRONMENTAL SECURITY OF INDIA.



DR. A K BHATNAGAR

Former Professor and Head, Department of Botany, University of Delhi, Delhi.

## ABSTRACT

India has plenty of sun, good soil, adequate water resource, high crop diversity, sound research and administrative support, and robust farming communities. Despite self-sufficiency in food production, we figure high on global hunger index, and low on rural economy due to systemic aberrations. More than half of our population is engaged in agriculture on over 50% of land resource (as against 12% global average). Productivity is low (a third of USA and Europe, and less than half of China). Rural folks earn a sixth of their urban counterparts. Over 80% of water resource goes to agriculture. Farmers indiscriminately use large amounts of pesticides, endangering their own health and contaminating the entire food web. With bulk of land under the plough, it is not possible to have 33% forest cover, as recommended by experts. We also have large stretches of wastelands that await appropriate technology for reclamation.

Judicious editing or introduction of genes in our crops for drought and salinity tolerance, adaptation to changing climate, resistance to pests, and for higher productivity and superior nutritional traits can help us alleviate pressing socio-economic, health and environmental issues. Scientific communities in India, with expertise in all relevant disciplines, can analyze and play a fruitful role in guiding public perception and building trust in procedures and products of GM/GE farm technology.

# PLURIPOTENT STEM CELLS FOR CARDIAC DISEASE MODELLING AND CLINICAL APPLICATIONS – WHERE ARE WE STANDING?



DR. ANUPAM MITTAL

Department of Translational and  
Regenerative Medicine, PGIMER,  
Chandigarh

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## ABSTRACT

Stem cells are undifferentiated cells that display properties of self-renewal capacity and the ability to generate differentiated cells. The discovery of human stem cells opened a new avenue with therapeutic potential for diseases. It has also provided a model system to study the molecular mechanisms associated with cardiovascular diseases (CVDs) and the identification of new drugs. Cardiovascular diseases (CVDs) are pointed out by the World Health Organization (WHO) as the leading cause of death, contributing to a significant and growing global health and economic burden. Biomedical research and the potential use of human stem cells that can be manipulated to originate new cardiac functional cells to repair a damaged heart have attracted much attention in the past two decades. Therapies based on adult stem cells (ASCs) and embryonic stem cells (ESCs) have emerged as promising strategies to regenerate damaged cardiac tissue and restore cardiac function. Moreover, the generation of human induced pluripotent stem cells (iPSCs) from somatic cells has opened new avenues for disease modeling, drug discovery, and regenerative medicine applications, with fewer ethical concerns than those associated with ESCs.

Our group is extensively working on disease remodelling, biomarker discovery and drug repurposing for various CVDs. We will be discussing the types and sources of stem cells that have been tested in preclinical and clinical trials for the treatment of CVDs as well as the applications of pluripotent stem-cell-derived *in vitro* systems to mimic disease phenotypes. How human stem-cell-based *in vitro* systems can overcome the limitations of current toxicological studies will also be discussed. Finally, the current state of clinical trials involving stem-cell-based approaches to treat CVDs will be discussed, and the strengths and weaknesses are critically discussed to assess the risk and stakes for researchers and clinicians.

**Keywords:** human stem cells; cardiovascular diseases; iPSC; disease modeling; cell therapy

ABSTRACTS OF  
ORAL  
PRESENTATIONS

<b>Life Sciences - Oral presentation</b>			
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
1.	Dr. Tej Kaur	Institute of Forensic Science and Criminology, Panjab University, Chandigarh.	Sex prediction accuracy through ear and nose dimensions: Insights from forensic anthropology.
2.	Dr. Jagdish Rai	Institute of Forensic Science and Criminology, Panjab University, Chandigarh.	Enhancing ethanol tolerance in yeast through halo tolerance genes.
3.	Dr. J. S. Sehrawat	Department of Anthropology, Panjab University, Chandigarh.	Artificial Intelligence (AI) in the forensic anthropological investigations and disaster victim identifications.
4.	Prof. Kewal Krishan	Department of Anthropology, Panjab University, Chandigarh.	Morphological Dental Features as a Biological Identity Card: A Study of Jingar Population of North India
<b>Faculty/Scientists from Colleges and Other Institutions</b>			
<b>S. No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
5.	Dr. Bharati Pandey	ICAR National Dairy Research Institute, Karnal (Haryana).	Wheat resistance gene database and deep learning model for R gene classification.
6.	Dr. Inderpal Singh Sidhu	Sri Guru Gobind Singh College, Sector 26, Chandigarh.	Blow Flies: Role and their importance.

7.	Dr. Pawandeep Kaur	Sri Guru Gobind Singh College, Sector 26, Chandigarh.	Seasonal succession of forensically important entomofauna of pig cadaver: An indoor study of Punjab (India).
8.	Dr. Renu Bist	Department of Zoology, University of Rajasthan, Jaipur.	Dichlorvos incited toxicity ascribes to cholinergic dysfunctions.
9.	Dr. Saranjeet Kaur	Department of Zoology, Sri Guru Gobind Singh College, Sector 26, Chandigarh.	Transcending barriers: Integrating linguistic diversity in life science research.
10.	Dr. Shivani Saini	NABI, Mohali, Punjab.	Molecular regulation of WRKY transcription factor network under iron deficiency in hexaploid wheat.

**Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)**

S.No.	Name of Participant	Affiliating Institution	Title of Abstract
11.	Ms. Aditi Rana	Department of Botany, Panjab University, Chandigarh.	Exploring the ecological implications of <i>Verbesina encelioides</i> and its management by thermal decomposition.
12.	Ms. Akanksha Sharma	Institute of Forensic Science and Criminology, Panjab University Chandigarh.	Wood species identification for illegal deforestation and sustainable forestry practices: An integration of ATR-FTIR spectroscopy and machine learning algorithms.

13.	Ms. Amita Rawa	Defence Institute of HighAltitude Research DRDO Base Lab, Chandigarh, India.	Comparative profiling of secondary metabolites in coloured bell peppers grown under different greenhouse conditions at high altitude.
14.	Dr. Anamika Kumari	Orchid Laboratory, Department of Botany, Panjab University, Chandigarh.	GC-MS analysis of bioactive compounds from methanolic extract of <i>Satyrium nepalense</i> D.Don tubers.
15.	Ms. Bristy Kalita	Department of Anthropology, Panjab University, Chandigarh.	From tradition to sustainability: Scaling up bamboo shoot processing in bodo cuisine for food security.
16.	Ms. Damini Siwan	Institute of Forensic Science and Criminology, Panjab University, Chandigarh.	Support vector and random forest regression for the prediction of facial dimensions from teeth and jaw parameters.
17.	Ms. Komal Choudhary	Department of Botany, Panjab University, Chandigarh.	Morphological and chemical characterization of Rainbow <i>Eucalyptus</i> .
18.	Ms. Mohini Kajla	ICAR National Bureau of Plant Genetic Resources New Delhi 110012 and Department of Botany Panjab University, Chandigarh.	Unravelling drought tolerance mechanisms in chickpea ( <i>Cicer arietinum</i> l.): Transcriptome analysis of selected drought-tolerant genotypes.
19.	Ms. Muskan Budhwar	Cell and Molecular Biology Lab, Department of Zoology, Panjab University, Chandigarh.	Polyethylene - nanoplastic induced testicular toxicity in wistar rats: A mechanistic insight.

20.	Ms. Nandini Chitara	Department of Anthropology, Panjab University, Chandigarh.	Odontometrics and artificial intelligence: A comparative study for best prediction of facial geometry in disaster victim identification.
21.	Ms. Neelam Gautam	Department of Botany, Panjab University, Chandigarh.	Phytochemical potential of asthma weed: From traditional uses to contemporary science.
22.	Ms. Nikita Kalyan	Department of Botany, Panjab University, Chandigarh.	Bamboo: A natural resource for antimicrobial phytochemicals.
23.	Mr. Pardeep Kumar	Department of Botany, Panjab University, Chandigarh.	Changes in soil organic carbon stocks along elevational gradients in the Western Himalayas.
24.	Ms. Raashi Gupta	Department of Botany, Panjab University, Chandigarh.	Sustainable forest management through indigenous techniques: Lessons from tribal communities.
25.	Ms. Rishu	Department of Zoology, Panjab University, Chandigarh.	Integrative approach to collagen structure, prediction and protein-protein docking with antimicrobial peptides in <i>Labeo rohita</i> , <i>Cyprinus carpio</i> , & <i>Ctenopharyngodon idella</i> & its characterization.
26.	Ms. Ritika Verma	Department of Anthropology, Panjab University, Chandigarh.	Sex classification from fingerprint ridge density through artificial intelligence: Anthropological and forensic implications.
27.	Ms. Sajida Banoo	Orchid Laboratory, Department of Botany, Panjab University, Chandigarh.	Regeneration potential of in vitro tuber of <i>Satyrium nepalense</i> D.Don: - An orchid of high medicinal value.

28.	Ms. Sandeep Kaur	Department of Zoology, Panjab University, Chandigarh.	Exploring the potential of a novel NOD2 agonist in enhancing the antileishmanial vaccine efficacy.
29.	Mr. Shivam	ICAR National Bureau of Plant Genetic Resources, New Delhi 110012 and Department of Botany, Panjab University, Chandigarh.	Assessing genotypic variation in chickpea under drought stress using morpho-physiological traits.
30.	Mr. Shubham Jattwal	Institute of Forensic Science and Criminology, Panjab University, Chandigarh.	Magnetite loaded tea waste a green sorbent for dispersive solid phase microextraction (M-DSPME) for nsaid's.
31.	Ms. Siloni Patial	Department of Microbiology, Panjab University, Chandigarh.	A potential prophylactic approach for atherosclerosis by cholesterol assimilating probiotic bacteria: An experimental study.
32.	Ms. Sunita	Orchid Laboratory, Department of Botany, Panjab University, Chandigarh.	In vitro plantlet regeneration of a medicinally important and endangered terrestrial orchid, <i>Liparis odorata</i> (Willd.) Lindl. through pseudobulb culture.
33.	Ms. Swati Gupta	Institute of Forensic Science and Criminology Panjab University, Chandigarh.	Sustainable nanomaterials from sugarcane bagasse: A green approach to document security and anti-counterfeiting.
34.	Ms. Thokchom Supriya Devi	Department of Anthropology, Panjab University, Chandigarh.	Orthopantomogram (OPG) in forensic anthropology for large-scale disaster victim identification.



<b>Research Scholars from Colleges and other Institutions (JRF, SRF, Project Fellow and Post Docs)</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
<b>35.</b>	Ms. Chongtham Nimi	Department of Forensic Science, Punjabi University, Patiala.	Implementing ATR-FTIR spectroscopy and chemometrics for the forensic identification and differentiation of sexual lubricants and their traces.
<b>36.</b>	Ms. Meghavi Purohit	Wildlife Institute of India, Dehradun.	Characterizing freshwater macroinvertebrate communities: Species-environment relationships and trait dynamics in the West-Kameng Basin, Eastern Himalaya.
<b>37.</b>	Ms. Navya Rana	Central University of Himachal Pradesh, Kangra.	Anti-cancer potential of medicinal plants in DMBA-induced breast cancer in mice.
<b>38.</b>	Mrs. Neha Sudhera	Child Growth and Anthropology Unit, Department of Pediatrics, Advanced Pediatrics Centre, PGIMER, Chandigarh.	Prevalence and predictors of metabolically healthy obesity in Asian children and adolescents: A systematic review and meta-analysis.
<b>39.</b>	Ms. Purna Bikal	Department of Zoology Kurukshetra University, Kurukshetra, Haryana.	Ameliorative potential of N-acetyl-l-cysteine against the cadmium induced toxicity in antral follicles of Goat ( <i>Capra hircus</i> ).

40.	Mr. Rakshit Rayal	Wildlife Institute of India, Dehradun.	Mitigating microplastic accumulation in edible freshwater fish: A comparative study of biofloc and traditional pond systems.
41.	Ms. Sreelakshmi M V	Department of Microbiology, College of Basic Science and Humanities, Punjab Agricultural University, Ludhiana, Punjab.	Assessment of antifungal activity of <i>Lactobacillus plantarum</i> for biopreservation of <i>Eleusine coracana</i> flour.

**UG/PG Students of Panjab University Campus and Regional Centres**

S.No.	Name of Participant	Affiliating Institution	Title of Abstract
42.	Ms. Gauri Sharma	Department of Anthropology, Panjab University, Chandigarh.	Forensic archaeology: Uncovering history and solving mysteries with modern science.
43.	Ms. Harshita Gautam	Institute of Forensic Science and Criminology, Panjab University, Chandigarh.	Unmasking deep fake voices: Using statistical and AI hybrid Model for forensic applications.
44.	Mr. Khushwinder Singh	Department of Botany, Panjab University, Chandigarh.	Adaptive strategies in ferns and their role in succession.
45.	Mr. Sukhwinder Singh	Institute of Forensic Science and Criminology, Panjab University, Chandigarh.	Evidence of occupational exposure: Workplace discrimination based on ATR-FTIR analysis of fingernail clippings for forensic applications.
46.	Mr. Udit	Department of Zoology, Panjab University, Chandigarh.	Trikatu for PCOS management as holistic health approach.

**UG/PG Students from Colleges and Other Institutions**

<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
47.	Ms. Navdeep Kaur	School of Agricultural Biotechnology, Punjab Agricultural University, Ludhiana.	Synthesis of silk fibroin matrices and their use for increase in fertilizer adsorption.

**Oral (Abstracts)- Life Sciences**

**Faculty/Scientists of Panjab University Campus and Regional Centre**

<b>S.No.</b>	<b>Abstract</b>
1.	<p><b>SEX PREDICTION ACCURACY THROUGH EAR AND NOSE DIMENSIONS: INSIGHTS FROM FORENSIC ANTHROPOLOGY</b></p> <p><u>Tej Kaur</u><sup>1</sup>, Kewal Krishan<sup>2</sup>, Vishal Sharma<sup>1</sup> <sup>1</sup><i>Institute of Forensic Science and Criminology, Panjab University, Chandigarh,</i> <sup>2</sup> <i>Department of Anthropology, Panjab University Chandigarh.</i></p> <p>Sexual dimorphism is a pervasive phenomenon among all the species. Human face has always been a paramount in forensic sciences and plays a considerable role in sex identification. The present study aims at predicting sex accuracy from different parameters of ear and nose using different statistical techniques viz. Multiple Linear Regression (MLR) and Logistic Regression (LR) through Machine Learning techniques. The research was carried out on 508 participants (264 males &amp; 244 females) aged 18-35 years from north India. Five measurements of nose and ten measurements of both ears, totalling the parameters to 25, were recorded manually using sliding and spreading calipers, on each participant. The MLR model achieved an accuracy range of 76.8% to 78% for sex estimation, whereas the LR classifier provided the highest sex accuracy score of 86.75%. Nasal breadth emerged as the most significant predictor of sex, followed by right physiognomic ear length. These findings suggest that both ear and nose morphometrics are valuable tools in forensic anthropological identification, offering reliable methods for determining sex, individuality and supporting forensic reconstructions. Their unique variations provide critical insights for forensic scientists and anthropologists in the identification process.</p>
2.	<p><b>ENHANCING ETHANOL TOLERANCE IN YEAST THROUGH HALO TOLERANCE GENES</b></p> <p><u>Jagdish Rai</u><sup>1</sup>, Lakhwinder Singh<sup>2</sup>, SC Sharma<sup>2</sup> <sup>1</sup><i>Institute of Forensic Science &amp; Criminology, Panjab University,</i> <sup>2</sup><i>Department of Biochemistry, Panjab University.</i></p> <p>Ethanol production by fermentation has industrial significance, as bioethanol is a renewable fuel. The ethanol produced during the fermentation process eventually becomes toxic for fermentation yeast itself. Increasing ethanol tolerance of yeast can enable ethanol production at higher concentration through fermentation process. Hal 5 gene is known to increase the halo-tolerance of yeast. Halo-tolerance is similar to ethanol tolerance in some aspects as there are similarities between how high salt concentration and high ethanol concentration disrupts the homeostasis of ions, water, and membrane permeability. High salt concentration reduces water availability and the high ethanol concentration also reduce water concentration in environment. Both disrupt the ion balance across the membrane through different mechanisms. We studied strains with mutant hal5 and overexpressing the hal 5 genes, with respect to wild type strain. Both the overexpressing and mutant hal5 strains are more tolerant to sub-lethal ethanol stress. The two strains are increasing the ethanol tolerance of yeast through different mechanisms. Hal5</p>

	<p>overexpression strain may have stabilized the ion transporters by direct binding of Hal5 protein to trk membrane transporters proteins. The hal5 mutant has increased the trehalose, which is a general protein stabilizing carbohydrate. The over-expression strain has the highest ethanol tolerance, therefore Hal5 over-expression can be used to increase ethanol tolerance and eventually increasing the ethanol production through fermentation.</p>
<p>3.</p>	<p><b>ARTIFICIAL INTELLIGENCE (AI) IN THE FORENSIC ANTHROPOLOGICAL INVESTIGATIONS AND DISASTER VICTIM IDENTIFICATIONS</b></p> <p><u>JS Sehrawat</u> <i>Department of Anthropology, Panjab University, Chandigarh.</i></p> <p>The technological advancements have revolutionized the science for human welfare; be it physical, chemical or biological sciences. Digitalization of evidence acquisition, analysis and reporting by utilizing digital technologies and tools has effectively and reliably replaced the traditional forensic investigations, particularly evidence management in disaster victim identifications. AI models/algorithms in forensics are primarily developed for prediction and decision-making in different forensic pursuits. Such models are designed and trained to overcome the variabilities and cognitive human errors or biasness and then applied for problem-solving and decision makings based on logical mathematical reasoning (Agrawal and Nikhade, 2022). AI has removed human subjective bias limitations of traditional forensic anthropological approaches like annotation of facial landmarks and estimation of soft-tissue thicknesses on MRI/CT scans, automated facial reconstructions and identification using comparison algorithms, cataloguing and studying human remains, estimation of age, sex and ethnicity from morphological features, reconstruction of skeletal and dental features, interpretation of traumatic lesions and ballistic injuries, quick and easy identification of taxonomic categorization of insects, pollens and diatoms, processing and interpreting DNA data etc. The humanoid robots and programs have facilitated the forensic anthropological tasks to be much easier and more efficient. AI assisted retrieval of skeletonized human remains using advanced forensic archaeological tools like ground penetrating radar (GPR), resistivity appliances, metal detectors, magnetometer, cadaver dogs can help their repatriation and reburial to bring closure comfort/solace to the relatives.</p>
<p>4.</p>	<p><b>MORPHOLOGICAL DENTAL FEATURES AS A BIOLOGICAL IDENTITY CARD: A STUDY OF JINGAR POPULATION OF NORTH INDIA</b></p> <p><u>Nandini Chitara, Kewal Krishan</u> <i>Department of Anthropology, Panjab University, Chandigarh.</i></p> <p>Forensic scientists, forensic anthropologists and medico-legal experts also have a keen interest in the human teeth due to their durability, uniqueness and distinctiveness. It has been well established in the literature that dental morphological and morphometric features aid in determination of age, sex and ancestry of an individual in forensic examinations. As examination of teeth for the estimation of age, sex and ancestry is the main focus of the study of forensic anthropology. Hinging on these primary pillars, the present study was carried out on 207 (93 males, 114 females) individuals from an endogamous ethnic group (Jingars) of North India. The dental casts, anthropometric measurements and facial photographs were secured from the participants after obtaining</p>

	<p>informed consent and ethical permission from Institutional Ethical Committee, Panjab University, Chandigarh, India vide approval no: PUIEC 230602-I-114 dated: 09/06/2023. Various morphological dental features and anomalies were studied and identified in the dental casts and data was analysed in IBM SPSS statistics version 20 for evaluating the dental features which can be linked to the Jingar population. It was found that the Carabelli's cusp, shovel shaped incisors, supernumerary teeth, crowding, peg shaped incisors, occlusion type and groove pattern form the unique features of the Jingar population. It is further concluded that the Jingar population being a genetically homogenous population may be distinguished from other population groups of Haryana on the basis of these unique features of the teeth. Therefore, the present study may help scientifically in identifying the Jingars in the state of Haryana.</p>
<p><b>Faculty/Scientists from Colleges and Other Institutions</b></p>	
<p><b>5.</b></p>	<p><b>WHEAT RESISTANCE GENE DATABASE AND DEEP LEARNING MODEL FOR R GENE CLASSIFICATION</b></p> <p><u>Bharati Pandey</u> <i>ICAR National Dairy Research Institute, Karnal.</i></p> <p>Following an extensive analysis, we established the Wheat Resistance Gene Database, which serves as a repository for predicted R genes from wheat and its wild relatives. This database is designed with a user-friendly interface, enabling efficient searches by chromosome number or gene ID. Additionally, users can conveniently download the complete dataset in Excel format, facilitating further analysis and research. To enhance our understanding of resistance genes, we applied various deep learning models for the classification of R genes and non-R genes. Among these, a model that integrates Long Short-Term Memory (LSTM) networks, Conv1D layers, and an attention mechanism exhibited superior performance, achieving an impressive accuracy of more than 92%. This model's architecture allows it to effectively capture sequential dependencies in the data, making it particularly suited for genetic sequence classification tasks. The development of this database and deep learning model not only contributes to the field of plant genetics but also provides researchers with valuable tools for studying disease resistance in wheat. This work represents a significant advancement in the classification and understanding of resistance genes, paving the way for future studies and applications in agricultural biotechnology.</p>
<p><b>6.</b></p>	<p><b>BLOW FLIES: ROLE &amp; THEIR IMPORTANCE</b></p> <p><u>Dr. Inderpal Singh Sidhu<sup>1</sup></u> <i><sup>1</sup>SGGS College Sector 26, Chandigarh</i></p> <p>Blow flies are among the most abundant, familiar and oldest known insect groups. Members of this family are usually metallic blue, green, purple or coppery although a number of species are non-metallic as well. The adult blow flies occur commonly on vegetation, flowers, decaying plant or animal substances, excrement, garbage and meat. The eggs or larvae are laid on decaying organic matter or on insects, earthworms, snails, toads, birds and mammals. The larvae occur on carrion, living animals, excretments and household foods and they can be omnivorous, carnivorous or parasitic in different species. Blow flies are also important medically since their larvae cause myiasis i.e. infestation of</p>

	<p>living tissue. Blow flies play a significant role in the fast emerging field of Forensic Entomology i.e. the use of entomological evidence in criminal investigations. It becomes amply clear that blow flies are extremely important group of insects from multiple points of view. Unfortunately, this family has remained ignored at the hands of Indian taxonomists, as is clear from the review of relevant literature. The present work is compiled with the hope that it would be helpful to fill the gaps in information about the taxonomy of Indian Calliphoridae. It will add to our information about the biodiversity of our country and help the future workers to undertake various kinds of studies on these insects having considerable medical, veterinary and forensic importance. The details will be discussed during presentation.</p>
7.	<p><b>SEASONAL SUCCESSION OF FORENSICALLY IMPORTANT ENTOMOFAUNA OF PIG CADAVER: AN INDOOR STUDY OF PUNJAB (INDIA)</b></p> <p><u>Pawandeep Kaur</u>  <i>Sri Guru Gobind Singh College, Sector 26, Chandigarh.</i></p> <p>The field of forensic entomology is concerned with using insects in legal investigations. Many of the studies have shown that insects are the major components of legal investigations. Medico-legal forensic entomology is used in the estimation of post-mortem interval (PMI) along with the physiological and chemical changes that occur in the body before and after death. This study was focused on the prevalence of carrion insects in indoor environments, during the five seasons of Punjab, India. i.e., Winter, Summer, Monsoon, Post-Monsoon and Spring season. The pig carcasses were placed inside a room and daily (morning and evening) two visits were made to collect the insects from the carrion. A total of 1187 insect specimens belonging to three insect orders: Diptera (692), Coleoptera (467), and Hymenoptera (28), 10 families, and 32 species were collected during all five seasons. The abundance and richness of each species varied in each season. Moreover, it has been observed that the decomposition of pig carcasses was way faster in the monsoon season followed by summer, spring, post-monsoon, and winter seasons. <i>Sarcophaga</i> (<i>Liosarcophaga</i>) <i>aegyptica</i>, <i>Boettcherisca bengalensis</i>, <i>Calliphora vicina</i>, <i>Megaselia scalaris</i> (Coffin fly) were the exclusive species in this experiment that were found for the first time from pig carcasses in the respective seasons. The data collected from these seasonal experiments can serve as the baseline data for indoor homicides, suicides, and related crime investigations as the insects collected from these experiments will help in determining the PMI (Post-mortem Interval).</p>
8.	<p><b>DICHLORVOS INCITED TOXICITY ASCRIBES TO CHOLINERGIC DYSFUNCTIONS</b></p> <p><u>Renu Bist</u>  <i>Department of Zoology, University of Rajasthan, Jaipur.</i></p> <p>Dichlorvos, an organophosphate pesticide, has been widely used in agriculture and pest control due to its efficacy against a broad range of insects. However, its potential for toxicity poses significant health risks to humans and animals exposed to it, both acutely and chronically. Dichlorvos intoxication primarily affects the cholinergic system by inhibiting acetylcholinesterase (AChE), an enzyme responsible for breaking down acetylcholine in synapses. This inhibition leads to the accumulation of acetylcholine,</p>

	<p>resulting in overstimulation of cholinergic receptors. Clinically, this manifests as a range of cholinergic dysfunctions, including muscle weakness, respiratory distress, convulsions, and, in severe cases, death. At the cellular level, excess acetylcholine affects both muscarinic and nicotinic receptors, causing an imbalance in neurotransmission that disrupts normal neuromuscular, cardiovascular, and central nervous system function. The dichlorvos exposure may also downregulate cholinesterase gene expression, compounding the inhibition of AChE activity. This downregulation can perpetuate acetylcholine buildup in neural synapses, intensifying cholinergic dysfunction and potentially leading to more severe neurological impairments. The pathophysiology of dichlorvos intoxication is also characterized by oxidative stress, mitochondrial dysfunction, and neuronal cell damage, contributing to long-term neurological deficits in survivors of acute exposure. Understanding the molecular and systemic mechanisms underlying dichlorvos-induced cholinergic dysfunction is essential for developing improved antidotes and reducing the health burden associated with organophosphate poisoning.</p>
<p><b>9.</b></p>	<p><b>TRANSCENDING BARRIERS: INTEGRATING LINGUISTIC DIVERSITY IN LIFE SCIENCE RESEARCH</b></p> <p><u>Dr Saranjeet Kaur</u>  <i>Department of Zoology, Sri Guru Gobind Singh College, Sector 26, Chandigarh.</i></p> <p>This paper explores the critical intersection between life sciences and languages, emphasizing how linguistic diversity enriches scientific discourse and highlights significant barriers to knowledge sharing. Despite the wealth of research published in languages other than English, much of this vital work remains untranslated and underrepresented in the global scientific community, leading to the loss of important insights and perspectives. Furthermore, understanding the etymology of scientific terminology derived from various languages can enhance the teaching-learning process, making complex concepts more accessible to students and researchers alike. Through case studies that illustrate the impact of linguistic variations on research methodologies, data interpretation, and public engagement, this study advocates for a more integrative approach that prioritizes multilingualism in scientific inquiry. By bridging these fields, one can foster inclusivity and accessibility in scientific communication, ensuring diverse voices contribute to the advancement of life sciences and promoting innovative interdisciplinary collaborations.</p>
<p><b>10.</b></p>	<p><b>MOLECULAR REGULATION OF WRKY TRANSCRIPTION FACTOR NETWORK UNDER IRON DEFICIENCY IN HEXAPLOID WHEAT</b></p> <p><u>Shivani Saini, Ajay Kumar Pandey</u>  <i>NABI, Mohali, Punjab.</i></p> <p>Plants being sessile in nature have to face multiple stress related challenges simultaneously. Iron is the fourth most abundant essential micronutrient present on the earth's crust, yet very less bioavailable to plants. Deficiency of iron leads to severe chlorosis in crop plants, including wheat reducing yield and quality. Transcription factor such as WRKY regulates iron homeostasis through controlling a complicated network of iron-responsive genes by binding to the W-box present in their promoter region. Hence, it is worth investigating the response of WRKY genes to Fe deficiency stress for enhancing</p>



	<p>the bioavailability of iron. The promoter region of TaWRKY include W-box, MYB, MYC, WRE3, DRE1 cis-elements which possibly participate in stress tolerance and iron regulation. Iron deficiency modulate the transcript abundance of several WRKY genes which belong to class II and Class III family of WRKY transcription factors. The class II members possess a single WRKY domain towards C-terminus and conserved C2H2-type zinc finger structure (C-X4-5-C-X23-H-X 1-H) while, group III members have a single WRKY domain towards N-terminus and C2HC conserved zinc-finger structure (C-X6-7-C-X23-28-H-X 1-C). Furthermore, protein-protein interaction analysis was also conducted which revealed WRKY-WRKY self-interaction. The study revealed the critical role of WRKY's in regulating iron homeostasis by self-interaction and exhibiting interaction with other iron-responsive genes in wheat.</p>
<p><b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b></p>	
<p><b>11.</b></p>	<p><b>EXPLORING THE ECOLOGICAL IMPLICATIONS OF <i>Verbesina encelioides</i> AND ITS MANAGEMENT BY THERMAL DECOMPOSITION</b></p> <p><u>Aditi Rana</u>, Daizy R. Batish <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p><i>Verbesina encelioides</i> (Cav.) Benth. &amp; Hook. f. ex A. Gray, a member of family Asteraceae, is a native species in Southwestern USA, growing drastically in semi-arid regions of India, Punjab, Haryana, Rajasthan and Uttar Pradesh. It is an annual herbaceous plant, that act as a troublesome invasive weed due to its inherent characteristics such as rapid growth, high fecundity, high tolerance to warm temperatures, production of large number seeds and seed dormancy. The plant can be seen commonly growing alongside the roads, disturbed habitats, agricultural fields and waste lands. In agriculture fields, the weed interferes and compete for resources with the native crops that leads to reduction in the crop yield while its drastic spread in natural ecosystem causes the depletion of the biodiversity. Therefore, its management becomes very important either by utilising strategies or by ecofriendly methods which also do not harm the environment. Thermal decomposition at elevated temperatures is one possible way to manage this weed.</p>
<p><b>12.</b></p>	<p><b>WOOD SPECIES IDENTIFICATION FOR ILLEGAL DEFORESTATION AND SUSTAINABLE FORESTRY PRACTICES: AN INTEGRATION OF ATR-FTIR SPECTROSCOPY AND MACHINE LEARNING ALGORITHMS</b></p> <p><u>Akanksha Sharma</u>, Suraj Garg, Vishal Sharma <i>Institute of Forensic Science and Criminology, Panjab University Chandigarh, India.</i></p> <p>Illegal deforestation and wood trafficking have a major impact on global biodiversity and climate change. Sustainable forestry methods are presently adopting an emerging field known as wood forensics to verify wood and wood products. Conventional wood identification techniques, such as dendrochronology and microscopy, are laborious and need specific expertise. Applying machine learning to ATR-FTIR data makes wood identification easier and more accurate. This study examined the chemical fingerprints of three Indian hardwood species, namely <i>Dalbergia</i>, <i>Eucalyptus</i>, and <i>Populus</i>, using ATR-FTIR spectroscopy, and significant spectral peaks for substances such as lignin, cellulose, hemicellulose, and flavones were identified. Outliers were eliminated using an unsupervised machine learning method called isolation forest (iForest), and the huge</p>

	<p>dimensionality of spectral data was reduced using principal component analysis (PCA). Four tree-based machine learning models; decision tree, random forest, extra tree, and categorical boosting; were then used to classify the reduced data. The potential of these models to distinguish between the various wood species using their distinct spectral patterns was evaluated. ATR-FTIR spectroscopy in conjunction with machine learning is an effective tool in the field of wood forensics, as it enhances the efficiency and accuracy of wood identification, allowing investigators to track the origin of wood products and enforce regulations against illegal deforestation. By strengthening the control and handling of wood resources, this approach also promotes sustainable forestry, which aids in preserving biodiversity and tackling global climate change.</p>
<p><b>13.</b></p>	<p><b>COMPARATIVE PROFILING OF SECONDARY METABOLITES IN COLOURED BELL PEPPERS GROWN UNDER DIFFERENT GREENHOUSE CONDITIONS AT HIGH ALTITUDE</b></p> <p><u>Amita Rawa</u><sup>1</sup>, Tsering Stobdan<sup>1</sup>, Shalinder Kaur<sup>2</sup>, Rohit Kumar<sup>1</sup>  <sup>1</sup> <i>Defence Institute of High Altitude Research, DRDO base lab, Chandigarh, India,</i>  <sup>2</sup> <i>Department of Botany Panjab University Chandigarh.</i></p> <p>The aim of this work was to investigate the influence of different shading materials and microclimate on quality and metabolite profiling of organically grown bell pepper (<i>Capsicum annum</i>) varieties at high altitude. Red, yellow and green coloured bell peppers were grown under open field, greenhouse with polyethylene sheet (120GSM, translucent) and red shade net covering at top in Leh (Ladakh). Samples of freshly harvested bell peppers were lyophilised at -800C and analysed. In lyophilised samples, polyphenolic compounds content and antioxidant activity was observed. Flavonoids were most abundant in the studied bell peppers grown under open field conditions compared to those grown under shading conditions formed a clear line between the locations. While myricetin quantity observed were significantly higher in bell peppers grown under red shade net condition in all three varieties. The green coloured pepper shows maximum amount of polyphenols with respect to red and yellow peppers at early or ripening stage, which together accounted for up to quercetin, rutin and naringenin. The cultivar ‘F1 hybrid 1601’ (red colour pepper) had the highest total phenolic compounds and antioxidant activity. These results provide comprehensive information on the chemical profiles of selected bell pepper variety, suggesting that organic vegetables grown in open conditions in summer season (May to September) in Leh, are a rich source of beneficial compounds that are known to have a positive impact on human health. Keywords: Bell peppers; organic production; metabolites; high altitude; polyphenols.</p>
<p><b>14.</b></p>	<p><b>GC-MS ANALYSIS OF BIOACTIVE COMPOUNDS FROM METHANOLIC EXTRACT OF <i>Satyrium nepalense</i> D.DON TUBERS</b></p> <p><u>Anamika Kumari</u>, Promila Pathak  <i>Orchid Laboratory, Department of Botany, Panjab University, Chandigarh.</i></p> <p>A preliminary phytochemical study of tubers of <i>Satyrium nepalense</i> D.Don was done using Gas chromatography-Mass spectrometry for the determination of the constituents. Chromatogram of the GCMS analysis indicated the presence of thirtytwo compounds. The prime compounds were 2-Amino-3-(3,4-dimethoxyphenyl) propanoic acid (58.00%), Hexadecanoic acid, 2-hydroxy-1-(hydroxymethyl) ethyl ester (21.64%), Ethanone, 2,2-</p>

	dimethoxy-1,2-diphenyl- (8.41%), 9,19-Cyclolanost-24-en-3-ol, (3 $\beta$ )- (1.35%) etc. with bioactivities such as antibacterial, antimicrobial, antiinflammatory, antioxidant.
<b>15.</b>	<p><b>FROM TRADITION TO SUSTAINABILITY: SCALING UP BAMBOO SHOOT PROCESSING IN BODO CUISINE FOR FOOD SECURITY</b></p> <p><u>Bristy Kalita</u><sup>1</sup>, Dr. Ramesh Sahani<sup>2</sup>  <sup>1</sup><i>Department of Anthropology, Panjab University, Chandigarh,</i> <sup>2</sup><i>Department of Anthropology, University of Delhi.</i></p> <p>This paper explores bamboo shoot processing in Bodo cuisine, focusing on traditional methods used by the Bodo community in Assam. Bamboo shoots are an important part of the local diet, and the processing techniques passed down through generations offer valuable insights into sustainable food practices. By examining these methods, the paper discusses the potential for scaling up bamboo-based food production to improve local food security and support sustainable agriculture. While traditional practices have proven effective on a small scale, this study considers the possibilities and challenges of expanding them for wider use.</p>
<b>16.</b>	<p><b>SUPPORT VECTOR AND RANDOM FOREST REGRESSION FOR THE PREDICTION OF FACIAL DIMENSIONS FROM TEETH AND JAW PARAMETERS</b></p> <p><u>Damini Siwan</u><sup>1</sup>, Vishal Sharma<sup>1</sup>, Arun K Garg<sup>2</sup>, Kewal Krishan<sup>3</sup>  <sup>1</sup><i>Institute of Forensic Science and Criminology, Panjab University, Chandigarh</i>  <sup>2</sup><i>Dr Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh,</i> <sup>3</sup><i>Department of Anthropology, Panjab University, Chandigarh.</i></p> <p>Facial reconstruction is one of the crucial parts in forensic science investigation, especially where body is highly decomposed and its hard to reveal the facial features. On other hand, teeth are the structure which can stay intact after the long decomposition process. There are some anthropometric measurements of face such as Maximum head width (MHW), Minimum frontal width (MFW), Maximum facial width (MFW), Mandibular width (MW), Morphological facial length (MFL), Facial height (FH), Inter commissural distance (ICD), Inter Pupillary distance (IPD), which can correlate with the anthropometric measurements of maxillary set of teeth such as first molar's Crown diameter, combines width of central incisor (CWCI), inter-incisor distance (I-I D), inter-canine distance (I-C D), inter-premolar distance (I-P D), Inter-molar distance (I-M D), Dental arch length (DAL). The present study utilizes the different models of machine learning and find the correlation between the anthropometric measurements of teeth and face. Random forest regression (RFR) and Support vector regression (SVR) are the machine learning based model used for the purpose of prediction in present study. The results shows that SVR are performing better than RFR for the prediction of facial measurements from teeth measurements. These models have potential to get a part for reconstructing the facial dimensions of unknown individual from the available measurements of teeth.</p>
<b>17.</b>	<p><b>MORPHOLOGICAL AND CHEMICAL CHARACTERIZATION OF RAINBOW <i>Eucalyptus</i></b></p>

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Plant based medicines are in use since ancient time in different parts of the world. These medicines often encourage the researchers to discover new or alternate medicinal formulations to take care of various human health related disorders. Morphology is one of the traditional but peculiar characteristics to establish the identity of the medicinal plants. Now days, increase in multidrug resistance is a major concern. To resolve this issue, novel plant-derived compounds from a less explored species including Rainbow *Eucalyptus* could be used as a source of medicines. This *Eucalyptus* species is so named because of its unique bark morphological features. This species has also been studied for the presence of phytochemicals in its bark and leaves using different solvents. The bioactivities such as anticancer, anti-inflammatory, antimalarial, antimicrobial, antipyretic were reported in leaves while antifungal and antioxidant in the bark. The presence or absence of various phytoconstituents including alkaloids, flavonoids, carbohydrates, glycosides, gum and mucilage, phenolics, proteins, resins, saponins, steroids, terpenoids etc. have been recorded. The leaves contain more phytochemicals than the bark, and ethanol proved to be the most effective solvent for extraction. Keywords: Bioactivity, Myrtaceae, Metabolites, Medicines, Plants, Tree.

**18. UNRAVELLING DROUGHT TOLERANCE MECHANISMS IN CHICKPEA (*Cicer arietinum* L.): TRANSCRIPTOME ANALYSIS OF SELECTED DROUGHT-TOLERANT GENOTYPES**

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Chickpea (*Cicer arietinum* L.), is an important cool season pulse crop cultivated mainly in arid and semiarid regions of the world and is highly valued for its high protein content. However, the productivity gains are lowered due to various biotic and abiotic stressors, particularly drought which accounts for over 50% loss in the yield. A total of 4500 chickpea germplasm was screened for drought stress at the seedling stage using parameters viz., shoot drooping, chlorophyll content, shoot length (cm), and shoot dry biomass followed by detailed phenotypic evaluation of selected genotypes under field conditions. Out of the selected genotypes, four drought stress tolerant genotypes along with the check genotypes viz., ICC4958 (tolerant) and ICC1882 (susceptible) were also subjected to transcriptome study. The study aims to understand the molecular mechanisms of drought tolerance in the selected drought-tolerant genotypes. The transcriptome analysis of shoot tissues under drought- stressed and control conditions revealed 10,307 differentially expressed genes. Out of which 3,284 genes were upregulated contributing to important mechanisms such as osmolyte accumulation, stress signalling, water transport, cell wall modification. Genes associated with osmotic regulation were also

	<p>notably differentially expressed. These findings not only highlighted the unique molecular pathways involved in drought adaptation but also identified novel genes in promising genotypes that differentiate them from well-established drought-tolerant check genotypes i.e., ICC4958. This study provides valuable insights for chickpea breeding programs aimed at enhancing crop resilience under drought-stress conditions. Keywords: Transcriptomics, drought tolerance, chickpea germplasm, osmotic regulation.</p>
<p><b>19.</b></p>	<p><b>POLYETHYLENE-NANOPLASTIC INDUCED TESTICULAR TOXICITY IN WISTAR RATS: A MECHANISTIC INSIGHT</b></p> <p><u>Muskan Budhwar</u>, Shweta, Madhu Sharma, Sweety Mehra, Mani Chopra <i>Cell and Molecular Biology Lab, Department of Zoology, Panjab University, Chandigarh.</i></p> <p>Polyethylene micro and nanoplastics (MNPs) are increasingly recognized as emerging environmental contaminants with potential detrimental health effects. Multiple studies have documented MNPs mediated reproductive toxicity, but underlying mechanisms remain enigmatic. Thus, the present study was undertaken to understand the mechanism based toxicological profile of PE-NPs in the testis of male Wistar rats. In this study, environmentally relevant doses of PE-NP were orally administered to adult Wistar rats for a period of 35 days. The results revealed that PE-NP exposure led to a significant reduction in testicular weight, sperm count, and motility. The biochemical analysis indicated a significant increase in the levels of reactive oxygen species (ROS) and lipid peroxidation markers, such as malondialdehyde (MDA), as well as decreased levels of glutathione (GSH) and antioxidant enzymes. The imbalance between pro and antioxidants caused enhanced ROS generation in testicular tissue. Additionally, the levels of Na<sup>2+</sup>-K<sup>+</sup>, Ca<sup>2+</sup>, and Mg<sup>2+</sup> ATPases were substantially reduced, indicating oxidative stress mediated mitochondrial membrane dysfunction. Moreover, histopathological analysis of testes revealed damaged seminiferous tubules, basement membrane, testicular atrophy, and reduced number of spermatozoa and sertoli cells. Furthermore, the exposure to PE-NP diminished serum testosterone levels, which may be attributed to impaired or reduced sertoli cells. These findings suggest that PE-NP instigated testicular toxicity in Wistar rats through enhanced ROS production and disruption of intracellular antioxidant defense mechanism. Furthermore, the aforementioned observations highlight potential risk posed by NP to male fertility.</p>
<p><b>20.</b></p>	<p><b>ODONTOMETRICS AND ARTIFICIAL INTELLIGENCE: A COMPARATIVE STUDY FOR BEST PREDICTION OF FACIAL GEOMETRY IN DISASTER VICTIM IDENTIFICATION</b></p> <p><u>Nandini Chitara</u><sup>1</sup>, Damini Siwan<sup>2</sup>, Kewal Krishan<sup>1</sup> <sup>1</sup><i>Department of Anthropology, Panjab University, Chandigarh,</i> <sup>2</sup><i>Institute of Forensic Science and Criminology, Panjab University, Chandigarh.</i></p>

	<p>The significance of forensic odontology in allocating an identifiable face to charred, decomposed, disfigured corpse has been explored in literature. The prediction of face from teeth is the latest approach in forensic identification. For this, various statistical tools and software were utilized in the recent time. However, the literature lacks to recognize the most appropriate dental measurements for facial prediction and hence give non-significant prediction models. Addressing this research gap, the present study was conducted in the Haryana state of northern India with 207 participants (93 males and 114 females). The study includes taking the dental cast and the anthropometric facial measurements. Correlation and multiple regression analysis were carried in the IBM SPSS version 20. Further regression models were predicted for each measurement. Machine learning based linear regression models were generated using Python version 3.11.4. Results revealed that the statistically predicted linear regression models for facial height, minimum frontal breadth, upper facial height, lower facial height, facial width, outer canthal distance, nasal width, mouth width shows the mean absolute error between the range of <math>\pm -8.937</math> to <math>\pm 0.0066</math> (95% confidence level). The machine learning generated models show the mean absolute error between the range of <math>\pm 0.25</math> to <math>\pm 0.65</math> which is far higher than the statistically predicted models. However, for the prediction of inner canthal distance machine learning showed lower MSE (<math>\pm 0.25</math>) as compared to the <math>\pm 1.79</math> MSE obtained by statistical prediction. Therefore, the present study concludes that the statistical models are better than the machine learning models.</p>
<p><b>21.</b></p>	<p><b>PHYTOCHEMICAL POTENTIAL OF ASTHMA WEED: FROM TRADITIONAL USES TO CONTEMPORARY SCIENCE</b></p> <p><u>Neelam Gautam</u>, M. C. Sidhu  <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>The use of plants as a source of medicine is as old as human civilization itself. Plants are good source to meet the daily requirements including healthcare needs in the form of decoction, infusion and maceration. Even in the progressive world, these are still the choice of pharma sectors. Phytoconstituents such as alkaloids, flavonoids, terpenoids, coumarins, saponins are associated with antioxidant, antiviral, antibacterial, anticancer and antidiabetic properties. There are large number of plant species whose medicinal potential is still unexplored including the species of large and diverse genus <i>Euphorbia</i> from family Euphorbiaceae which contains 2150 species in world and 195 in India. As per the available literature, around 5% Euphorbia species are studied for phytochemicals till now. The species of genus Euphorbia have long been used in traditional medicine for the treatment of various human ailments such as respiratory, digestive, inflammatory, microbial infections etc. <i>Euphorbia hirta</i> is one of the most commonly used species in respiratory diseases, asthma, bronchitis and also inhibit SARS-Co-V2 virus which was responsible for COVID-19 pandemic. Further studies on isolation of bioactive compounds from medicinally important plants including <i>E. hirta</i> has a potential in the development of novel drugs. Keywords: Antimicrobial, Healthcare, Medicine, Phytoconstituents, Plants, Species.</p>
<p><b>22.</b></p>	<p><b>BAMBOO: A NATURAL RESOURCE FOR ANTIMICROBIAL PHYTOCHEMICALS</b></p> <p><u>Nikita Kalyan</u>, Nirmala Chongtham  <i>Department of Botany, Panjab University, Chandigarh.</i></p>

	<p>The therapeutic properties of bamboo have been recognized for millennia, with references documented in pharmacological texts dating back to 10,000 BCE. It has been vital in traditional medicine worldwide, with nearly every part used to treat ailments such as skin infections, bleeding gums, and wounds. Bamboo also demonstrates promising activities, including anti-cancer, anti-diabetic, cardioprotective, anti-inflammatory, antioxidant, and antimicrobial effects. Historically, the antimicrobial properties of bamboo have been acknowledged, with culm sheaths and bamboo shoot skins traditionally used for food packaging. In Japan, these materials are used to wrap meat and rice balls, while in China, they help preserve tea flavor. Young bamboo shoots and leaves contain bioactive compounds like phenols, phytosterols, flavonoids, and dietary fibers, offering potential health benefits. Notable compounds include glycosides, coumarin lactones, and anthraquinones, with anthraquinones and coumarins exhibiting strong antibacterial effects. Essential oils from bamboo leaves, such as tricosane, cedrol, and hexadecanoic acid, show antimicrobial activity against foodborne pathogens like <i>Bacillus subtilis</i> and <i>Escherichia coli</i>. Antimicrobial derivatives from bamboo, including lignin, are seen as safer alternatives to traditional agents, being environmentally friendly, widely available, and cost-effective. Leaves of some bamboo species are reported to inhibit <i>Staphylococcus aureus</i>, <i>E. coli</i>, <i>Pseudomonas aeruginosa</i>, and <i>Bacillus</i> spp. As resistance to current medications rises, there is a growing need to explore bamboo as a source for new preservatives, antibiotics, and disinfectants.</p>
<p><b>23.</b></p>	<p><b>CHANGES IN SOIL ORGANIC CARBON STOCKS ALONG ELEVATIONAL GRADIENTS IN THE WESTERN HIMALAYAS</b></p> <p><u>Pardeep Kumar</u>, Abhishek Kumar, Meenu Patil, Anand Narain Singh  <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>Soil organic carbon (SOC) stocks refer to the quantity of carbon stored in soil in the form of organic matter. SOC is a key component of the global carbon cycle and plays a critical role in soil fertility, ecosystem functioning, and climate regulation. The present study was conducted across three elevational zones (lower, middle and upper) comprising different forest types in the Western Himalayan region. The soil samples were collected over two years on a seasonal basis and subjected to estimation of carbon stock and various physicochemical parameters using standard methodology. The results showed that SOC stock was highest in upper-elevation forests and least among lower-elevation forests. With the increase in elevation, the SOC stock follows an increasing trend. However, above the tree line, the value decreases substantially. The higher value of SOC stocks at upper elevations could be attributed to the cooler climatic conditions, high moisture regime and subsequently the slow rate of litter decomposition that may favour the accumulation of SOC. Although these forest types possess high carbon storage potential, they are at the same time facing severe anthropogenic threats such as encroachment of forest areas, deforestation, climate change and plant invasion. Therefore, the conservation of these forests is crucial for the long-term persistence of atmospheric carbon dioxide in the biotic pool and the mitigation of climatic alterations.</p>
<p><b>24.</b></p>	<p><b>SUSTAINABLE FOREST MANAGEMENT THROUGH INDIGENOUS TECHNIQUES: LESSONS FROM TRIBAL COMMUNITIES</b></p>

	<p>Raashi Gupta<sup>1</sup>, Aakash Malik<sup>2</sup>, Daizy R. Batish<sup>1</sup>  <sup>1</sup><i>Department of Botany, Panjab University, Chandigarh.</i>, <sup>2</sup><i>Department of Laws, Panjab University, Chandigarh.</i></p> <p>Sustainable forest management is essential for preserving biodiversity, maintaining ecological balance, and supporting the livelihoods of millions who depend on forest resources. Indigenous communities have, for centuries, practiced sustainable techniques rooted in a deep understanding of the natural environment, offering valuable lessons in forest conservation and management. This study explores traditional forest management practices employed by tribal communities, focusing on their holistic approaches to resource utilization, soil conservation, and biodiversity preservation. Techniques such as shifting cultivation, controlled burning, agroforestry, and sacred groves are analyzed to understand their ecological benefits and socio-cultural significance. The research highlights how these practices minimize environmental degradation, enhance soil fertility, and maintain forest health, all while fostering a sustainable livelihood for local communities. By comparing these indigenous methods with modern forest management practices, this study aims to identify synergies and recommend the integration of traditional ecological knowledge (TEK) into contemporary sustainable forestry strategies. In light of climate change and rapid deforestation, recognizing and incorporating indigenous knowledge can provide a more resilient, community-centered approach to forest management, paving the way for sustainable development and conservation.</p>
25.	<p><b>INTEGRATIVE APPROACH TO COLLAGEN STRUCTURE, PREDICTION AND PROTEIN-PROTEIN DOCKING WITH ANTIMICROBIAL PEPTIDES IN <i>Labeo rohita</i>, <i>Cyprinus carpio</i>, &amp; <i>Ctenopharyngodon idella</i> &amp; ITS CHARACTERIZATION</b></p> <p>Rishu<sup>1</sup>, Ravneet Kaur<sup>1</sup>, Preeti Thakur<sup>2</sup>, Veena Puri<sup>2</sup>  <sup>1</sup><i>Department of Zoology, Panjab University, Chandigarh, India,</i>  <sup>2</sup><i>Centre for Systems Biology and Bioinformatics UIEAST, Panjab University, Chandigarh.</i></p> <p>Fish collagen holds significant promise for applications in tissue engineering, particularly in biodegradable constructs for skin regeneration. However, its application has been restricted due to its low stability and cytotoxicity at high concentrations. Antimicrobial peptides (AMPs) are a potential therapeutic factor in wound healing. To counteract these undesirable properties, antimicrobial peptides are tethered to collagen, in wound sites and commercial dressings. The purpose of this study was to investigate the characterisation of fish collagen scaffolds by FESEM, TGA, FTIR and molecular interactions of various AMPs to collagen protein of fish species <i>Labeo rohita</i>, <i>Cyprinus carpio</i>, and <i>Ctenopharyngodon idella</i> to find the most competent binding antimicrobial peptide. Three-dimensional (3D) structures of the collagen were predicted by ColabFold and validated by Verify-3D. Antimicrobial peptide information was sourced from the Antimicrobial Peptide Database and antimicrobial peptides LL-37, hBD-3 &amp; PR-39 were used. The collagen's physiochemical characteristics were assessed, alongside the determination of its functional domains. Active residues were identified using DoGSiteScorer, facilitating Protein-Protein interaction studies between collagen and antimicrobial peptides conducted via the HADDOCK 2.4 server. The PRODIGY webserver was utilized to compute the binding affinity of the highest- ranked docked structures. The binding affinity analysis indicated that the antimicrobial peptide LL-37</p>



	<p>binds competently to collagen from <i>L. rohita</i>, <i>C. carpio</i>, and <i>C. idella</i>, with binding energies of -7.6 kcal/mol, -9.2 kcal/mol, and - 11.5 kcal/mol, respectively. The final docked structures were visualized using PyMol. This study sets a precedent for further in-silico and in-vitro investigations, opening pathways for advancing fish collagen scaffold development.</p>
<p><b>26.</b></p>	<p><b>SEX CLASSIFICATION FROM FINGERPRINT RIDGE DENSITY THROUGH ARTIFICIAL INTELLIGENCE: ANTHROPOLOGICAL AND FORENSIC IMPLICATIONS</b></p> <p><u>Ms. Ritika Verma</u>, Kewal Krishan  <i>Department of Anthropology, Panjab University, Chandigarh.</i></p> <p>Biometrics play an important role in the identification of an individual. The characteristics of fingerprints such as pattern type, fingerprint ridge count and fingerprint ridge density are distinct in case of every individual. Ridge density is important parameter for sex classification in forensic examinations. The present study intends to classify sex using fingerprint ridge density through statistical and artificial intelligence tools. The study includes <i>Ravidasi</i> population which is an endogamous group in Chandigarh. Fingerprints of 210 participants (105 males and 105 females) were collected. Ridge density of fingerprint i.e. radial, ulnar and proximal area was assessed. Statistical tools were applied and models of machine learning were prepared to classify sex. Significant differences were found through the statistical tools, where the mean of radial area is 14.72 of females; 11.90 for males, for ulnar area it is 14.21 for females and 11.90 for males which means that there is significant differences in ridge density for sex classification but proximal areas showed less significance i.e. 11.12 in females and 10.19 in males. The frequency of ridge density of radial area of females is 15 ridges/ 25mm<sup>2</sup> and 12 ridges/25mm<sup>2</sup> in males. The frequency of ridge density of ulnar area of females is 14 ridges/ 25mm<sup>2</sup> and 12 ridges/25mm<sup>2</sup> in males. Support Vector Machine (SVM) model of machine learning showed 82% accuracy where it proves that females have higher ridge density than males of <i>Ravidasi</i> population. Therefore, Support Vector Machine can be utilized for sex classification through fingerprint ridge density in forensic investigations.</p>
<p><b>27.</b></p>	<p><b>REGENERATION POTENTIAL OF IN VITRO TUBER OF <i>Satyrium nepalense</i> D.DON:-AN ORCHID OF HIGH MEDICINAL VALUE</b></p> <p><u>Sajida Banoo</u>, Promila Pathak  <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>A successful method for regenerating plantlets from in vitro tubers was established. Tubers of 6 months old in vitro seedlings of <i>Satyrium nepalense</i> were cultured on Mitra et al. (1976, M) medium with and without growth additives; auxin [IAA (1 mg/l-1), IBA (1 mg/l-1), NAA (1 mg/l-1)], cytokinin [KN (1 mg/l-1); TDZ (1 mg/l-1)], and its combinations [NAA+TDZ (1 mg/l-1), IAA+TDZ (1 mg/l-1), and NAA+KN (1 mg/l-1)]. Early and healthy plantlets were obtained in 128.00±1.63 days on the combination NAA+TDZ (1 mg/l-1). The combinations IAA (1 mg/l-1), NAA (1 mg/l-1), and KN (1 mg/l-1) failed to produce any plantlets. The combination NAA+TDZ (1 mg/l-1) proved the best for the formation of healthy plantlets.</p>

<p><b>28.</b></p>	<p><b>EXPLORING THE POTENTIAL OF A NOVEL NOD2 AGONIST IN ENHANCING THE ANTILEISHMANIAL VACCINE EFFICACY</b></p> <p><u>Sandeep Kaur</u><sup>1</sup>, Shivani Thakur<sup>1</sup>, Aarzo Kamboj<sup>2</sup>, Deepak B. Salunke<sup>2</sup>, Sukhbir Kaur<sup>1</sup>  <sup>1</sup><i>Department of Zoology, Panjab University Chandigarh,</i> <sup>2</sup><i>Department of Chemistry, Panjab University Chandigarh.</i></p> <p>NOD-like receptors (NLR) are essential PAMPs of cytoplasmic origin and play a crucial role in controlling intracellular infection caused by <i>Leishmania</i> species. Amongst various classes of NLR, NOD2 has been extensively studied and is important for <i>Leishmania</i> recognition, the control of intracellular killing, and the induction of innate and adaptive immune responses. In this study, the <i>in-vitro</i> cell cytotoxicity and antileishmanial activity of a synthetic desmuramyl peptide-based novel NOD2 agonist (AAK-01-183) were evaluated by determining their CC50 and IC50 values against Raw macrophage cell line and <i>L. donovani</i> parasites respectively. We also explored the protective efficacy of NOD2 agonist as an adjuvant, along with first-generation antigen i.e. formalin-killed <i>L. donovani</i> promastigotes in a murine model. The BALB/c mice were vaccinated three times with the FK antigen along with the synthetic NOD2 agonist and then challenged with the <i>L. donovani</i> parasite. Various assays were conducted both before and after the challenge infection such as parasite load, immunophenotyping, ROS and NO levels and gene expression analysis of iNOS and NF-κB. The study revealed that the NOD2 agonist was highly effective in suppressing the growth of the parasite. Therefore, we concluded that FK antigen adjuvanted with a novel synthetic desmuramyl peptide-based NOD2 agonist could be pursued for the development of an effective vaccine against leishmaniasis.</p>
<p><b>29.</b></p>	<p><b>ASSESSING GENOTYPIC VARIATION IN CHICKPEA UNDER DROUGHT STRESS USING MORPHO-PHYSIOLOGICAL TRAITS</b></p> <p><u>Shivam</u><sup>1</sup>, Mohini Kajla<sup>1</sup>, Gayacharan<sup>2</sup>, Papiya Mukherjee<sup>3</sup>, Swarup K. Parida<sup>4</sup> Gyanendra Pratap Sinigh<sup>2</sup>  <sup>1</sup> <i>ICAR National Bureau of Plant Genetic Resources, New Delhi and Department of Botany, Panjab University, Chandigarh,</i> <sup>2</sup> <i>ICAR National Bureau of Plant Genetic Resources, New Delhi,</i> <sup>3</sup> <i>Department of Botany, Panjab University Chandigarh,</i> <sup>4</sup> <i>DBT National Institute of Plant Genome Research, Aruna Asif Ali Marg, New Delhi.</i></p> <p>Chickpea (<i>Cicer arietinum L.</i>) is an important and major pulse crop known for its high protein content and versatile culinary applications. The crop is primarily grown in rainfed environments which makes drought a critical constraint for its production. Therefore, this study investigates 1640 chickpea germplasm based on the physio-morphological traits responsive to drought stress in comparison to normal irrigated conditions. The parameters recorded are days to 50% flowering, days to maturity, number of primary branches/plant, plant height, chlorophyll content, shoot dry biomass/plant, 100 seed weight, number of seeds/plant, grain yield/plant, canopy temperature, canopy temperature depression (CTD), and Normalized Difference Vegetation Index (NDVI). The Canopy temperature depression was recorded twice during the reproductive to seed-filling stage of chickpea germplasm. NDVI was measured thrice at 15-day intervals to see the impact of drought</p>

	<p>stress on the vegetative growth of plants. The experiment was conducted in augmented block design using well-known chickpea genotypes as drought tolerant (ICC4958, BGM 10216, JG11, BG 4005) and drought susceptible (ICC1882, ICC 6263) checks. Statistical analyses such as summary statistics, principal component analysis (PCA), and correlation among variables indicated a wide range of variation in chickpea germplasm for the traits studied. Relative variation was higher for the number of branches/plant, NDVI, shoot dry biomass, 100 seed weight, grain yield/plant, and CTD under both drought and irrigated conditions. However, certain genotypes' relative performance under drought conditions was better and were superior to drought tolerant checks. Such genotypes can serve as potential donors for the chickpea improvement programs.</p>
<p><b>30.</b></p>	<p><b>MAGNETITE LOADED TEA WASTE A GREEN SORBENT FOR DISPERSIVE SOLID PHASE MICROEXTRACTION (M-DSPME) FOR NSAID'S.</b></p> <p><u>Shubham Jattwal</u>, Anshu Sehrawat, Swati Gupta, Shweta Sharma <i>Institute of Forensic Science and Criminology, Panjab University, Chandigarh.</i></p> <p>Waste mitigation is one of the major issues being faced worldwide. Tea being an organic waste is often overlooked and considered as a biodegradable waste it is a high oxygen demanding waste which pollutes water sources by depriving them with oxygen. In this work we demonstrated Magnetite loaded tea waste as a sorbent for quick and cheap and efficient microextraction from various matrices. The synthesis of this sorbent was done using simple co-precipitation method which aligns it with the principles of green analytic chemistry (GAC). Characterization was done using Fourier Transform-Infrared Spectrometry, Field Emission Scanning Electron Microscope and X-ray Diffraction. Analysis was done using UV-Visible Spectroscopy and various factors were optimized using OFAT approach. Under optimized conditions Maximum recovery percentage obtained was found to be 92% in water sample. The adsorption kinetics was also determined and it was found the sorbent follows pseudo second order kinetics with R<sup>2</sup> value of it being 0.971. These promising results allows us to explore the possibilities of such organic wastes to be used judiciously.</p>
<p><b>31.</b></p>	<p><b>A POTENTIAL PROPHYLACTIC APPROACH FOR ATHEROSCLEROSIS BY CHOLESTEROL ASSIMILATING PROBIOTIC BACTERIA: AN EXPERIMENTAL STUDY</b></p> <p><u>Siloni Patial</u>, Geeta Shukla <i>Department of Microbiology, Panjab University, Chandigarh.</i></p> <p>Cardiovascular disease, largely driven by the progression of atherosclerosis, remains a leading global health challenge. However, current statin therapies often have some side effects i.e., myalgia, liver problems, neuropathy, when used for long term, prompting a growing interest in alternative approach like probiotics, which offer potential benefits in modulating risk factors. Therefore, the objective of study was to assess the cholesterol assimilating ability of indigenous lactic acid bacteria in-vitro vis-à-vis in atherosclerotic animal model induced via high-cholesterol diet. Among the screened isolates, Lactobacillus plantarum A5 had the maximum cholesterol assimilating potential in normal De Man, Rogosa, and Sharpe media (54.10%), simulated gastric conditions (23.28%) and intestinal conditions (50.42%). Interestingly, cholesterol assimilation was significantly enhanced in the presence of both 1% and 2% of prebiotic isomaltose. Morespecifically,</p>

	<p>feeding of high-cholesterol-diet (HCD) to Sprague Dawley rats for 12 weeks led to successful development of atherosclerotic model as significant increase in the body weights, body mass index, obesity, altered lipid profile, decreased glucose tolerance, and fasting sugars together with hepatic steatosis, atheromatic artery, and adipocyte hypertrophy was observed. Intriguingly, simultaneous supplementation of <i>L. plantarum</i> A5 to HCD animals for 12 weeks attenuated the gain in body weight, adiposity, serum lipid levels, glucose tolerance, and hepatic function, while both <i>L. plantarum</i> A5 and <i>L. pentosus</i> GSSK2 reduced oxidative stress markers and enhanced antioxidant levels in liver and arterial tissues. Moreover, histological observations also revealed that administration of <i>L. plantarum</i> A5 HCD animals improved the hepatic steatosis, reduced adipocyte.</p>
<p><b>32.</b></p>	<p><b>IN VITRO PLANTLET REGENERATION OF A MEDICINALLY IMPORTANT AND ENDANGERED TERRESTRIAL ORCHID, <i>Liparis odorata</i> (WILLD.) LINDL. THROUGH PSEUDOBULB CULTURE</b></p> <p><u>Sunita</u>, Promila Pathak  <i>Orchid Laboratory, Department of Botany, Panjab University, Chandigarh.</i></p> <p><i>Liparis odorata</i> (Willd.) Lindl., a terrestrial species found, growing in clusters of 3-5 individuals in open grasslands and distributed in different regions of India (Andhra Pradesh, Arunachal Pradesh, Assam, Goa, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Sikkim, Tamil Nadu, Uttarakhand, and West Bengal). It is recognized for its medicinal importance for the treatment of fever, edema, burns, inflammation, cancerous ulcers, gangrene, and hemoptysis. An effective conservation approaches are required to protect these plants in their natural habitat as the species is are exploited for its therapeutic significance. In the present study, pseudobulb segments (5-10mm long) from in vivo grown plants were used to develop an effective regeneration protocols. For assessing regeneration, two nutrient media such as, MS (Murashige and Skoog, 1962) and KC (Knudson C, 1946) were used with and without AC and different plant growth regulators (IAA, IBA, NAA, BAP, KN, TDZ- singly or in combinations at the concentration of 2mg/l-1 each). MS medium augmented with NAA+BAP+AC exhibited the highest regeneration response (75.00±0.00%) and acted synergistically to initiate and complete the regeneration cycle via PLBs and shoot bud formation, resulted in the maximum number of regenerants. Plantlets were acclimatized and subsequently transplanted to greenhouse conditions, resulting in a recorded survival rate of 65%. An efficient protocol was presently developed for the rapid mass propagation of <i>L. odorata</i>, thereby reducing the pressure on its wild populations.</p>
<p><b>33.</b></p>	<p><b>SUSTAINABLE NANOMATERIALS FROM SUGARCANE BAGASSE: A GREEN APPROACH TO DOCUMENT SECURITY AND ANTI-COUNTERFEITING</b></p> <p><u>Swati Gupta</u>, Riya Pandey, Gurpreet Kaur, S.K. Mehta, Shweta Sharma  <i>Institute of Forensic Science &amp; Criminology, Panjab University, Chandigarh.</i></p> <p>As the world moves toward sustainable development, the concept of "Waste to Wealth" presents a novel approach to waste management. Biowaste-based materials, known for their biocompatibility, biodegradability, eco-friendly nature, and cost-effectiveness, have</p>

	<p>gained significant attention for creating flexible and durable products. Among these, nitrogen-doped carbon nanoparticles (N-CNPs) have emerged as a promising material. This study explores a multidisciplinary "green" methodology for the production of N-CNPs using waste sugarcane bagasse as a natural precursor and highlights their potential applications in forensic science. Fluorescent N-CNPs were synthesized via the hydrothermal treatment of sugarcane bagasse extract and ethylene diamine. The synthesized N-CNPs were characterized using FTIR, UV-visible spectroscopy, FESEM-EDS, and AFM techniques. The N-CNPs exhibited strong yellow fluorescence under UV light (<math>\lambda_{\text{exc}} = 365 \text{ nm}</math>), making them particularly useful in forensic applications. Particularly noteworthy is the emphasis on its application in questioned documents crimes like financial fraud, forgery, counterfeiting, etc. Notably, they can be employed as invisible ink to encrypt messages and authenticate documents, effectively distinguishing genuine items from counterfeit ones through UV light illumination. This study offers a novel perspective on transforming waste materials into valuable resources for document security. By integrating emerging advancements in sustainable and green technologies, an effective framework architect for anticounterfeiting materials is proposed. Keywords: Biowaste-based materials, Waste sugarcane bagasse, Forensic science, Detection and encryption, Anti-counterfeiting.</p>
<p><b>34.</b></p>	<p><b>ORTHOPANTOMOGRAM (OPG) IN FORENSIC ANTHROPOLOGY FOR LARGE-SCALE DISASTER VICTIM IDENTIFICATION</b></p> <p><u>Thokchom Supriya Devi</u>, JS Sehrawat  <i>Department of Anthropology, Panjab University, Chandigarh.</i></p> <p>Identification of disaster victim poses significant challenges, particularly in the large-scale incidents. Dental records play a crucial role in forensic anthropology, particularly in large-scale disaster victim identification (DVI) due to their unique advantages. The records typically maintained by dental practitioners, include charts and radiographs that document an individual's dental history. Here, a narrative review has been done from various sources such as PubMed, ScienceDirect, Google search and journals highlighting the importance of orthopantomogram (OPG) in forensic anthropology. The present paper highlights the role of orthopantomogram (OPG) in forensic anthropology to determine age, and gender estimation using traditional methods of large-scale disaster victims. The speed of identification through dental records shows significant benefit than DNA analysis as it is time-consuming. Effective collaborations with local dentists and dental associations facilitates the rapid collection of necessary antemortem data, enhancing the identification process. This paper provides an overview of dental records particularly orthopantomogram (OPG) in forensic anthropology, reinforcing their importance and limitations in the identification of victims in large-scale disasters.</p>
<p><b>Research scholars from colleges and other institutions (JRF, SRF, project fellow and post docs)</b></p>	
<p><b>S.No.</b></p>	<p><b>Abstract</b></p>
<p><b>35.</b></p>	<p><b>IMPLEMENTING ATR-FTIR SPECTROSCOPY AND CHEMOMETRICS FOR THE FORENSIC IDENTIFICATION AND DIFFERENTIATION OF SEXUAL LUBRICANTS AND THEIR TRACES</b></p>

	<p>Chongtham Nimi<sup>1</sup>, Arti Yadav<sup>1</sup>, Parampreet Singh<sup>1</sup>, Sweety Sharma<sup>2</sup>, Rajinder Singh<sup>1</sup>  <sup>1</sup> <i>Department of Forensic Science, Punjabi University, Patiala</i> <sup>2</sup> <i>NFSU Delhi Campus.</i></p> <p>Sexual lubricants are likely to be encountered at crime scenes due to the wide availability and variability of the products. These lubricants found in sexual assault cases may help supplement biological evidence or be the primary evidence where there is a lack of DNA evidence. The discrimination of sexual lubricants will help assess the potential contact between the victim and suspect. In India, locally made sexual lubricants based on Ayurvedic or Unani formulations that target local muscular or nervous tissue weakness are also marketed. These products claim to increase male sexual performance. Therefore, it is necessary to discriminate this from other formulations available in the market. In this study, an analysis of a total of 43 products of condom lubricants, bottled sexual lubricants and personal hygiene products was carried out to evaluate their variability and discrimination potential. The sample set also included Ayurvedic and Unani products manufactured in India in order to assess their inherent chemical diversity. ATR-FTIR spectroscopy was used to analyze the samples, and the spectra were then visually examined and interpreted using chemometrics. Chemometric classification was done using LDA and SVM in a two-stage classification process: identification of the type of product and a brand-level classification. The combination of LDA and SVM helped to discriminate the samples further in an objective manner. A substate study was conducted to evaluate how these products can be linked to their sources.</p>
36.	<p><b>CHARACTERIZING FRESHWATER MACROINVERTEBRATE COMMUNITIES: SPECIES-ENVIRONMENT RELATIONSHIPS AND TRAIT DYNAMICS IN THE WEST-KAMENG BASIN, EASTERN HIMALAYA</b></p> <p><u>Meghavi Purohit</u>, Himangshu Borah, Rakshit Rayal, Vineet Dubey, J. A. Johnson  <i>Wildlife Institute of India, Dehradun.</i></p> <p>Himalayan freshwater hill-stream habitats, support rich aquatic diversity. Among aquatic life, freshwater macroinvertebrates are vital for nutrient processing and maintaining water quality. This study explores macroinvertebrate diversity, community structure, key environmental drivers, and functional traits. Sampling conducted from 2022 to 2024 across a 92 km stretch of river in the West Kameng basin, Arunachal Pradesh, covers an elevation gradient from 400m to 2500m masl. A total of 27 environmental parameters were recorded, and macroinvertebrates were collected at 500m intervals in higher-order streams and 200m in lower-order streams for family-level taxonomic identification. A correlation matrix eliminated highly correlated variables, retaining 24. Redundancy Analysis (RDA) explored the influence of the environment on community distribution, while Hierarchical Modelling of Species Communities (HMSC) modeled trait-environment relationships. The study identified 8 orders and 72 families from 2,200 samples, categorized into 5 functional feeding groups (FFGs), with community turnover observed between 1700m and 2000m masl. RDA explained 54.52% of the variance, with 28.33% attributed to constrained and 23.63% to unconstrained factors (<math>R^2 = 0.5452</math>). Flow and bedrock showed high loading on RDA axis I, while slope and pebbles loaded higher on axis II. HMSC explained 34% of the variance (<math>R^2 = 0.35</math>, mean AUC = 0.94), highlighting family-specific preferences: Ephemerillidae (DO, altitude), Psychodidae (high-silt), and Baetidae as generalists. Among functional feeding groups (FFGs), topographic and substrate gradients contributed more to variation than physicochemical</p>

	<p>gradients in influencing species richness. These findings provide insights into ecological processes influencing macroinvertebrate distribution in the eastern Himalaya.</p>
<p><b>37.</b></p>	<p><b>ANTI-CANCER POTENTIAL OF MEDICINAL PLANTS IN DMBA-INDUCED BREAST CANCER IN MICE</b></p> <p><u>Navya Rana</u>, Sunil Kumar, Rakesh Kumar  <i>Central University of Himachal Pradesh, Kangra.</i></p> <p>Breast cancer is one of the leading cancers among women worldwide. An animal model that can replicate the early markers of the disease's onset and progression is necessary to comprehend and aid in the early detection of breast cancer. This study investigates the therapeutic effects of a synergistic combination of <i>Emblica officinale</i> (EO) and <i>Withania somnifera</i> (WS) on DMBA-induced breast cancer in mice. After confirming tumor development, the mice were treated with the combined synergistic herbal formulation for twelve weeks. The efficacy of this treatment was evaluated through biochemical assays (Glucose, Protein and Cholesterol), tumor markers (CEA and CA 15.3), hormone markers (Estrogen and Progesterone) and histological examinations. The results demonstrated a significant reduction in hyperplastic changes, adipose tissues and normal ducts in the treated mice, suggesting a potential anti-carcinogenic effect of the herbal combination. Glucose level was <math>86.5\text{mg/dl} \pm 1.60</math>, Protein level was <math>5.73 \text{ mg/dl} \pm 0.20</math> and Cholesterol level was <math>154 \pm 4.68</math>. CEA level was <math>0.746\text{ng/ml} \pm 0.302</math> and CA 15.3 level was <math>3.133 \pm 0.351</math>. Estrogen was <math>0.476 \text{ nmol/ml} \pm 0.04</math> and progesterone level was <math>3.33 \text{ ng/ml} \pm 0.750</math> which showed improved levels, indicating a reversal of cancer-associated biochemical changes. The results indicated that the combined administration of EO and WS offers a superior therapeutic benefit over other groups. This study underscores the potential of a synergistic herbal approach in managing breast cancer, demonstrating significant biochemical and histological improvements.</p>
<p><b>38.</b></p>	<p><b>PREVALENCE AND PREDICTORS OF METABOLICALLY HEALTHY OBESITY IN ASIAN CHILDREN AND ADOLESCENTS: A SYSTEMATIC REVIEW AND META-ANALYSIS</b></p> <p><u>Neha Sudhera</u><sup>1</sup>, Harvinder Kaur<sup>1</sup>, Anil Kumar Bhalla<sup>1</sup>, Prakasani Sathapathy<sup>2</sup>  <sup>1</sup><i>Child Growth and Anthropology Unit, Department of Pediatrics, Advanced Pediatrics Centre, PGIMER, Chandigarh,</i> <sup>2</sup><i>Center for Global Health Research, Saveetha Medical College and Hospital, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai.</i></p> <p>Background: We conducted systematic review and meta-analysis to find prevalence of metabolically healthy obese (MHO) and metabolically unhealthy obese (MUO) in normal and obese children and adolescents, as well as factors linked to MHO and MUO. Methods: Original studies were searched using PRISMA guidelines. Random effects models were used to pool MHO prevalence from each study. The factors linked to MHO and MUO</p>

	<p>were identified by pooling the odds ratios (ORs). Results: The study included 28 articles and 84631 individuals from the South Asian region. Combined prevalence of MHO and MUO was 0.29 and 0.27, respectively. The incidence varied by region (least in China, highest in Singapore). Children with high birth weight and prolonged breastfeeding (&gt;12 months) were about 1.60 and 1.61 times more likely to be MHO, respectively and demographic factors increased the likelihood by 1.5-fold. Having no siblings increased the likelihood of child being MUO [odds ratio (OR): 1.63 (95% CI (1.29-1.96), I2:0%]; having an obese parent increases the likelihood of child being MUO [odds ratio (OR): 3.34 (95% CI (1.18-5.49), I2:0%]; and larger waist circumference and BMI increases likelihood of child being MUO by 2.95 times. Conclusion: Meta-analyses show that a sizable proportion of obese children were in transient stages of metabolic health and estimates varied substantially between studies, emphasizing significance of developing standardized criteria for defining metabolic health. The MHO phenotype in Asian children is not associated with obesity measurements; rather, high birth weight, prolonged breastfeeding, Indian ancestry, and female gender are independent predictors of MHO.</p>
<p><b>39.</b></p>	<p><b>AMELIORATIVE POTENTIAL OF N-ACETYL-L-CYSTEINE AGAINST THE CADMIUM INDUCED TOXICITY IN ANTRAL FOLLICLES OF GOAT (<i>Capra hircus</i>)</b></p> <p><u>Prerna Bikal</u>, Jitender Kumar Bhardwaj  <i>Department of Zoology, Kurukshetra University, Kurukshetra, Haryana.</i></p> <p>Cadmium (Cd) is a toxic non-essential heavy metal and environmental pollutant occurring naturally in the environment and from various anthropogenic sources. Exposure to Cd primarily occurs through the ingestion of contaminated food, water, cigarette smoking which then eventually accumulates in brain, kidneys, bones, liver as well as in the reproductive organs, including ovaries. Therefore, the current study was designed to assess the Cd induced reproductive toxicity in ovarian antral follicles cultured in vitro at dose of 1,10 &amp; 100 µM CdCl<sub>2</sub> along with supplementation of an antioxidant, N-Acetyl-L-Cysteine (NAC) for 24 and 48 hours of exposure duration. The results revealed histopathological alterations and various apoptotic attributes such as vacuolization, pyknotic nuclei, marginated chromatin, empty spaces in Cd treated follicles. The EB/AO differential staining has shown increased apoptotic cells with increase in Cd concentration in time and dose dependent manner. Increased levels of oxidative stress were also reported after Cd exposure as shown by higher MDA levels (TBARS assay) and decreased antioxidant enzymatic activity. NAC co-administration with the Cd treatment was found to successfully ameliorate the Cd induced oxidative stress, histological lesions, and apoptosis. The anti-oxidant potential of NAC restored the declined levels of various antioxidant enzymes (CAT, GST and SOD) in Cd treated ovarian tissue. Thus, the study concludes that NAC significantly mitigated the Cd mediated ovarian damage, suggesting its potential role in preventing fertility disorders among females exposed to Cd contaminated environment.</p>
<p><b>40.</b></p>	<p><b>MITIGATING MICROPLASTIC ACCUMULATION IN EDIBLE FRESHWATER FISH: A COMPARATIVE STUDY OF BIOFLOC AND TRADITIONAL POND SYSTEMS.</b></p>



	<p>Rakshit Rayal<sup>1</sup>, Archana Sharma<sup>2</sup>  <sup>1</sup><i>Wildlife Institute of India, Dehradun</i> <sup>2</sup><i>Doon University.</i></p> <p>The rapid accumulation of microplastics in water bodies causes a significant threat to freshwater fauna. This study assesses the effectiveness of producing low or microplastic-free fish through biofloc technology (BFT). A comparative analysis was conducted on two species that were most popular as a food source in Dehradun, Uttarakhand. Samples of <i>Pangasius pangasius</i> and <i>Labeo rohita</i> cultured in traditional open-pond systems and indoor biofloc systems were collected. The microscopic observation revealed that the biofloc-cultured fish exhibited a notably lower accumulation of microplastics. The study specifically targeted fish specimens weighing less than 500 grams, comprising the maximum and average weights observed in the biofloc system over six months. A total of 82 microplastics were detected in pond-cultured <i>Pangasius pangasius</i> and 51 in <i>Labeo rohita</i>, while biofloc systems recorded only 14 and 15, indicating ~60% less contamination. The Length-Weight Relationship (LWR) showed <i>L. rohita</i> with R<sup>2</sup>=0.84 (pond) and R<sup>2</sup>=0.78(biofloc). For <i>P. pangasius</i>, R<sup>2</sup>=0.65 (pond) and R<sup>2</sup> = 0.42(biofloc). The ANOVA between the LWRs of all four groups of fishes showed a significant difference between groups LWRs (p&lt;0.05). The result suggested that the microplastics were primarily concentrated in the esophagus, gut, and intestines of the fish, with accumulation levels correlating with the weight. These results underscore the potential of Biofloc Technology as a sustainable aquaculture practice, effectively mitigating microplastic contamination in comparison to conventional pond systems.</p>
41.	<p><b>ASSESSMENT OF ANTIFUNGAL ACTIVITY OF <i>Lactobacillus plantarum</i> FOR BIOPRESERVATION OF ELEUSINE CORACANA FLOUR</b></p> <p>Sreelakshmi M V<sup>1</sup>, K Vijila<sup>2</sup>  <sup>1</sup><i>Department of Microbiology, College of Basic Science and Humanities, Punjab Agricultural University, Ludhiana, Punjab, India,</i> <sup>2</sup><i>Department of Microbiology, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India.</i></p> <p>Finger millet also known as Ragi, is a gluten free cereal, which hold wide significance in Asian diet. Present research focus on the development of preservation process for finger millet using Lactic acid bacteria. Four LAB isolates were screened for antifungal activity. The LAB isolate LAFP3 with high antifungal activity against <i>A. flavus</i>, was identified as <i>Lactobacillus plantarum</i>. The finger millet grain harbored and initial fungal load of 5.04±0.04 log cfu g<sup>-1</sup> and a very low number of LAB. The native isolates of finger millet exhibited compatibility to <i>L. plantarum</i> afp3. Cell surface characteristic study revealed higher adhesion percentage of 55% to xylene in antifungal <i>L. plantarum</i> afp3 indicated its hydrophobicity. 50% of the cells of <i>L. plantarum</i> afp3 aggregated at 1h. Approximately 50% of LABR7, LABR9, LABR13, LABR16 and <i>L. plantarum</i> afp3 in mixed culture co aggregated at 4h. Milled flour were analysed for its particle size and all cultures were checked for its adhesion ability and growth. In vitro studies with finger millet flour on optimization of inoculum level of <i>L. plantarum</i> afp3 against <i>A. flavus</i> was done. Antifungal <i>L. plantarum</i> afp3 co-fermented finger millet flour was formulated into dry flour and then packaged and used for in situ fungal inhibitory and aflatoxin reduction studies. The growth of <i>A. flavus</i> was observed only in <i>L. plantarum</i> afp3 untreated flour after 30 days of storage. Biopreservation with antifungal <i>L. plantarum</i> afp3 reduced the aflatoxin B1 from 5.49 to 2.83 parts per billion in fermented finger millet flour.</p>

UG/PG Students of Panjab University Campus and Regional Centres	
S.No.	Abstract
42.	<p><b>FORENSIC ARCHAEOLOGY: UNCOVERING HISTORY AND SOLVING MYSTERIES WITH MODERN SCIENCE</b></p> <p><u>Gauri Sharma</u> <i>Department of Anthropology, Panjab University, Chandigarh.</i></p> <p>Forensic archaeology is a specialized discipline that merges archaeological techniques with forensic science to recover and analyze human remains in the legal and historical contexts. It plays a crucial role in solving modern criminal cases and uncovering mysteries from the past. Through meticulous fieldwork, forensic archaeologists reconstruct events, identify victims, and provide evidence in both modern-day investigations and historical inquiries. The objective of the present study is to provide an overview of forensic archaeology, focusing on the methodologies used, such as excavation and advanced laboratory techniques like DNA and isotopic analysis. In addition to this, the present study aims to bring a case study of <i>Lucy Alsop Chauncey</i> into consideration, illustrating how forensic archaeology can help to bridge gaps between past and present, offering new insights into historical narratives, and providing a scientific means of investigating even the most obscure of mysteries. Additionally, the ethical challenges of working with sensitive human remains will be addressed, emphasizing the balance required between scientific inquiry and cultural respect.</p>
43.	<p><b>UNMASKING DEEP FAKE VOICES: USING STATISTICAL AND AI HYBRID MODEL FOR FORENSIC APPLICATIONS.</b></p> <p><u>Harshita Gautam</u>, Gulshan Gauri, Vishal Sharma <i>Institute of Forensic Science and Criminology, Panjab University, Chandigarh.</i></p> <p>Advancements in artificial intelligence have led to a surge in AI-related abuse, particularly through the proliferation of deep fake audio, a significant driver of misinformation and criminal activities. This study examines real and deep fake voice samples obtained from 50 individuals, comprising equal numbers of males (25) and females (25). The recordings were made at a 16-bit resolution, single channel, with a sampling rate of 44100 Hz. Using forensic parameters, advanced statistical and machine learning methods, we conducted a thorough analysis. Spectrographic analysis, including harmonics and linear predictive coding (LPC), identified substantial variation in the first four formant frequencies (F1, F2, F3, and F4) across all vowels for both genders. Descriptive analysis revealed higher mean values for deep fake speech compared to real speech in both formant frequency and formant listing. ANOVA significance tests demonstrated accurate differentiation of formants, with accuracy rates ranging from 72% to 88% for male vowels and 72% to 96% for female vowels. The Extra Tree Classifier emerged as the top-performing machine learning method for gender differentiation, consistently achieving high accuracy rates of 82% to 90% for males and 81% to 86% for females, based on formants (F1-F4) and vowels (/a/, /e/, /i/, /o/, and /u/). Moreover, Area Under the Curve (AUC) values ranged from 92% to 98% for males and from 86% to 94% for females, underscoring the robustness of the Extra Tree Classifier in discerning deepfake from real speech. Keywords: Deep fake</p>

	voice, LPC, Formant listing, MFCC, Chromogram, Statistical, machine learning algorithm.
44.	<p><b>ADAPTIVE STRATEGIES IN FERNS AND THEIR ROLE IN SUCCESSION</b></p> <p><u>Khushwinder Singh</u>  <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>A substantial number of ferns and lycophytes from different systematic groups colonize xeric habitats that are otherwise found in humid environments. This is because of the inability of leaves to adapt to fluctuating environmental conditions, poor control of water loss, a less efficient water transport system and lower photosynthetic rates than seed plants. Desiccation tolerance is much more common in ferns than in angiosperms, wherein most xerophytic ferns rely on a high degree of desiccation tolerance and perhaps on transpiration control and water uptake through fronds, and less on water storage. Other adaptations found in xerophytic ferns include photoprotection with pigments, antioxidants, frond curling and drought avoidance by shedding leaves in the dry season. Further, crassulacean acid metabolism is a common adaptation in xerophytic angiosperms, but is very rare in ferns. Succulence is also not strongly developed in xerophytic ferns. Rapid establishment and dense growth can make ferns competitive with other vascular plants through light reduction and nutrient immobilization. Fern thickets can delay successional transitions but ferns also provide regeneration sites for other species and stabilize slopes. Ferns are important components for both progressive buildup of plant biomass and soil fertility and the retrogressive phase of succession characterized by a loss of biomass and fertility. Thus, study of adaptive strategies in ferns is a sought-after area for researchers.</p>
45.	<p><b>EVIDENCE OF OCCUPATIONAL EXPOSURE: WORKPLACE DISCRIMINATION BASED ON ATR-FTIR ANALYSIS OF FINGERNAIL CLIPPINGS FOR FORENSIC APPLICATIONS</b></p> <p><u>Sukhwinder Singh</u>, Akanksha Sharma, Vishal Sharma  <i>Institute of Forensic Science and Criminology, Panjab University, Chandigarh.</i></p> <p>For the first time, an attempt was made to differentiate occupation of male workers from their fingernail clippings (80 samples aged between 20 to 60 years). ATR-FTIR spectroscopy coupled with chemometric models (PCA &amp; PLS-DA) was utilized for characterization and discrimination purpose. ATR-FTIR spectral analysis depicted the presence of aldehyde, amine salt, amide I, II and III, Metal-O stretching and aliphatic &amp; aromatic hydrocarbons in fingernail clippings, collected from different male occupants. Specifically, PCA and PLS-DA were used for exploratory and predictive data analysis. It was noticed that PCA just provided an indication of the number of distinct classes instead of classifying the data. On the other hand, PLS-DA has been found to be excellent for predicting the workplace based on classifying male fingernail clippings from different occupational exposure. Using 10 unknown samples, the model was further validated, and each unknown sample's prediction was found to be correct, yielding a 100% accuracy rate. When fingernail clippings are discovered at a crime scene as corroborative evidence, the findings of this study may be useful to a forensic expert. Furthermore, it aids in focusing and narrowing down the criminal inquiry depending on occupation. For this purpose, a</p>

	database based on forensic examination of fingernail clippings could be created, for workplace discrimination based on occupational exposure.
<b>46.</b>	<p><b>TRIKATU FOR PCOS MANAGEMENT AS HOLISTIC HEALTH APPROACH</b></p> <p><u>Udit</u> <i>Department of Zoology, Panjab University Chandigarh.</i></p> <p>Polycystic ovary syndrome (PCOS) is a prevalent and complex endocrine disorder affecting 5-25% of reproductive-age women worldwide. Its multifaceted aetiology and inadequate management strategies present significant challenges in contemporary healthcare. PCOS is associated with a spectrum of risk factors, including hormonal imbalances, lifestyle modifications, dietary changes, genetic predisposition, gut microbiome disruptions, and obesity. These factors can precipitate metabolic syndrome, characterized by insulin resistance, oxidative stress, and menstrual irregularities, leading to a constellation of symptoms such as ovarian cysts, weight gain, acne, hirsutism, and fertility challenges with an increased risk of endometrial cancer and psychological issues like depression and anxiety. Alongside, the rising global prevalence of metabolic syndrome has imposed substantial health and socioeconomic burdens with a predisposition for PCOS development in adolescents' females. Conventional treatments for PCOS and related metabolic conditions often entail high costs and adverse effects. Further, spurring interest in complementary and alternative medicine (CAM), the polyherbal formulation Trikatu, offers a promising approach comprising majorly of black pepper, long pepper, and ginger, emerges as a promising approach in managing PCOS and associated metabolic disorders. This natural remedy offers potential benefits in supporting weight management, alleviating symptoms like irregular menstrual cycles and hirsutism, and promoting hormonal balance through its anti-inflammatory properties. Additionally, Trikatu's capacity to enhance digestion and nutrient absorption contributes to improved metabolic health. Incorporating Trikatu into a holistic management strategy for PCOS presents a natural and potentially effective approach to address both reproductive and metabolic aspects of the syndrome, warranting further research and clinical evaluation.</p>
<b>UG/PG students from colleges and other institutions</b>	
<b>S.No.</b>	<b>Abstract</b>
<b>47.</b>	<p><b>SYNTHESIS OF SILK FIBROIN MATRICES AND THEIR USE FOR INCREASE IN FERTILIZER ADSORPTION</b></p> <p><u>Navdeep Kaur</u><sup>1</sup>, Nitish Dhingra<sup>2</sup>, Mehra S Sidhu<sup>2</sup></p> <p><sup>1</sup> <i>School of Agricultural Biotechnology, Punjab Agricultural University, Ludhiana,</i> <sup>2</sup> <i>Electron Microscopy and Nanoscience Laboratory, Punjab Agricultural University, Ludhiana.</i></p> <p>Silk fibroin from bombyx mori is extensively utilized as a natural biopolymer, particularly in the textile industry, due to its advantageous properties such as moisture absorption and release, antibacterial and antitumor activities and UV/oxidation resistance. These natural polymers exhibit enhanced biocompatibility, biodegradability, and ability to mimic extracellular matrices, making them suitable for applications in tissue engineering, wound</p>

healing, and drug delivery. The silk fibroin matrices were synthesized and purified using standard LiBr method with slight modification. To disintegrate the silk fibroin to nano-form, the solution was subjected to probe sonication for 30 mins with a pulse-width of 1s at 900 W followed by subsequent disintegration using blue laser. The UV-VIS characterization revealed no sericin peak in the purified nanoform of silk fibroin solution. FTIR analysis peaks at 1058, 1224, 1505, 1615, 2326, 2918, and 3276  $\text{cm}^{-1}$ , demonstrated C-O stretching, amide III (C-O stretching), amide II bands (C=C stretching), amide I bands (C=C or C=O stretching),  $\text{C}\equiv\text{C}$  or  $\text{C}\equiv\text{N}$  stretching, C-H stretching, and O-H stretching groups, respectively. Amide bands provide elasticity to silk fibroin films. While coating silk matrices on glass substrate, the contact angle decreased beyond 40°, making it super-hydrophilic compared to glass and aluminum surfaces. TGA analysis revealed a linear relationship between evaporation rate and silk protein concentration in water. Further, a combination of silk matrices and nano fertilizers such as nano-Zinc may increase their uptake in plants. Nano biopolymer matrices will be the next generation conjugants for higher fertilizer uptake besides preventing its environmental leaching.

ABSTRACTS OF  
POSTER  
PRESENTATIONS

<b>Life Sciences- Poster Presentation</b>			
<b>Faculty /Scientists of Panjab University Campus and Regional Centres</b>			
<b>S.No.</b>	<b>Name of Participants</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
1.	Dr. Bahadur Singh	Department of Anthropology, Panjab University, Chandigarh.	Deep Fake: An elephant in the room.
<b>Faculty/Scientists from colleges and other institutions</b>			
<b>S.No.</b>	<b>Name of Participants</b>	<b>Affiliating institution</b>	<b>Title of Abstract</b>
2.	Dr. Abhinashi Singh Sodhi	Department of Biotechnology Goswami Ganesh Dutta Sanatan Dharma College Sector 32 Chandigarh.	Production, characterization and potential application of pigment from <i>Talaromyces verruculosus</i> AB21 using agro-industrial waste under solid state fermentation.
3.	Dr. Amita Suneja Dang	Centre for Medical Biotechnology, Maharshi Dayanand University, Rohtak.	In-silico analysis to unravel gluten-digesting properties of <i>Bifidobacterium breve</i> .
4.	Dr. Rajni Bala	Department of Zoology, Sri Guru Gobind Singh College, Sector 26, Chandigarh.	Morphological and molecular characterization of <i>Henneguya bicaudi n. Sp.</i> ( <i>Myxosporea</i> : Myxobolidae) infecting gills of <i>Cirrhinus mrigala</i> (Ham.) in Harike wetland, Punjab (India).
<b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project fellows, post docs)</b>			
<b>S. No.</b>	<b>Name of Participants</b>	<b>Affiliating Institution</b>	<b>Title of abstract</b>
5.	Ms. Aditi	Department of Zoology, Panjab University, Chandigarh.	Assessing the Prevalence of Microplastics in the GI tract of <i>Cyprinus carpio</i> and <i>Labeo rohita</i> from Ropar (Punjab) and Karnal (Haryana) fish farms.

6.	Ms. Akansha Rana	Department of Anthropology, Panjab University, Chandigarh.	Preliminary investigation of fingerprint resemblance amongst siblings and non-siblings – A study of North-Western Indian population.
7.	Ms. Ankita Guleria	Department of Anthropology, Panjab University, Chandigarh.	Anthropometric analysis of facial and nasal indices of a North Indian population: Insights into forensic and anthropological implications.
8.	Mrs. Anshul Pannu	Department of Botany, Panjab University, Chandigarh.	Phytochemical characterization and antifungal activity of <i>Plagiochasma appendiculatum lehm. Et lindenb.</i> against <i>Fusarium oxysporum</i> and <i>Alternaria alternata</i> .
9.	Ms. Anupriya Bhardwaj	Energy Research Centre, Panjab University, Chandigarh.	Targeting nanostructures to refine precision agriculture and elevate sustainability.
10.	Mrs. Arshpreet Kaur	Department of Botany, Panjab University, Chandigarh.	Understanding the role of Cinnamate 4-hydroxylase (C4H) in the phenylpropanoid pathway in orchids: An in-silico approach.
11.	Ms. Avantika	Department of Botany, Panjab University, Chandigarh.	Microplastics: An emerging threat to agroecosystems and food chain.
12.	Ms. Ayushi Srivastava	Institute of Forensic Science and Criminology, Panjab University, Chandigarh.	Strands of evidence: Unveiling the forensic power of hair.
13.	Mr. Chhering Dorje	Department of Botany, Panjab University, Chandigarh.	Phytochemical analysis and bioactivity of two medicinally rich spp. of Gentianaceae family collected from Spiti valley of Northwest Himalayas.
14.	Mrs. Deepika	Department of Botany, Panjab University, Chandigarh.	Overexpression of talysm1-a gene confers tolerance to salt and drought stress in transgenic <i>Arabidopsis</i> .



15.	Ms. Diksha Jindal	Department of Zoology, Panjab University, Chandigarh.	Role of Cestode parasite as bioindicator in farm animals.
16.	Mr. Gaurav Spehia	Department of Zoology, Panjab University, Chandigarh.	Protective effect of sodium propionate on keratinocyte apoptosis and oxidative stress.
17.	Ms. Isha Saini	Parasitology Laboratory, Department of Zoology, Panjab University, Chandigarh.	Quercetin adjuvanted vaccine triggered central and effector memory T cells mediated long-term immunity against <i>Leishmania donovani</i> in BALB/c mice.
18.	Ms. Isha	Department of Botany, Panjab University, Chandigarh.	<i>Justicia adhatoda</i> : A traditional medicinal herb with promising therapeutic applications.
19.	Ms. Kusum Singh Sahariya	Department of Botany, Panjab University, Chandigarh.	Heavy metal tolerance and carbohydrate metabolism in chickpea ( <i>Cicer arietinum</i> L.).
20.	Ms. Ishu	Department of Botany, Panjab University, Chandigarh.	Complementation with Tan12-A Reinstates Growth and Abiotic Stress Response in Atncl Mutant of <i>Arabidopsis</i>
21.	Ms. Meena Kumari	Department of Botany, Panjab University, Chandigarh.	24-epibrassinolide: Physiological and biochemical attributes of Cd-stressed chickpea ( <i>Cicer arietinum</i> L.).
22.	Ms. Monika Sen	Department of Zoology, Panjab University, Chandigarh.	Investigating the impact of heavy metal contamination on parasite infestation in ruminants.
23.	Ms. Neelam	Department of Botany, Panjab University, Chandigarh	Comprehensive evaluation of the anti-diabetic plant utilized in Uttarakhand.
24.	Ms. Neha Chadha	Department of Zoology DAV College, Chandigarh.	In-silico and in-vitro analysis of novel imidazopyrimidine-based heterocycle against visceral leishmaniasis.
25.	Ms. Neha Negi	Department of Zoology, Panjab University, Chandigarh.	PCOS induction and assessment in Wistar rats to estimate as a model organism.

26.	Ms. Nidhi	Department of Botany, Panjab University, Chandigarh.	N-Hexane extract of leaves of <i>Zanthoxylum armatum</i> DC: Insecticidal activity, potential chemical compounds.
27.	Ms. Pooja Beniwal	Parasitology Laboratory, Department of Zoology, Panjab University, Chandigarh.	Antiparasitic effect of Dasatinib against <i>Leishmania donovani</i> : In vitro and in silico investigations.
28.	Ms. Pooja Rani	Department of Botany, Panjab University, Chandigarh.	Role of allelopathy in plant invasion and its possible utilization for management of invasive plants.
29.	Dr. Poonam Keshav	Parasitology Laboratory, Department of Zoology, Panjab University, Chandigarh.	Trans-Himalayan <i>Cicer microphyllum</i> kills <i>Leishmani</i> parasite in vitro.
30.	Ms. Prabhsangam Kaur Dhillon	Department of Biochemistry, Panjab University, Chandigarh.	Mycocin from <i>Wickerhamomyces</i> <i>anomalous</i> : A sustainable antimicrobial agent.
31.	Ms. Prerna	Department of Botany, Panjab University, Chandigarh.	An integrated ecological study of degrading riparian ecosystems of lower Siwaliks in a changing environment.
32.	Ms. Priyanka Bhardwaj	Department of Zoology, Panjab University, Chandigarh.	Valproic acid induced rodent model of autism: Bridging the gap to therapeutic approach.
33.	Mr. Rakesh Meena	Department of Anthropology, Panjab University, Chandigarh.	Morphometric signature analysis for sex determination using support vector machine.
34.	Ms. Reecha	Department of Zoology, Panjab University, Chandigarh.	Assessment of ecological health of urban streams: A study of major streams in Chandigarh.
35.	Ms. Mohini Thakur		
36.	Ms. Ritesh Sheokhand	Department of Anthropology, Panjab University, Chandigarh.	Echoes of the past: Assessing the bathing waters of Ghaggar's ephemeral flow.

37.	Mrs. Sarbjeet Kaur	Department of Botany, Panjab University, Chandigarh.	How plants sense cold and heat stress?
38.	Ms. Shalini Ojha	Department of Botany, Panjab University, Chandigarh.	Utilization-based management of invasive plants: An upcoming approach.
39.	Er. Sharanjeet Kaur	Dr. S. S. Bhatnagar University Institute of Chemical Engineering and Technology, Panjab University, Chandigarh.	Ultrasonic assisted extraction of soluble fibers from citrus by-products.
40.	Ms. Sheenu Sharma	Department of Botany, Panjab University, Chandigarh.	Urban trees' potential for regulatory services in the urban environment: An exploration of carbon sequestration.
41.	Ms. Shefali	Department of Botany, Panjab University, Chandigarh.	Effect of manganese and lead on primary and secondary metabolites of <i>Mnium cuspidatum</i> hedw.
42.	Ms. Shilpa Sharma	Orchid Laboratory, Department of Botany, Panjab University, Chandigarh.	Unlocking the therapeutic potential of <i>Aerides multiflora</i> roxb.: a GC-MS analysis of bioactive compounds.
43.	Ms. Shiwani Latwal	Department of Botany, Panjab University, Chandigarh.	Chemical characterization and forecasting of potential anti-inflammatory targets of moss <i>Hyophila involuta</i> (hook.) Jaeg. using network pharmacology and molecular docking approach.
44.	Ms. Soniya Thakur	Department of Botany, Panjab University, Chandigarh.	Therapeutic properties of bamboo
45.	Mr. Subodh Negi	Department of Botany, Panjab University Chandigarh.	Diversity of orchids in Kullu valley of North- Western Himalayas.

46.	Ms. Surbhi Kumari	Department of Biochemistry, Panjab University, Chandigarh.	Augmentation of mesoporous silica and au-cu bimetallic nanoparticles for electrochemical aptasensing of ampicillin in milk samples.
47.	Ms. Swati	Department of Botany, Panjab University, Chandigarh.	A peek into the alkaloid biosynthetic pathway in orchids: A study of 3-hydroxy-3-methylglutaryl coenzyme a reductases (HMGRS) gene family.
48.	Ms. Swati Sharma	Department of Zoology, Panjab University, Chandigarh.	Sex bias in susceptibility to tuberculosis.
49.	Mr. Umesh Thakur	Department of Botany, Panjab University, Chandigarh.	Impact of lead and cadmium on chlorophyll and carotenoid content of <i>Taxiphyllum taxirameum</i> .
50.	Mr. Yashraaj Sharma	Department of Biotechnology, Panjab University, Chandigarh.	Exploring the potential role of a tatlp gene of bread wheat.
51.	Ms. Neha Thakur	Department of Botany, Panjab University, Chandigarh.	Insights to histone lysine methyltransferases (HKMTS) in <i>Vanilla planifolia</i> : A genome-wide study.

**Research scholars from colleges and other institution (JRF, SRF Post docs, Project fellows)**

S.No.	Name of Participants	Affiliating Institution	Title of Abstract
52.	Ms. Anshu Siwach	Kurukshetra University, Haryana.	Ameliorating effects of quercetin against nicotine-induced genotoxicity within granulosa cells of antral follicles.
53.	Ms. Arshiya Sood	Sardar Patel University Mandi, Himachal Pradesh.	Harnessing gut microbiota and indigenous practices for health and wellness: A pathway to viksit bharaat.
54.	Ms. Iva Patyal	Sri Guru Gobind Singh College, Sector 26, Chandigarh.	Comparison of season specific solitary and multiple nest founding strategies of the primitively eusocial Paper wasp, <i>Polistes wattii</i> .

55.	Ms. Samridhi Pushkarna	Centre for Medical Biotechnology, Maharshi Dayanand University, Rohtak.	Computational analysis to uncover the potential of <i>Lactobacillus rhamnosus</i> as gluten-digesting bacteria.
56	Ms. Shruti Kharod	Maharshi Dayanand University, Rohtak, Haryana.	Role of probiotics in regulating cytotoxicity: An evolving concept.
57.	Mr. Vineet Singh	Central University of Himachal Pradesh, Kangra.	A systematic review on human-wildlife conflict research trends, key species, and global collaborations.
58.	Ms. Yogita Thakur	Central University of Himachal Pradesh, Kangra.	Microplastic distribution in water and soil samples from the UHL river, district Kangra, Himachal Pradesh.

**UG/PG Students of Panjab university and regional centres**

<b>S. No.</b>	<b>Name of Participants</b>	<b>Affiliating Institutions</b>	<b>Title of Abstracts</b>
59.	Ms. Aditi Bhatnagar	Department of Anthropology, Panjab University, Chandigarh.	Sustainable forensic practices using indigenous blow flies in India.
60.	Er. Akashdeep Sharma	Dr. SSB UICET, Panjab University, Chandigarh.	Novel packaging from arrowroot starch decorated with green synthesized nanosilver derived from <i>Carica papaya</i> peel extract.
61.	Ms. Anjali	Department of Anthropology, Panjab University, Chandigarh.	Criminal profiling: Understanding the criminal behaviour in forensic psychology.
62.	Mr. Anoop Raj Tiwari	Department of Zoology, Panjab University, Chandigarh.	<i>Leishmania</i> on the move: Climate-induced spread of vectors in non-endemic regions.
63.	Mr. Ashwin Goswami	Department of Botany, Panjab University, Chandigarh.	Indigenous biofertilizers.

64.	Mr. Ayush Thakur	Department of Botany, Panjab University, Chandigarh.	Orchid innovations: Bridging biotechnology and commerce.
65.	Ms. Babanpreet Kaur	Centre for Systems Biology and Bioinformatics, Panjab University, Chandigarh.	Metagenomic analysis of microbial communities from diverse soil ecosystems: Unraveling functional and taxonomic diversity.
66.	Ms. Bhawna	Department of Zoology, Panjab University, Chandigarh.	Nutraceutical approaches for PCOS.
67.	Mr. Bhupender Sharma	Department of Zoology, Panjab university, Chandigarh.	Empowering local voices: Grassroots solutions for sustainable environmental conservation.
68.	Ms. Chehak Goyal	Department of Zoology, Panjab university, Chandigarh.	Neuronal art through the ink of cajal.
69.	Ms. Garima Parmar	Department of Anthropology, Panjab University, Chandigarh.	From cure to customization: the ethical challenges of enhancing designer babies and sustaining humanity.
70.	Ms. Gehna Sharma	Department of Anthropology, Panjab University, Chandigarh.	An investigation of sustainable livelihood based on indigenous weaving traditions among tribal women in Assam and Manipur.
71.	Ms. Harnoor Kaur	Department of Anthropology, Panjab University, Chandigarh.	Antibiotic resistance: A global health crisis in making.
72.	Ms. Harshita Jain	Department of Anthropology, Panjab University Chandigarh.	Exploring indigenous water management techniques in India for modern water crisis.
73.	Ms. Jeenat	Department of Zoology, Panjab University, Chandigarh.	Challenges of vector control: insecticide resistance in <i>Phlebotomus</i> Sandflies in the Indian subcontinent.

74.	Ms. Kirti Sharma	Department of Biophysics, Panjab University, Chandigarh.	Titanium carbide (Ti <sub>3</sub> C <sub>2</sub> ) quantum dots ameliorate colonic inflammation by redox modulation in experimental colitis.
75.	Ms. Komal Chopra	Department of Zoology, Panjab University, Chandigarh.	Acoustically communicating crickets of Panjab University, Chandigarh.
76.	Ms. Kriti Panchal	Centre for Systems Biology UIEAST, Panjab University, Chandigarh.	Unravelling Alzheimer's disease pathology: A multi-omics and network-based approach for precision biomarker identification.
77.	Ms. Kritika Chandel	Department of Zoology, Panjab University, Chandigarh.	Cells to cure: Personalised iPSCs for diabetes.
78.	Ms. Rooppreet Kaur		
79.	Ms. Stanzin Nordon		
80.	Mr. Tenzin Tsognees		
81.	Ms. Manvi	Department of Zoology, Panjab University, Chandigarh.	Foreign fins: The underwater battle between exotic and native fish in Gobindsagar reservoir (India).
82.	Ms. Muskan Attwal	Department of Botany, Panjab University, Chandigarh.	Designing the future of climate resilient crops.
83.	Mr. Muzamil Qayoom Lone	University Institute of Pharmaceutical Sciences Panjab University, Chandigarh.	Neuropharmacological investigations on Nf- $\kappa$ b pathway in experimental paradigm of Huntington's disease.

84.	Ms. Nitika	Department of Zoology, Panjab University, Chandigarh.	Advancing ozone therapy in aquaculture: Challenges and opportunities.
85.	Ms. Nitika Chaudhary	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Cryonics; will the dead return?
86.	Ms. Pallak Bahl	Department of Biotechnology, Panjab University, Chandigarh.	Therapeutic potential of viral vectors glioblastoma multiforme.
87.	Ms. Payal Goyal	Department of Zoology, Panjab University, Chandigarh.	Nourish to flourish: Personalizing nutrition for optimal mental health.
88.	Ms. Savneet Kaur		
89.	Ms. Shreeji Aggarwal	Department of Anthropology, Panjab University, Chandigarh.	Human remains and algorithms: The role of AI in forensic anthropology.
90.	Ms. Shreya	Department of Zoology, Panjab University, Chandigarh.	Parasites as bioindicators of environmental change and ecosystem health.
91.	Ms. Shweta Kumari	University Institute of engineering and technology, Panjab University, Chandigarh.	Harnessing superparamagnetic iron oxide nanoparticles (spions) for enhanced bioremediation.
92.	Ms. Sweta	Department of Zoology, Panjab University, Chandigarh.	Innovative vaccination strategies: Paving the way to eradicate leishmaniasis.
93.	Dr. Navjyot Kaur Dyal	Centre for Public Health, Panjab University, Chandigarh.	Integrating indigenous agricultural practices for sustainable nutrition and food security in India: Advancing towards zero hunger.



<b>UG/PG students from colleges and other institutions</b>			
<b>S.No.</b>	<b>Name of Participants</b>	<b>Affiliating Institutions</b>	<b>Title of abstracts</b>
94.	Mr. Ashish Kumar	Centre of Nanoscience and Nanotechnology.	Nanotechnology in Alzheimer's disease: Advancements in diagnosis and targeted therapy through biocompatible nanoparticles.
95.	Ms. Deepali	Department of Zoology, Sri Guru Gobind Singh College, Chandigarh.	Life cycle and behavioral study of <i>Tagiades litigosa</i> at the botanical garden of Sri Guru Gobind Singh College, Chandigarh.
96.	Ms. Dimple Mandla	Department of Zoology, Punjab Agricultural University, Ludhiana.	Enhancing quineestrol bioavailability for rodent pest management: A nanotechnology-based approach.
97.	Ms. Shalini Thakur	G.H.G Khalsa College of Pharmacy Gurusar Sadhar Ludhiana, Punjab.	Evaluation of anxiolytic and locomotor activity of ethanolic extract of <i>Prunus persica</i> leaves in Wistar rats.
98.	Ms. Swetha Muduku	Department of Microbiology, College of Basic Sciences and Humanities.	Isolation and characterization of plant growth promoting endophytic bacteria from direct seeded rice and bioenzymes.

<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>	
<b>S. No.</b>	<b>Abstract</b>
1.	<p><b>DEEP FAKE: AN ELEPHANT IN THE ROOM.</b></p> <p><u>Bahadur Singh<sup>1</sup></u>, Kawaljit Kaur, Kewal Krishan  <i>Department of Anthropology, Panjab University, Chandigarh.</i></p> <p>The central idea of this paper is not to discuss how deep fake images or videos are generated using artificial intelligence technology but to discuss the legal and social consequences. Artificial technology has left laboratory space and now takes everyone's personal space. There are n-number of online software that provide their services to generate videos and images sometimes just from a text prompt. With time these kinds of software have reached a stage where a common person can't identify between real and fake. This technology has many facets like advertisement and content creation, which are used by social media content creators and advertising agencies to create business leads. However, the same technologies are used to create fake news as well as fake intimate videos and images of people. Minority ethnic groups and children are more vulnerable groups in society and are often targeted in cyberspace. It has been reported that cybercriminals have used deep fake videos and images to extort money from people. The news of deep fake images and videos of celebrities is becoming common day by day. The young generation needs to be more aware of their social media presence. The government should make strict laws against making and distributing deep fake images and videos. Sensitization workshops and awareness programs should be curated and delivered to people so that they can protect themselves and learn the course of action in case their deep fake image or video is posted online.</p>
<b>Faculty/Scientists from Colleges and Other Institutions</b>	
<b>S. No.</b>	<b>Abstract</b>
2.	<p><b>PRODUCTION, CHARACTERIZATION AND POTENTIAL APPLICATION OF PIGMENT FROM <i>Talaromyces verruculosus</i> AB21 USING AGRO-INDUSTRIAL WASTE UNDER SOLID STATE FERMENTATION</b></p> <p><u>Abhinashi Singh Sodhi</u>, Sonu Bhatia, Navneet Batra  <i>Department of Biotechnology Goswami Ganesh Dutta Sanatan Dharma College, Sector 32, Chandigarh.</i></p> <p>Agro-industrial waste such as pomace, pulp, seeds, bagasse provides a nutrient rich environment for microorganisms with novel characteristics to thrive. Microorganisms use these residues as substrate for their growth and metabolism, producing a range of industrially important products including biopigments and enzymes with applications in food, textile and pharmaceutical industry. The present study investigated the potential of agro-industrial waste as substrate for the synthesis of biopigment using <i>Talaromyces</i></p>

	<p><i>verruculosus AB21</i> under solid state fermentation. Four different types of agro-industrial waste were employed as growth substrates namely, apple pomace, lemon waste, orange pulp and watermelon rinds. Significant production of red (421.6 AU) and yellow (460.4 AU) biopigment was reported using orange waste. In contrast, lemon waste, apple pomace, watermelon rinds yielded comparatively less amount of biopigment. Red and yellow biopigment were extracted using 90% ethanol and subjected to structural characterization using Fourier transform infrared spectroscopy (FTIR) and Nuclear Magnetic Resonance (NMR). Additionally, biopigment also demonstrated fabric dyeing ability with maximum colour fastness shown by silk fabric followed by wool, cotton and nylon. This study highlights the potential of valorization of agro-industrial waste as a sustainable and cost-effective approach towards environmental waste management.</p>
3.	<p><b>IN-SILICO ANALYSIS TO UNRAVEL GLUTEN-DIGESTING PROPERTIES OF <i>Bifidobacterium breve</i></b></p> <p>Samridhi Pushkarna<sup>1</sup>, Pooja Suneja<sup>2</sup>, <u><a href="#">Amita Suneja Dang</a></u><sup>1</sup>  <sup>1</sup> Centre for Medical Biotechnology, Maharshi Dayanand University, Rohtak,  <sup>2</sup> Department of Microbiology, Maharshi Dayanand University, Rohtak.</p> <p>Dietary gluten is the primary environmental trigger of celiac disease (CeD), a common food intolerance affecting the population worldwide. The inability of gastrointestinal enzymes to completely digest gluten results in the generation of immunogenic peptides that induce a chronic inflammatory response in genetically susceptible individuals leaving the patients no choice but to completely avoid gluten. However, if these toxic gluten peptides are enzymatically degraded, CeD manifestation may be prevented. Hence, this study used an in-silico approach to uncover the potential of <i>Bifidobacterium breve</i>, a well-established probiotic, as gluten-digesting bacteria and gain genetic insights underlining the mechanism. 49 strains of <i>B. breve</i> that represented a complete genome assembly level were selected for the study and subjected to genome annotation and analysis employing standard computational biology databases and tools. The resulting data demonstrated that this species contained 28 different protein-hydrolyzing genes, representing a wide spectrum of peptidases. Further investigation of these enzymes for their domain architecture revealed that 7 peptidases namely, Aminopeptidase N, Neutral endopeptidase, Proline iminopeptidase, Aminopeptidase C, Aminopeptidase E, Dipeptidyl aminopeptidase BI, and Dipeptidyl aminopeptidase 4 contained domains commonly found in previously reported gluten-digesting enzymes, hence highlighting their probable use in hydrolyzing toxic gluten peptides. Consequently, the outcomes of this study suggest that <i>Bifidobacterium breve</i> carries an untapped potential for combating gluten toxicity that can be further explored for maximum possible aid in developing celiac disease therapeutics in the long run.</p>
4.	<p><b>MORPHOLOGICAL AND MOLECULAR CHARACTERIZATION OF <i>Henneguya Bicaudi</i> N. SP. (Myxosporea: MYXOBOLIDAE) INFECTING GILLS OF <i>Cirrhinus mrigala</i> (HAM.) IN HARIKE WETLAND, PUNJAB (INDIA)</b></p> <p><u><a href="#">Rajni Bala</a></u>  Department of Zoology, Sri Guru Gobind Singh College, Sector 26, Chandigarh.</p>

	<p>During research, <i>Henneguya bicaudi</i> n. sp. infecting gills of <i>Cirrhinus mrigala</i> (Ham.) an Indian major carp from Harike Wetland in Punjab, India has been described on the basis of myxospore morphology and partial amplification of SSU rRNA gene. The pseudocysts of <i>H. bicaudi</i> n. sp. were located within the gill filament, whitish with round to irregular outer margin and 0.5 to 0.7 mm in diameter, 3-4 pseudocysts each containing about 50-100 myxospores were detected per gill. Mature myxospores were oblongate, 21.0×6.2µm had a caudal appendage bifurcating into two thin thread-like branches starting posterior to middle of its length. The two equal polar capsules were 3.14×2.02 µm. The present species was compared morphologically with 21 species of the genus <i>Henneguya</i> infecting fresh water fishes in India and related geographical area. <i>H. bicaudi</i> n.sp. differed in having peculiar oblongate shape and size of the myxospore, equal polar capsules and also by the location of point of bifurcation of the caudal appendage. 18S rDNA sequences of <i>H. bicaudi</i> n. sp. obtained revealed 96% homogeneity with <i>H. pseudorhinogobi</i> (Kageyama et al. 2009) infecting gill filaments of <i>Rhinogobius</i> sp. (Rutter 1897) in Japan. The intensity of infection was determined by gill pseudocyst index (GPI) based on number of countable pseudocysts under stereozoom trinocular microscope per gill (on one side). Key words: <i>Henneguya</i>, <i>Cirrhinus mrigala</i>, 18S rDNA, Phylogeny.</p>
<p><b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b></p>	
<p><b>S.No.</b></p>	<p><b>Abstract</b></p>
<p>5.</p>	<p><b>ASSESSING THE PREVALENCE OF MICROPLASTICS IN THE GI TRACT OF <i>Cyprinus Carpio</i> AND <i>Labeo Rohita</i> FROM ROPAR (PUNJAB) AND KARNAL (HARYANA) FISH FARMS</b></p> <p><u>Aditi</u>, Ravneet Kaur  <i>Department of Zoology, Panjab University, Chandigarh, India.</i></p> <p>The increasing accumulation of microplastics (MPs) in aquatic ecosystems has raised significant concern about their impact on aquatic organisms, including fish. The ingestion of microplastics by fish may have potential impacts on fish health, and there is a risk of MPs entering the human food chain through fish consumption. This study aimed to assess the prevalence, types, sizes and shapes of microplastics in the gastrointestinal (GI) tract of <i>Cyprinus carpio</i> (common carp) and <i>Labeo rohita</i> (rohu) from Ropar (Punjab) and Karnal (Haryana) fish farms. The presence of MPs was identified under stereo zoom microscopy which employed to visually detect and categorize the microplastics based on its shapes and size. Following this, FTIR analysis was conducted for characterization and to confirm the polymer composition of the detected microplastics, which included polyethylene, nylon and polystyrene, among others. The fish samples were collected from fish farms and then dissected to expose their GI tracts. Stereomicroscopic results revealed a high prevalence of different shapes of microplastics in both fish species from both locations. This showed that <i>Cyprinus carpio</i> exhibited a slightly higher MPs accumulation as compared to <i>Labeo rohita</i>, particularly in the Ropar samples. The most common form of MPs were fibers, fragments and followed by films, with sizes ranging from 100 µm to 250 µm. FTIR analysis confirmed the presence of nylon and polystyrene polymers, commonly used in packaging, fishing gears and textiles. Future research should focus on the long-term impacts of MP ingestion on fish physiology.</p>

6.	<p><b>PRELIMINARY INVESTIGATION OF FINGERPRINT RESEMBLANCE AMONGST SIBLINGS AND NON-SIBLINGS – A STUDY OF NORTH-WESTERN INDIAN POPULATION</b></p> <p><u>Akansha Rana</u>, Kewal Krishan  <i>Department of Anthropology, Panjab University, Chandigarh.</i></p> <p>Fingerprint patterns may serve as a fascinating link to understanding familial connections and genetic inheritance. This study investigates the comparative analysis of thumbprints among siblings and non-siblings to assess the hereditary nature of these unique patterns. The study was conducted in Agra district, Uttar Pradesh, the research involved 36 families of Jatav Population, comprising 72 sibling pairs and 72 non-sibling pairs. Using the nail-to-nail method for fingerprint collection, the results show a significant similarity in thumbprint patterns among siblings, with 69.4% of right thumbprints displaying congruence. In stark contrast, only 30.5% of non-sibling pairs exhibited similar patterns on their right thumbs, highlighting a noteworthy genetic linkage among siblings. The findings were validated through both manual examination and machine learning (ML) techniques, enhancing data reliability. This dual-method approach may provide valuable tools for identifying individuals within the same family based on their fingerprint patterns. The implications of this research extend across various fields, including anthropology, population genetics, and forensic science, potentially aiding in familial identification and investigations in complex scenarios such as mass disasters or paternity disputes.</p>
7.	<p><b>ANTHROPOMETRIC ANALYSIS OF FACIAL AND NASAL INDICES OF A NORTH INDIAN POPULATION: INSIGHTS INTO FORENSIC AND ANTHROPOLOGICAL IMPLICATIONS</b></p> <p><u>Ankita Guleria</u><sup>1</sup>, Vishal Sharma<sup>2</sup>, Kewal Krishan<sup>3</sup>  <sup>1,3</sup><i>Department of Anthropology, Panjab University, Chandigarh,</i>  <sup>2</sup><i>Institute of Forensic Science and Criminology, Panjab University,</i> <sup>3</sup><i>Department of Anthropology, Panjab University, Chandigarh.</i></p> <p>In a world where no two faces are exactly similar, facial identification showcase human diversity. Facial identification is not just a modern tool for technology often but an ancient science embedded in our DNA, providing clues from where we come from and what our facial features can tell about us. Facial features of individuals reflect their demographic profile, such as age, gender, ancestry, ethnicity etc. This is due to the fact that there are several factors which affect the facial shape of a person such geographic region and climatic conditions where a person is living, nutritional, genetics, ethnicity, ancestry etc. The aim of the present study was to evaluate the facial and nasal phenotypes of the north Indian population on the basis of the prosopic or facial and nasal indices. The study incorporated healthy, young and adult 228 participants (158 males, 70 females) of 18-35 years of age group. The faces and noses were classified based upon the standard numerical values of prosopic and nasal indices into five phenotypes. The study reported that the most common facial phenotype was hypereuryprosopic (38.60%, 61 males, and 44.28%, 31 females) followed by euryprosopic (32.27% males and 205 females). Whereas, in case of nasal index, mesorrhine (56.32%, 51 males) and leptorrhine (55.71%, 39 females) types of nasal phenotypes were commonly present. The findings of the present study</p>

	<p>showcase the facial variations existing in the population and the assessment of these facial phenotypes will be helpful in biometric use, forensic investigations and medico-legal purposes.</p>
8.	<p><b>PHYTOCHEMICAL CHARACTERIZATION AND ANTIFUNGAL ACTIVITY OF <i>Plagiochasma Appendiculatum</i> Lehm. Et Lindenb. AGAINST <i>Fusarium oxysporum</i> AND <i>Alternaria alternata</i>.</b></p> <p><u>Anshul Pannu</u>, Sunita Kapila  <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>Abstract: The present study was aimed to explore the phytochemicals and the fungicidal properties of <i>P. appendiculatum</i> extracts against <i>F. oxysporum</i> and <i>A. alternata</i>. The plant thalli were extracted in four different solvents (Acetone, Methanol, Hexane and Di-ethyl ether) for phytochemical characterization by FTIR, GC-MS and LC-MS and for assessing antifungal activity in each by Poisoned Food Technique. Significant fungal growth inhibition was caused by <i>P. appendiculatum</i> extracts. The highest inhibition was shown by di-ethyl ether extract (PI= 76.08±0.68 and 71.37±0.68 against <i>F. oxysporum</i> and <i>A. alternata</i> respectively). The di-ethyl ether extract with best antifungal activity was further examined for its mode of action using Field Emission Scanning electron microscopy and Fluorescence microscopy. FE-SEM and Fluorescence microscopy depicted the ultrastructural changes in the fungal species induced after treatment with the plant extract. FTIR and GC-MS analysis revealed the presence of various bioactive compounds in di-ethyl ether extracts such as Hexadeca-2,6,10,14-tetraen-1-ol, 3,7,11,16-tetramethyl-, n- Hexadecanoic acid, Campesterol and Phytol with reported pharmacological properties. LC-MS revealed the presence of three antifungal compounds: Marchantin A, Marchantin B, Marchantin M and Riccardin F. The presently obtained data suggested that <i>P. appendiculatum</i> has significant antifungal activities and potential solution to the existing dilemma caused by antifungal agrochemicals.</p>
9.	<p><b>TARGETING NANOSTRUCTURES TO REFINE PRECISION AGRICULTURE AND ELEVATE SUSTAINABILITY</b></p> <p><u>Anupriya Bhardwaj</u><sup>1</sup>, Anjali Joshi<sup>2</sup>, Gaurav Verma<sup>2</sup>, Harsh Nayyar<sup>3</sup>  <sup>1</sup> <i>Energy Research Centre, Panjab University, Chandigarh,</i>  <sup>2</sup> <i>Dr. SSBUI CET, Panjab University, Chandigarh,</i>  <sup>3</sup> <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>Nanostructure applications are revolutionizing precision agriculture, enhancing crop yield, sustainability, and resource efficiency. Key components include nano-peptides, nano-hormones, nano-proteins, and nano-minerals, each offering unique advantages. Nano-peptides can act as bio-stimulants, promoting plant growth and resilience against stressors like drought and disease. Their targeted delivery systems ensure that nutrients are absorbed efficiently, minimizing waste. Similarly, nano-hormones can be utilized to regulate plant development processes, such as flowering and fruiting, thereby optimizing growth cycles and maximizing harvests. Nano-proteins hold significant importance in improving nutrient uptake and enhancing soil health. By encapsulating essential nutrients, these proteins facilitate slow release, ensuring that plants receive a consistent supply of minerals necessary for growth. Moreover, nano-minerals improve soil structure and</p>

	<p>fertility, addressing the challenge of nutrient depletion in agricultural lands. In India, the future of nanotechnology in agriculture appears promising. With increasing emphasis on sustainable practices nanotechnology can help tackle food security challenges. Nanobiosensors also offer a revolutionary means of real-time monitoring of agricultural conditions. They can detect soil quality, crop health, and pest infestations, allowing for timely interventions. Such advancements elevate crop yields and align agricultural practices with environmental sustainability. As research and development in nanotechnology advance, its potential to transform agricultural practices in India is significant, paving the way for smarter, more efficient, and environmentally friendly farming solutions. Aspects from the experiments conducted in our lab will be incorporated into this study. Embracing these innovations will be crucial for achieving sustainable agricultural growth in the face of a growing population and changing climatic conditions.</p>
10.	<p><b>UNDERSTANDING THE ROLE OF CINNAMATE 4-HYDROXYLASE (C4H) IN THE PHENYLPROPANOID PATHWAY IN ORCHIDS: AN IN-SILICO APPROACH</b></p> <p><u>Arshpreet Kaur</u><sup>1</sup>, Sandip V. Pawar<sup>2</sup>, Jaspreet K. Sembi<sup>1</sup>  <sup>1</sup><i>Department of Botany, Panjab University, Chandigarh,</i>  <sup>2</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>The phenylpropanoid pathway leads to the formation of a wide array of secondary metabolites. In this pathway, the Cinnamate 4-hydroxylase (C4H) gene encodes the enzyme catalyzing the second step of hydroxylation of cinnamic acid into p-coumaric acid. Orchids serve as a rich source of metabolites thus making it significant to analyze the C4Hs in orchids. In the present study, two C4H proteins were identified in each of the orchid species under study (<i>Apostasia shenzhenica</i>, <i>Dendrobium catenatum</i>, <i>Phalaenopsis aphrodite</i>, <i>P. equestris</i>, <i>P. lueddemanniana</i>, <i>P. modesta</i>, <i>P. schilleriana</i> and <i>Vanilla planifolia</i>) except in <i>Phalaenopsis bellina</i> which had three C4H proteins. Multiple sequence alignment confirmed the presence of five substrate binding sites, the ERR triad, enzymatic active sites, hinge motif and heme-iron binding domain in all the proteins. Motif analysis showed that the motif encapsulating the p450 domain was present in all the proteins. Secondary structure prediction revealed a prevalence of alpha helices and random coils in the identified proteins. Phylogenetic analysis grouped C4H proteins into two clades, representing class I and II. Gene structural analysis showed the presence of two introns and the promoter study of these genes revealed the presence of cis-acting elements regulated by light, abiotic and biotic stress and plant growth and development. Tissue-specific expression profiling of C4H genes showed varied expression patterns in reproductive and vegetative tissues, suggesting diverse roles in growth and development.</p>
11.	<p><b>MICROPLASTICS: AN EMERGING THREAT TO AGROECOSYSTEMS AND FOOD CHAIN</b></p> <p><u>Avantika</u>, Anand Narain Singh  <i>Department of Botany, Panjab University Chandigarh.</i></p> <p>Microplastics, defined as plastic particles smaller than 5 mm, have emerged as a growing environmental concern, posing significant threats to the earth's ecosystems, mainly</p>

	<p>aquatic as ocean and terrestrial as agro- and urban ecosystems. The present study is focused on nearby agroecosystems of urban areas. Under rapid human development and a faster urbanization pace, urban areas have become a significant sink of microplastic accumulation. Microplastics originate from various sources, including synthetic fertilizers, plastic mulch and industrial by-products. The persistence and accumulation of microplastics disrupt soil properties, hinder nutrient cycling, and negatively affect crop growth, leading to reduced agricultural productivity. Microplastics also facilitate the transport of heavy metals and toxic chemicals, increasing ecological risks. Furthermore, microplastics can enter the food chain through plant uptake and consumption of contaminated agricultural products, posing potential health risks to humans, such as oxidative stress, and gastrointestinal issues. Therefore, the present study aims to investigate the contamination of microplastics along the farm-to-plate pathway. The methodology involves collecting soil samples from agroecosystems using a simple random sampling approach and identifying microplastics through FTIR spectroscopy. The expected outcomes of this research will contribute to developing strategies to prevent microplastics from entering the food chain, promote improved waste management practices, and encourage the reduction of plastic use in agriculture through eco-friendly packaging alternatives. In addition, the study emphasizes the need to implement regulations to curb microplastic pollution and safeguard global food safety. Keywords: Microplastics, agroecosystems, plastic pollution, human health, soil contamination, agricultural productivity, food chain, toxic chemicals, mitigation strategies.</p>
12.	<p><b>STRANDS OF EVIDENCE: UNVEILING THE FORENSIC POWER OF HAIR</b></p> <p><u>Ayushi Srivastava</u><sup>1</sup>, Vishal Sharma<sup>1</sup>, Kewal Krishan<sup>2</sup>  <sup>1, 2</sup><i>Institute of Forensic Science and Criminology, Panjab University, Chandigarh</i>  <sup>2</sup><i>Department of Anthropology, Panjab University, Chandigarh.</i></p> <p>Hair is one of the most frequently encountered evidence at crime scenes due to the natural process of daily shedding as well as its tendency to be dislodged in physically violent crimes, where victims may pull out the assailant's hair in self-defence. Being primarily composed of keratin, a dead protein, it exhibits significant resistance to environmental degradation, making it highly valuable, particularly in long-term investigations. The discovery of hair at a crime scene can associate a suspect with the location, while its absence may contribute to their exclusion. While hair itself may not conclusively identify a suspect, it can aid in generating a suspect profile. In cases where the hair root is intact, DNA can be extracted from the follicle to develop a highly accurate genetic profile, which can be compared to DNA databases or reference samples. Microscopic examination of hair reveals critical characteristics, such as its colour, texture, diameter, and any treatments or dyes, which can be compared to known samples to establish a match. Additionally, the hair sample offers a longer window period for toxicological analysis compared to bodily fluids, making it an essential tool in forensic investigations. Toxicological analysis of hair can offer insights into an individual's occupation, drug and alcohol use, health, and other aspects of their lifestyle. The present study discusses the various aspects of hair analysis in forensic investigations, such as sexual dimorphism, species identification and others. The paper contains the original pictures collected during the pilot survey.</p>



13.	<p><b>PHYTOCHEMICAL ANALYSIS AND BIOACTIVITY OF TWO MEDICINALLY RICH SPP. OF GENTIANACEAE FAMILY. COLLECTED FROM SPITI VALLEY OF NORTHWEST HIMALAYAS</b></p> <p><u>Chhering Dorje</u><sup>1</sup>, Anil Thakur<sup>2</sup>, Kamal Jit Singh<sup>1</sup></p> <p><sup>1</sup> <i>Department of Botany Panjab University, Chandigarh,</i>  <sup>2</sup> <i>Department of Botany, Government College, Dhama, Shimla.</i></p> <p><i>Gentianella moorcroftiana</i> (Wall.ex G. Don) and <i>Gentiana kirilowii</i> Turcz. belonging to family Gentianaceae are found in the grassy and moist meadows across Spiti valley. The importance of these two species is well documented in the Amchies system of medicine for treating jaundice, headaches, strengthening the liver, and improving digestion. Their medicinal efficacy is attributed to the presence of bitter glycosides. The present study provides insight into the antioxidant, antimicrobial, and efficacy of bioactive compounds, and further underscores the need to identify active principles and their medicinal relevance in the Gentianaceae family. Our results show that (i) Total phenolics and flavonoids in the flowers and shoots were much higher in comparison to leaves in <i>G.moorcroftiana</i> than in <i>G. kirilowii</i>, (ii) DPPH assay revealed a much stronger antioxidant activity of the flowers in both <i>G. moorcroftiana</i> and <i>G. kirilowii</i> to that of leaves and shoots, (iii) GC-MS analysis revealed the presence of varied number of antimicrobial compounds in both species i.e., in <i>G. moorcroftiana</i> leaves-4, flowers and shoots-3 each and <i>G. kirilowii</i>: leaves-6, shoots-5, flowers-4 and, (iv) Both the plants have shown activity against bacterial spp. namely <i>Escherichia coli</i>, <i>Klebsiella pneumoniae</i>, <i>Pseudomonas aeruginosa</i> and <i>Staphylococcus aureus</i>. Keywords: Antimicrobial, DPPH, GC-MS, Gentiana.</p>
14.	<p><b>OVEREXPRESSION OF TALYSM1-A GENE CONFERS TOLERANCE TO SALT AND DROUGHT STRESS IN TRANSGENIC <i>ARABIDOPSIS</i></b></p> <p><u>Deepika</u>, Santosh Kumar Upadhyay</p> <p><i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>Lysin-motif proteins (LysMs) are apoplastic receptor-like proteins involved in stress signaling. They recognize the external stimulus by the lysin motif present in the extracellular domain and activate downstream signaling in association with kinase domain-containing proteins, which leads to plant adaptation. In the current study, <i>TaLysMI-A</i> gene of bread wheat has been cloned and used for the development of overexpressing transgenic Arabidopsis lines. The transgenic lines showed higher germination rate and seedling growth during salinity and drought conditions. In addition, improved physiological responses like chlorophyll content, relative water content; increased antioxidant activities like CAT, APX, POD; and reduced oxidative stress-related molecules such as MDA content were observed in the transgenic lines in comparison to wild-type under salinity and drought stress. The results revealed the positive role of <i>TaLysMI-A</i> in regulating the stress tolerance mechanism. Thus, this gene can be used for crop improvement that provides tolerance to rising environmental stresses. Keywords: <i>Arabidopsis</i>, LysM, Overexpression, Receptor-like protein, Salt and drought stress.</p>

15.	<p><b>ROLE OF CESTODE PARASITE AS BIOINDICATOR IN FARM ANIMALS</b></p> <p><u>Diksha Jindal</u>, Monika Sen, Harpreet Kaur  <i>Department of Zoology, Panjab University, Chandigarh.</i></p> <p>For years heavy metals have been recognized as a health hazard to man and animals. Heavy metals are well- known pollutants which cause disaster in ecosystem with deleterious effect on associated organisms showing a phenomenon called bioaccumulation. Bioaccumulation means when an organism absorbs and stores a contaminant, such as any chemical, heavy metals etc. Monitoring of heavy metals have become a serious issue and it has to be done at every step of the environmental hierarchy. A few reports are already present about the parasites acting as bio-Indicators of aquatic environment with respect to the bioaccumulation of heavy metals such as lead (Pb), cadmium (Cd) especial cestodes and acanthocephalans and to some extent in nematodes and trematodes. But when it comes to terrestrial farm animals monitoring of environmental pollutants has become much lesser because of their maximum exposure to the environmental pollutants while grazing, feeding, drinking etc. Studies showing the potential of parasites of terrestrial environment acting as bio indicators are still less which states that cestode parasites can accumulate a significant number of heavy metals when compared to their host and its tissues. The aim here is to study the heavy metal bioaccumulation potential of cestode parasites of terrestrial farm animals such as sheep, goat and cattle and the potential to act as the bio indicators for the environment by using the technique of ICP-MS (Inductively Coupled Plasma Mass Spectroscopy), also to determine the relationship of heavy metal accumulation between the host animal and the cestodes parasite.</p>
16.	<p><b>PROTECTIVE EFFECT OF SODIUM PROPIONATE ON KERATINOCYTE APOPTOSIS AND OXIDATIVE STRESS</b></p> <p><u>Gaurav Spehia</u>, Kanika Thakur, Anamica Thakur, Ravinder Kumar  <i>Department of Zoology, Panjab University Chandigarh.</i></p> <p>Short-chain fatty acids (SCFAs) such as acetate (C2), propionate (C3), and butyrate (C4) are generated by bacterial fermentation of dietary fiber in the intestinal lumen. SCFAs are known to influence various cellular processes. Recently, the use of SCFAs as anti-oxidative drugs in skin-related autoimmune diseases has gained attention, as they are less likely to cause systemic toxicity since they are naturally occurring and quickly metabolized by the body. This study investigates the <i>in-vitro</i> effects of sodium propionate, a specific SCFA, on reactive oxygen species (ROS) generation and apoptosis in keratinocytes under oxidative stress conditions induced by hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>). Keratinocytes were exposed to 200µM H<sub>2</sub>O<sub>2</sub> to induce oxidative stress, followed by treatment with sodium propionate at 2.5mM and 5mM concentrations. The effects on ROS generation and apoptosis were subsequently evaluated. <i>In-vitro</i> treatment with sodium propionate effectively reduced H<sub>2</sub>O<sub>2</sub>-induced ROS generation and apoptosis in keratinocytes, indicating its protective role against keratinocyte death and oxidative damage. These findings suggest that sodium propionate could have potential therapeutic applications in skin conditions characterized by increased keratinocyte death and oxidative damage, such as vitiligo, chronic wounds, and atopic dermatitis.</p>

17.	<p><b>QUERCETIN ADJUVANTED VACCINE TRIGGERED CENTRAL AND EFFECTOR MEMORY T CELLS MEDIATED LONG-TERM IMMUNITY AGAINST <i>Leishmania donovani</i> IN BALB/C MICE</b></p> <p><u>Isha Saini</u>, Sukhbir Kaur  <i>Parasitology laboratory, Department of Zoology, Panjab University, Chandigarh.</i></p> <p>Understanding the immune response to <i>Leishmania</i> infection and identifying biomarkers that correlate with protection are crucial for developing effective vaccines. One intriguing aspect i.e., memory T cells, play a crucial role in concomitant immunity against <i>Leishmania</i> infection. Currently the lack of an effective vaccine implies the demand for a prophylactic vaccine candidate to prevent the infection and resulting fatal disease. Therefore, in this study, quercetin was assessed for its adjuvant potential along with heat-killed antigen of <i>L. donovani</i> for the immune induction. Quercetin induces the production of superoxide anion, hydrogen peroxide, and other reactive oxygen species (ROS). This property of adjuvant, to generate ROS for the destruction of cellular macromolecular components, is important because this action can be modulated to derive maximal effect. Immunological and parasitological studies were conducted to evaluate the efficacy of different vaccine formulations before challenge as well as 6 and 12-weeks post challenge infection. Significant protective immunity was observed in all the immunized animals and it was indicated by remarkably declined parasite burden, augmented levels of T cells (CD4+ &amp; CD8+) and reactive oxygen species (ROS). At the memory phase, vaccines also induced the development of high quality long-term central (CD44<sup>high</sup>CD62L<sup>high</sup>) and effector (CD44<sup>high</sup>CD62L<sup>low</sup>) memory of CD4+ and CD8+ T-cells in before challenged as well as post challenged groups. The efficacy of the first-generation vaccine i.e., heat-killed antigen was boosted with the use of adjuvant quercetin that depicts its potential to induce memory T cells that helps in the clearance of parasite.</p>
18.	<p><b><i>Justicia adhatoda</i>: A TRADITIONAL MEDICINAL HERB WITH PROMISING THERAPEUTIC APPLICATIONS</b></p> <p><u>Isha</u>, Anand Narain Singh  <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>India's extensive and diverse medicinal plant resources have been pivotal in advancing traditional medicinal systems such as Ayurveda and Siddha. These systems utilize approximately 1500 plant species harnessed in Ayurveda and about 1200 species in the Siddha medicinal system for drug preparation. The Acanthaceae family, which comprises over 4300 species globally, holds particular significance due to its numerous medicinally essential plants. <i>Justicia adhatoda</i>, as scientific, and Adulsa or Vasaka, as vernacular, is a highly medicinal native plant species. The plant is widely distributed across diverse climatic conditions in tropical Southeast Asian areas, including India. This plant is known for its medicinal properties in treating respiratory disorders, tuberculosis, malaria, and dysentery. It contains important phytoconstituents such as anisotine, vasicinone, vasicinol, adhatodine, adhatodinine, and adhavasinone. These compounds have shown promise in developing new medications, and the plant also has diverse pharmacological properties, including antibacterial, antifungal, anticancer, and antioxidant effects. As the demand for natural remedies and novel therapeutics grows, it is essential to integrate</p>

	<p>traditional knowledge with modern scientific research. This collaborative approach preserves valuable indigenous practices and paves the way for innovative treatments to enhance global healthcare. Therefore, this study aims to explore the phytochemistry and pharmacological properties of Vasaka, emphasizing the importance of bridging ethnomedicine with contemporary pharmacology to unlock new avenues in medical science.</p>
19.	<p><b>HEAVY METAL TOLERANCE AND CARBOHYDRATE METABOLISM IN CHICKPEA (<i>Cicer arietinum</i> L.)</b></p> <p><u>Kusum Singh Sahariya</u>, Kamal Jit Singh  <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>The entry of heavy metals like cadmium in agroecosystem have raised world-wide concerns. Cadmium (Cd) being a non-essential, non-biodegradable and phytotoxic is adversely affecting the growth and productivity of crops. The present study was designed to mitigate the deleterious effects of cadmium induced metal toxicity with added calcium and salicylic acid in chickpea (<i>Cicer arietinum</i> L.). Ten-day old seedlings were exposed to Cadmium (CdSO<sub>4</sub>: 0.25 and 0.75 mM) alone and in combination with Calcium (CaCl<sub>2</sub>: 0.75 mM) and Salicylic acid (SA: 0.50 mM). Several biochemical parameters related to carbohydrate metabolism such as starch, total sugars and reducing sugars content along with the enzymatic activities of <math>\alpha</math>-amylase, <math>\beta</math>-amylase and invertase were assessed 130 DAS in the crop. The severity of stress was directly proportional to Cd concentration. The reduced contents of starch, total sugars and reducing sugars with Cd treatment were restored with added treatment of Ca and SA. The combination was also effective in upregulating the activities of related enzymes such as <math>\alpha</math>-amylase, <math>\beta</math>-amylase and invertase in Cd stressed chickpea plants. The results were promising in the combination treatment of Ca and SA specifically against the lower concentration of cadmium. Hence, the amalgam of Ca and SA was synergistically active in alleviate Cd induced heavy metal toxicity in chickpea plants. Key words: Pulses, <i>Legumes</i>, <i>Phytotoxicity</i>, <i>Antioxidant</i>, <i>Oxidative Stress</i>.</p>
20.	<p><b>COMPLEMENTATION WITH TANCL2-A REINSTATES GROWTH AND ABIOTIC STRESS RESPONSE IN ATNCL MUTANT OF <i>Arabidopsis</i></b></p> <p><u>Ishu</u>, Shumayla, Madhu  <i>Department of Botany, Panjab university, Chandigarh.</i></p> <p>The sodium/calcium exchanger-like (NCL) transporters are members of Cation/Ca<sup>2+</sup> antiporters (CaCAs) family, localized at the tonoplast, which is primarily involved in calcium (Ca<sup>2+</sup>) homeostasis and stress response. They transport Ca<sup>2+</sup> to the cytosol and sequester cytosolic Na<sup>+</sup> into the vacuole. This study investigates the functional complementation of the atncl mutant with the <i>Triticum aestivum</i> gene TaNCL2-A in <i>Arabidopsis thaliana</i> for abiotic stress tolerance. The germination and root length assays under abiotic stress conditions demonstrate the improved germination rate and root length of TaNCL2-A complemented lines than the atncl mutant. Biochemical investigations reveal high proline accumulation, reduced malondialdehyde (MDA), and H<sub>2</sub>O<sub>2</sub> content in complemented lines, highlighting the stress responsive role of TaNCL2-A gene. Furthermore, high chlorophyll, carotenoids, improved relative water content (RWC), and</p>

	<p>reduced relative electrical conductivity (REC) of complemented lines indicate enhanced water use efficiency and better membrane integrity. Overall, this study highlights the potential of the TaNCL2-A gene as a genetic tool to enhance growth parameters and stress tolerance in plants, thus providing new prospects for future agricultural applications. Keywords: Calcium, functional complementation, Sodium/calcium exchanger-like, abiotic stress, growth, carotenoids, proline.</p>
21.	<p><b>24-EPIBRASSINOLIDE: PHYSIOLOGICAL AND BIOCHEMICAL ATTRIBUTES OF CD-STRESSED CHICKPEA (<i>Cicer arietinum</i> L.)</b></p> <p><u>Meena Kumari</u>, Kamal Jit Singh <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>The uptake of cadmium (Cd) in our ecological chain has been negatively impacting the growth and development of agricultural crops. This study was aimed at assessing the role of 24-epibrassinolide (24-EBL) in mitigating the deleterious effect of Cd on physiological and biochemical attributes of chickpea genotype (GPF2). Chickpea seedlings (20 DAS) were exposed to CdSO<sub>4</sub> (0, 0.2, 0.4, 0.6 mM) along with foliar spray of 24-EBL (0, 1.0, 5.0 μM). A significant drop in photosynthetic pigments and relative leaf water content (RLWC) resulted with increasing concentrations of Cd accompanied by the heightened electrolyte leakage (EL), malondialdehyde (MDA), and hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>). The foliar application of 24-EBL proved effective in lowering the level of stress markers and improving the overall growth of plants. Additionally, both Cd and 24-EBL treatments has boosted the antioxidant activity and proline accumulation thereby controlling the osmolytes and antioxidants with enhanced Cd- stress tolerance. The study has confirmed the relevance of exogenously applied 24-EBL as a plant growth regulator in regulating photosynthetic activity, osmoregulation, and cell membrane stabilization against Cd toxicity. Keywords: Brassinosteroids, osmoregulation, ROS, antioxidants, PGR.</p>
22.	<p><b>INVESTIGATING THE IMPACT OF HEAVY METAL CONTAMINATION ON PARASITE INFESTATION IN RUMINANTS</b></p> <p><u>Monika Sen</u>, Diksha Jindal, Harpreet Kaur <i>Department of Zoology, Panjab University, Chandigarh.</i></p> <p>Multiple applications of heavy metals in industrial, domestic, agricultural, medical, and technological sectors have led to their wide distribution in the environment. Because of their toxicity, stability, and great biological capacity, heavy metals are now regarded as "detrimental contaminants of the environment". Heavy metals tend to bioaccumulate in living organisms, and their accumulation has been a major concern. According to the literature, aquatic ecosystems have been studied more than terrestrial ecosystems. There are findings showing that cestodes and acanthocephalans, along with trematodes and nematodes parasites have a large capacity for accumulating heavy metals. Helminthic parasites can be regarded as promising suitable bioindicators to detect environmental pollutions because these worms have a higher potential to absorb heavy metals from their environment than their hosts. Studies about trematode parasites acting as bio indicator are scarce but a few studies have used <i>Fasciola hepatica</i>, as a bio indicator for heavy metal bioaccumulation. The aim of this study is to assess the heavy metal concentration using Inductively coupled plasma mass spectrometry (ICP-MS) which is a powerful analytical</p>

	<p>technique that combines the advantages of plasma ionization and mass spectrometry detection to quickly and accurately determine the content of metal elements in a sample.</p>
23.	<p><b>COMPREHENSIVE EVALUATION OF THE ANTI-DIABETIC PLANT UTILIZED IN UTTARAKHAND</b></p> <p><u>Neelam</u>, Richa Puri  <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>Diabetes mellitus, commonly called diabetes, is a chronic metabolic disorder characterized by high blood sugar levels (hyperglycemia) resulting from defects in insulin secretion, insulin action, or both. <i>Rumex hastatus</i> (D.Don) belongs to the Polygonaceae family and is used by local people to cure diabetes. The selection of the plant material is based upon an ethnobotanical survey that aerial parts of the plant are used in folklore to manage the hike in blood sugar levels. Consequently, the current study examined the antioxidant and antidiabetic properties of the ethanol extract derived from the plant. Additionally, preliminary assessments were conducted to determine the presence of phytochemicals, total phenols, and flavonoids. Our findings indicate that the extract of <i>R. hastatus</i> demonstrates notable antioxidant activity as assessed by DPPH and H<sub>2</sub>O<sub>2</sub> assays, with 91.3±0.08 µg/ml and 87.34±0.26µg/ml respectively. Additionally, this plant exhibits significant inhibitory effects against the enzymes alpha-amylase 93.22±0.73 µg/ml (Porcine α-amylase) and alpha-glucosidase 96.21±0.29 µg/ml. Therefore, it is suggested that the present plant exhibits remarkable antidiabetic properties, surpassing the standard Acarbose for alpha-amylase 70.66±1.33 µg/ml and for alpha-glucosidase 84.78±0.27 µg/ml. These results highlight the potential of further investigation into this plant to validate its therapeutic benefits. In conclusion, studies offer valuable insights into the antidiabetic potential of medicinal plants by elucidating underlying mechanisms and identifying lead compounds. Keywords: Antioxidant, Alpha-amylase, Alpha-glucosidase <i>Rumex hastatus</i>, Phytochemicals, Antidiabetic.</p>
24.	<p><b>IN-SILICO AND IN-VITRO ANALYSIS OF NOVEL IMIDAZOPYRIMIDINE-BASED HETEROCYCLE AGAINST VISCERAL LEISHMANIASIS</b></p> <p><u>Neha Chadha</u><sup>1</sup>, Nitin Kumar<sup>2</sup>, Binita Sihag<sup>3</sup>, Sukhbir Kaur<sup>4</sup>, Deepak B Salunke<sup>3</sup>, Puneet Raina<sup>1</sup>  <sup>1</sup> Department of Zoology DAV College Chandigarh, <sup>2</sup> Centre for Medical Biotechnology MDU Rohtak, <sup>3</sup> Department of Chemistry Panjab University Chandigarh, <sup>4</sup> Department of Zoology Panjab University Chandigarh.</p> <p>Visceral leishmaniasis (VL) is the second deadliest parasitic disease after malaria and is regarded as a neglected tropical disease by the World Health Organization. VL is caused by the parasite <i>Leishmania donovani</i>, popularly known as the “parasite of the poor” due to its large impact on the poor population. The drugs primarily used against VL disease are antimonials, liposomal amphotericin-B, miltefosine, paromomycin, and their combination. However, due to the rise in toxicity and drug resistance, conventional drugs are not the solution for VL disease. The novel imidazopyrimidine-based heterocycle compound has been identified as possessing anti-leishmanial activity against <i>L.donovani</i>. The determination of cytotoxic concentration (CC<sub>50</sub>) and anti-promastigote activity or</p>

	<p>inhibitory concentrations (IC<sub>50</sub>) of the imidazopyrimidine-based heterocycle compound was done using MTT assay and trypan blue assay. The results showed the IC<sub>50</sub> and CC<sub>50</sub> of the compound were 4.7 µg/ml and 13.2 µg/ml, respectively, with a selectivity index value of 2.4, respectively. Meanwhile, the reference drug (miltefosine) exhibited an IC<sub>50</sub> value of 5.7 µg/ml, while the CC<sub>50</sub> value was 7.4 µg/ml and S.I value of 1.2, respectively. Further, the molecular docking analysis using the autodock software revealed that the novel imidazopyrimidine-based heterocycle compound showed the lowest binding affinity against DHFR (dihydrofolate reductase) and PTR1 (pteridine reductase1) proteins of <i>L. donovani</i> as compared to reference drug miltefosine and resiquimod. This study will help in our search for finding a novel therapeutic solution for VL disease.</p>
25.	<p><b>PCOS INDUCTION AND ASSESSMENT IN WISTAR RATS TO ESTIMATE AS A MODEL ORGANISM</b></p> <p><u>Neha Negi</u>, Indu Sharma  <i>Department of Zoology, Panjab University, Chandigarh.</i></p> <p>Polycystic ovary syndrome (PCOS) is a complex endocrine disorder affecting reproductive-age women, characterised by metabolic and reproductive abnormalities. This study aimed to develop and evaluate a comprehensive rat model of PCOS that accurately replicates both the metabolic and reproductive facets of the syndrome. Female Wistar rats were treated with dehydroepiandrosterone (DHEA), high-fat diet (HFD), combination for 20 and 30 days. The study assessed body weight, estrous cyclicity, serum biochemistry, hormone levels, and ovarian histology. Results revealed that the DHEA+HFD combination model efficaciously mimicked PCOS characteristics and exhibited significant increase in body weight, disrupted estrous cycles, elevated blood glucose, lipid levels and hormonal analysis showed increased testosterone, estrogen, and LH levels, with decreased FSH levels. Liver and kidney function markers were also altered, indicating systemic effects. Further, histological examination of ovaries revealed cyst-like follicles and reduced corpus luteum formation, resembling PCOS ovarian morphology. Moreover, DHEA alone induces reproductive changes without significant metabolic alterations, HFD alone showed slow progression of metabolic features, but the combination rapidly induced both metabolic and reproductive abnormalities within 20 to 30 days. This synergistic effect highlights the potential role of diet in exacerbating PCOS symptoms. This study presents a rat model that comprehensively replicates PCOS features in a shorter timeframe. The DHEA+HFD combination model is valuable for investigating PCOS pathophysiology and potential therapeutic interventions. Furthermore, these findings underscore the importance of considering nutritional factors in PCOS management and open new avenues for research into the intricate relationship between PCOS-related metabolic and reproductive abnormalities.</p>
26.	<p><b>N-HEXANE EXTRACT OF LEAVES OF <i>ZANTHOXYLUM ARMATUM</i> DC: INSECTICIDAL ACTIVITY, POTENTIAL CHEMICAL COMPOUNDS</b></p> <p><u>Nidhi</u>, Richa Puri  <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p><i>Zanthoxylum armatum</i> DC. A plant of the Rutaceae family known for its various biological properties, one of which is insecticidal. Plants, agricultural fields, and structures of economic importance are damaged by termites and cause a great loss to crops</p>

	<p>and wooden components. <i>Odontotermes obesus</i> (Isoptera: Odontotermitidae), the white Indian termite, is a highly destructive polyphagous insect pest, lives in huge mounds, and feeds on cellulose material and almost anything that contains carbohydrates. Currently, most of the control measures to control termites rely mainly on synthetic chemicals. As its already proven that these chemicals cause great harm to both the environment and human health. Therefore, it necessitates the biological methods that curb the menace of termites.</p> <p>The present research aims to access the insecticidal activity of <i>Zanthoxylum armatum</i> DC. Against white Indian termites. The highest mortality of n-Hexane fraction was <math>68 \pm 10\%</math> and <math>85 \pm 10\%</math> for 1000 ppm conc after 24 hrs and 48 hrs respectively. Chemical constituents of n-hexane extract showed the presence of many important compounds such as sesquiterpenes, diterpenes, monoterpenes, oxygenated monoterpenes, oxygenated aliphatics, aliphatic hydrocarbons, alkyl ketones, dialkyl ketones etc. This potential insecticidal activity observed may be attributed to the varied nature of compounds such as alkyl ketones, and dialkyl ketones. Accordingly, the <i>Z. armatum</i> leaf extract has tremendous commercial utilization potential for the management of polyphagous insects like white Indian termites.</p>
27.	<p><b>ANTIPARASITIC EFFECT OF DASATINIB AGAINST <i>Leishmania donovani</i>: IN VITRO AND IN SILICO INVESTIGATIONS</b></p> <p><u>Pooja Beniwal</u><sup>1</sup>, Prof. Sukhbir Kaur<sup>1</sup>, Prof. Bikash Medhi<sup>2</sup>  <sup>1</sup> Parasitology Laboratory, Department of Zoology, Panjab University, Chandigarh 160014, <sup>2</sup> Post Graduate Institute of Medical Education and Research, Chandigarh, 160012.</p> <p>Leishmaniasis is a vector-borne parasitic infection caused by the infective bite of female phlebotomine sandflies. Treatment of leishmaniasis by conventional synthetic compounds is met by challenges pertaining to adverse effects which call for the discovery of newer anti-leishmanial molecules. This study was performed to evaluate the antileishmanial effect of the multikinase inhibitor molecule- Dasatinib on <i>Leishmania donovani</i>, the causative agent of visceral leishmaniasis. Dasatinib is a tyrosine kinase inhibitor utilised as a first-line treatment for acute and chronic myeloid leukaemia (CML). The cytotoxicity assay revealed that Dasatinib was not toxic even at a concentration of <math>101.92 \pm 2.7 \mu\text{g/mL}</math> to the HeLa cell lines. The IC<sub>50</sub> on promastigotes by Dasatinib was evaluated by the trypan blue dye exclusion method and was found to be <math>2.027 \pm 0.07 \mu\text{g/mL}</math>. Further, Dasatinib exhibited leishmanicidal activities against <i>L. donovani</i> promastigote through cellular shrinkage with folding on the cell surface, rounding of cells, and shortening or complete loss of flagella as observed under Scanning Electron Microscopy (SEM) analysis. Additionally, molecular docking analysis on the enzyme target of <i>L. donovani</i>: Trypanothione Reductase (TR) suggested strong binding affinity by hydrogen bonds with residues at the active site of the enzyme with a docking score - 10.9 kcal/mol. Next, a Molecular Dynamics (MD) simulation of protein-ligand complexes was performed to get insights into the structural stability of the protein-drug complex and was found stable over a time scale of 100 ns. Thus, this study suggests that that Dasatinib may act as a potent inhibitor of <i>Ld</i>TRYR.</p>



28.	<p><b>ROLE OF ALLELOPATHY IN PLANT INVASION AND ITS POSSIBLE UTILIZATION FOR MANAGEMENT OF INVASIVE PLANTS</b></p> <p><u>Pooja Rani</u><sup>1</sup>, Harminder Pal Singh<sup>2</sup>, Shalinder kaur<sup>1</sup>  <sup>1</sup><i>Department of Botany, Panjab University, Chandigarh,</i>  <sup>2</sup><i>Department of Environment Studies, Panjab University, Chandigarh.</i></p> <p>Allelopathy is a biological phenomenon in which an organism produces one or more biochemicals that affect the germination, growth, survival, and reproduction of other plants. Allelochemicals are biochemicals that may affect target plants and the community in either a positive or negative manner depending upon the concentration. In many cases, invasive plants release chemicals that suppress the germination and growth of natives, thereby allowing the alien species to advantage and spread. Such behaviour is compatible with the "novel weapons hypothesis," whereby exotic species may have novel chemical features, such as offering them selective advantages over native plants. Native plants may also use allelopathy as a weapon against non-native species, with its capacity to regulate native species' allelopathic effects on invading species, hence controlling the invasion of exotic plants. Understanding the interactions between the allelopathic effects of invading and native plants as well as which allelochemicals produced by native plants work best against invasives is essential for the ecological restoration of invaded communities.</p>
29.	<p><b>TRANS-HIMALAYAN CICER MICROPHYLLUM KILLS <i>Leishmania</i> PARASITE IN VITRO</b></p> <p><u>Poonam Keshav</u>, Deepak Kumar Goyal, Sukhbir Kaur  <i>Parasitology Laboratory, Department of Zoology, Panjab University, Chandigarh.</i></p> <p>Leishmaniasis is affecting the world due to keeping more than one billion individuals at risk of having disease in the endemic areas. Three clinical forms are affecting the world, out of which the deadly visceral form caused by <i>Leishmania donovani</i> is posing big threat to India as well. There is no vaccine to prevent the infection and visceral leishmaniasis is treated using chemotherapeutic agents with lengthy regimes, having high cost and deadly after-effects. Drug-resistance is another major issue to be addressed. New drug candidates are needed and herbal therapy can be employed to develop one such drug against this dreaded infectious disease. We analysed the high-altitudinal plant <i>Cicer microphyllum</i> against the promastigote form of the parasite. The dichloromethane extract was prepared using aerial parts of the plant. The phytochemical analysis was also performed and all major phytochemicals were present in the prepared extract. The quantitative analysis of phytochemicals (phenolics, flavonoids and terpenoids) was also done. The <i>in vitro</i> antileishmanial activity was assessed after 72 hours. The IC50 was calculated and found to be <math>43.78 \pm 1.04 \mu\text{g/mL}</math>. The cytotoxicity was also evaluated and the CC50 was estimated to be <math>1187.63 \pm 97.20 \mu\text{g/mL}</math>. Hence, the study suggested that plant extract has the potential to kill the parasite that can be developed as a drug candidate against leishmaniasis.</p>

30.	<p><b>MYCOCIN FROM <i>Wickerhamomyces anomalus</i>: A SUSTAINABLE ANTIMICROBIAL AGENT</b></p> <p><u>Prabhsangam Kaur Dhillon</u>, Sukesh Chander Sharma, Akhtar Mahmood <i>Department of Biochemistry, Panjab University, Chandigarh.</i></p> <p>The rising threat of antimicrobial resistance represents a critical challenge to public health and the food and industrial microbiology sectors. In response to this urgent issue, researchers are actively exploring novel antimicrobial agents from a variety of biological sources. Yeasts, particularly those belonging to the genus <i>Wickerhamomyces</i>, have emerged as compelling candidates due to their production of mycocins (killer toxins) with significant antimicrobial properties. This study focused on <i>Wickerhamomyces anomalus</i>, isolating its mycocin from culture supernatants through size exclusion chromatography. Our results demonstrated that the mycocin exhibits a molecular weight range of 15 to 37 kDa. Bioactivity assessments using well diffusion assays confirmed its potent inhibitory effects against Gram-positive bacteria, with notable activity also observed against Gram-negative strains. These findings highlight the mycocin's potential as a natural antimicrobial agent, particularly in food microbiology, where the demand for effective and safe preservatives is increasing. The mycocin from <i>W. anomalus</i> could serve as a viable alternative to synthetic preservatives, enhancing food safety and shelf life while aligning with consumer preferences for clean-label products. Additionally, its applications in industrial settings could transform bioprocessing by providing natural solutions to combat resistant pathogens. In summary, this research positions <i>W. anomalus</i> as a promising candidate for the development of innovative bio-drugs and food preservation strategies, significantly contributing to the urgent challenge of antimicrobial resistance and promoting safer, more sustainable practices in microbial management.</p>
31.	<p><b>AN INTEGRATED ECOLOGICAL STUDY OF DEGRADING RIPARIAN ECOSYSTEMS OF LOWER SIWALIKS IN A CHANGING ENVIRONMENT</b></p> <p><u>Prerna, Anand Narain Singh</u> <i>Department of Botany, Panjab University, Chandigarh</i></p> <p>Riparian areas, also known as transitional zones, serve as the interface between terrestrial and aquatic ecosystems, facilitating the exchange of materials and energy. These critical transition zones, exemplified by riparian zones, are pivotal in connecting different ecosystems. Typically, narrow strips of land adjacent to water bodies, such as streams and lakes, these are linked to aquatic systems through surface water and groundwater. Their unique ecological processes and communities set them apart from other ecosystems. Riparian ecosystems play a crucial role in preserving the integrity of river water by mitigating pollution and providing essential functions such as food, habitat, and thermal protection for fish, aquatic life, and ecological processes. They provide an ample quantity of good services to maintaining stream microclimate, stabilizing banks, modifying sedimentation processes, improving water quality, retaining and recycling organic litter and nutrients, offering wildlife habitat, and supporting the food web for a diverse range of organisms. Despite their ecological significance, riparian ecosystems face tremendous pressure from anthropogenic activities, especially from urbanization and industrialization sectors. However, both processes are inevitable parts of human civilization that cannot stop. Also, the changing climate is a natural calamity which significantly affects the riparian bodies. Moreover, several other human activities like farming, grazing, logging,</p>

	<p>mining, recreational activities, road construction, transportation infrastructure etc., significantly contribute to the degradation of riparian ecosystems. Therefore, the present study's primary goal is to investigate degradation's impact on ecosystem services/disservices of riparian ecosystems in a changing environment. Keywords: Riparian ecosystems, Climate change, Degradation, Ecological restoration, sustainable management.</p>
32.	<p><b>VALPROIC ACID INDUCED RODENT MODEL OF AUTISM: BRIDGING THE GAP TO THERAPEUTIC APPROACH</b></p> <p><u>Priyanka Bhardwaj</u><sup>1</sup>, <u>Sweety Mehra</u><sup>2</sup>, <u>Madhu Sharma</u><sup>1</sup>, <u>Anupriya Rana</u><sup>1</sup>, <u>Mani Chopra</u><sup>1</sup>  <sup>1</sup><i>Department of Zoology, Panjab University Chandigarh,</i> <sup>2</sup><i>Department of Pediatrics, PGIMER, Chandigarh.</i></p> <p>Autism spectrum disorder (ASD) is a neurodevelopmental disorder, characterized by deficits in social communication and the presence of restricted, repetitive behaviours or interests. Different animal modeled studies can be done for better understanding of ASD. The valproic acid (VPA) induced rodent model has become a key tool for investigating the etiology and potential interventions for ASD, effectively replicating critical behavioural and neurobiological features associated with the disorder. By administering intraperitoneal VPA during crucial developmental periods, can induce ASD related behaviour. Prenatal exposure of VPA generates oxidative stress, increases ROS, which ultimately damages mitochondria and dysregulate different signalling pathways (such as AKT/mTOR Cascade, Wnt signalling pathway, Notch Signalling Pathway, Extracellular signal-regulated kinase (ERK) Signalling etc) and stimulate the BBB disruption, apoptosis and neuronal damage. Various studies have documented that VPA induced rodent model of autism is one of the effective model as it recapitulates major ASD associated behaviour. However, future investigations are required to develop a comprehensive model which incorporates genetic and epigenetic variables to enhance its translational potential. Moreover, by employing various therapeutic strategies to target this variable could prove to be a promising approach to deal with ASD. Keywords: ASD, VPA, therapeutics, epigenetic, ROS.</p>
33.	<p><b>MORPHOMETRIC SIGNATURE ANALYSIS FOR SEX DETERMINATION USING SUPPORT VECTOR MACHINE.</b></p> <p><u>Rakesh Meena</u>, <u>Abhik Ghosh</u>, <u>Kewal Krishan</u>  <i>Department of Anthropology, Panjab University, Chandigarh.</i></p> <p>A person's signature is a unique representation of their identity and can be vulnerable to theft through copying or forgery. The process of signature examination involves extracting handwriting characteristics and comparing them with genuine signatures. While traditional signature examination methods are still widely used and effective, they can be time-consuming. Nevertheless, the emergence of advanced technologies, such as artificial intelligence, has significantly streamlined the examination process. In this study, machine learning-based technology was used to differentiate between male and female signatures based on the length and height of the signatures. The study involved collecting handwritten signatures from a total of 208 participants, and precise measurements of the length and height of these signatures were obtained using a scale. The support vector</p>

	<p>machine (SVM) classifier was employed to analyze the data, and it yielded an accuracy rate of 66.6% in distinguishing between male and female signatures based on their length and height characteristics. This innovative approach demonstrates the potential of machine learning in refining the analysis of handwritten signatures and its applications in the field of forensic document examination.</p>
<p>34 &amp; 35.</p>	<p><b>ASSESSMENT OF ECOLOGICAL HEALTH OF URBAN STREAMS: A STUDY OF MAJOR STREAMS IN CHANDIGARH</b></p> <p><u>Mandeep Kaur</u>, Mohini Thakur, Reecha Sharma, Sidharth Chauhan, Kumari Aditi, Rasandeep, Anchita, Shivali, Yogesh Kumar Rawal <i>Department of Zoology, Panjab University, Chandigarh.</i></p> <p>Urban streams provide essential ecosystem services, but their health has been severely compromised by urbanization. This study evaluates the ecological health of Sukhna Choe, Patiala Ki Rao, and N-Choe in Chandigarh, with a focus on the impact of human activities on water quality and biodiversity. Macroinvertebrates were used for bioassessment, applying indices such as EPT (Ephemeroptera, Plecoptera, Trichoptera) diversity and the Biotic Index. Physico-chemical parameters, including pH, temperature, electrical conductivity, and total dissolved solids (TDS), were also analyzed. Results revealed that all three streams are heavily polluted, with macroinvertebrate populations dominated by pollution-tolerant species like Diptera and Gastropoda, and a near absence of sensitive groups such as Ephemeroptera. Redundancy Analysis (RDA) and correlation studies highlighted strong links between macroinvertebrate diversity and environmental factors such as substrate composition and water flow. Patiala Ki Rao and N-Choe exhibited the highest levels of ecological degradation, stressing the urgent need for restoration efforts. This study underscores the necessity for comprehensive monitoring and management strategies to promote the recovery of these urban streams and protect them from further degradation. Keywords: Sukhna Choe, Patiala Ki Rao, N- Choe, Ecological health, Macroinvertebrates, Water pollution, Biomonitoring.</p>
<p>36.</p>	<p><b>ECHOES OF THE PAST: ASSESSING THE BATHING WATERS OF GHAGGAR'S EPHEMERAL FLOW</b></p> <p><u>Ritesh Sheokand</u> <i>Department of Anthropology, Panjab University, Chandigarh.</i></p> <p>The problem of degradation of surface waters has become a matter of public awareness and scientific concern. In particular, the quality of bathing waters has received special attention of the scientific community and also environmental policymakers. This study examines the deteriorating outdoor bathing water quality of a seasonal river, <i>Ghaggar</i>, once central to the community's daily life for swimming, drinking, and cultural activities. Elders of the village recount the river's past significance, when its waters were clean and safe for consumption. However, in recent years, pollution from nearby industries and agricultural runoff has severely degraded the river's condition. Villagers now avoid the river due to its foul odour, discoloured water, and associated health risks. Primary data was collected through interviews with local villagers, revealing a deep sense of loss and disengagement with the river. Secondary data, including scientific parameters like BOD,</p>

	<p>DO, FC, FS, etc. from pollution control board reports, was used to assess the water quality, identifying high levels of contaminants. This study calls for immediate action to restore the river's health and reinstate its cultural and environmental value to the community.</p>
37.	<p><b>HOW PLANTS SENSE COLD AND HEAT STRESS?</b></p> <p><u>Sarbjeet Kaur</u>, Aastha Sharda, Dr. Harsh Nayyar  <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>Temperature is a critical environmental factor that influences plant distribution and behaviour worldwide. With a gradual increase or decrease in the ambient temperature plants need to perceive these changes accurately and adjust accordingly in order to adapt and survive. Both cold and heat stresses induce distinct physiological and molecular responses that help plants adapt to changing conditions. Under cold stress, plants experience alterations in morphology and internal metabolism. Cold disrupts membrane stability, affects the redox system, fatty acid composition, photosynthesis, and increases osmoregulatory substances. Membranes play a key role in cold sensing, where histidine kinases detect the temperature drop, triggering mechanosensitive Ca<sup>2+</sup>-influx channels. The rise in cytosolic calcium is sensed by kinases, such as CDPK and MAPK, which activate transcriptional responses that help plants cope with stress. Heat stress, on the other hand, causes changes in cell components, including membrane fluidity, calcium levels, cytoskeleton, and protein folding. Heat shock proteins (HSPs) play a critical role in protecting and refolding denatured proteins under elevated temperatures. While the full mechanisms of heat sensing are still being unraveled, recent research has emphasized the roles of photoreceptors, phytohormones, and molecular markers such as DNA and RNA in heat perception. These responses are crucial for processes such as thermomorphogenesis and thermotolerance, which help plants survive high temperatures. This review highlights recent advances in temperature sensing in <i>Arabidopsis thaliana</i> across four key pathways: vernalization, cold stress, thermomorphogenesis, and heat stress, highlighting unresolved questions and their relevance for breeding climate-resilient crops.</p>
38.	<p><b>UTILIZATION-BASED MANAGEMENT OF INVASIVE PLANTS: AN UPCOMING APPROACH</b></p> <p><u>Shalini Ojha</u>, Shalinder Kaur, Daizy R. Batish  <i>Department of Botany, Panjab University, Chandigarh, India</i></p> <p>Invasive plant species pose a significant threat to biodiversity, ecosystem stability, and agricultural productivity worldwide. These species are highly adaptable and capable of thriving in new environments, often without the natural enemies that control their populations in native habitats. These non-native species outcompete native flora, alter habitats, and disrupt ecological interactions, leading to habitat degradation and economic losses. Effective management strategies are critical to mitigate these harmful impacts. An innovative management strategy involves the utilization of these invasive species for beneficial purposes that is 'utilization-based management'. By promoting their use in bioenergy production, feed and fodder, organic fertilizers, biomolecular studies, biosorbents, pharmaceuticals, and other industrial products, their economic incentives for removal while simultaneously addressing their proliferation can be created. Plants like</p>

	<p>Japanese Honeysuckle and <i>Lantana</i> are used in handicrafts and eco-friendly materials. Additionally, biochar production from invasive plants helps to improve soil quality and sequester carbon. This dual approach not only mitigates the adverse impacts of invasive species but also fosters community engagement and awareness. This concept promotes a circular economy, turning ecological threats into productive resources, minimizing environmental harm, and reducing dependence on herbicides. Through sustainable practices and research into new applications, managing invasive plants through utilization presents a promising pathway for restoring ecosystems and enhancing local economies. Ultimately, this strategy highlights the potential for transforming ecological challenges into opportunities for environmental stewardship and sustainable development.</p>
39.	<p><b>ULTRASONIC ASSISTED EXTRACTION OF SOLUBLE FIBERS FROM CITRUS BY-PRODUCTS</b></p> <p><u>Sharanjeet Kaur</u><sup>1</sup>, Meena Krishania<sup>2</sup>, Anupama Thakur<sup>1</sup>  <sup>1</sup><i>Dr. S. S. Bhatnagar University Institute of Chemical Engineering and Technology, Panjab University, Chandigarh,</i> <sup>2</sup><i>Center of Innovative and Applied Bioprocessing, Sector 81, Mohali, Panjab.</i></p> <p>To reduce the post-harvest losses, appropriate processing techniques need to be followed for valorization of citrus fruit by-products. Citrus fruit by-products (peel, pomace, seeds) are rich in vitamins, bioactive compounds, macronutrients such as lipids, protein and fibers. Dietary fibers can be extracted from them and used as a functional ingredient in fortified foods. Many studies have been observed to modify insoluble dietary fibers to soluble dietary fibers (SDF). SDF are found in oats, beans, apples, citrus fruits, carrots and barley. These fibers can help lower blood cholesterol and glucose levels in human body. Treatments like chemo-mechanical treatment, non-conventional treatments etc, have been optimize to maximize dietary fibers yield from citrus by-product. As per previous studies it was observed that the chemo-mechanical treatment destroyed the citrus fiber's crystalline region, increased its soluble dietary fibers content and exposed more hydrogen bonds to water. In current study, SDF extracted by the ultrasonication method has good antioxidant capacity and promotes intestinal health. Moreover, these soluble dietary fibers can also be used as ingredients in the industry to address the fiber gap and provide technological functionalities.</p>
40.	<p><b>URBAN TREES' POTENTIAL FOR REGULATORY SERVICES IN THE URBAN ENVIRONMENT: AN EXPLORATION OF CARBON SEQUESTRATION</b></p> <p><u>Sheenu Sharma</u>, Sabir Hussain, Pardeep Kumar, Anand Narain Singh  <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>Urbanisation has emerged as a formidable challenge for urban policymakers, reaching unparalleled heights and unsettling the ecological equilibrium of the cities. Urban areas now grapple with many issues encompassing climate change, resource depletion,</p>

	<p>population surges, and increased pollution levels. This study assessed tree species diversity and their potential for carbon sequestration in Panjab University Campus, Chandigarh. We established 188 plots, each comprising randomly selected quadrats measuring 10 m ×10 m, encompassing areas with varying levels of vegetation, ranging from low to moderate and high density. We used four different allometric equations to estimate tree biomass and carbon stock. Our findings revealed that 92 tree species belong to 72 genera and 35 families, with a total tree density of 975 ha<sup>-1</sup>. The total CO<sub>2</sub> sequestration in form of carbon stock was 18769.46 Mg C ha<sup>-1</sup>, with Manilkara hexandra (1239.20 Mg C ha<sup>-1</sup>), Ficus benghalensis (1072.24 Mg C ha<sup>-1</sup>), Kigelia pinnata (989.89 Mg C ha<sup>-1</sup>), and Lagerstroemia floribunda (716.88 Mg C ha<sup>-1</sup>) being the top contributors. Specifically, the equation of Chave et al. (2005) without tree height yielded the highest biomass and carbon stock estimates than other equations. The present study underscores the vital role of trees on the campus as potent carbon reservoirs meet to maintain an aesthetic sense for biotic components and alleviate rising levels of CO<sub>2</sub> in the atmospheric environment. By emphasising the role of urban trees as potent carbon reservoirs, the study underscores the importance of integrating green infrastructure into urban planning strategies.</p>
41.	<p><b>EFFECT OF MANGANESE AND LEAD ON PRIMARY AND SECONDARY METABOLITES OF <i>Mnium cuspidatum</i> HEDW.</b></p> <p><u>Shefali</u>, Sunita Kapila  <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>The current study comprising experimental studies on bryophytes focused on their behaviour under varying concentrations of selected two heavy metals - Manganese and Lead. Their effect has been studied on two primary metabolites water soluble carbohydrates and total free amino acids; and two secondary metabolites, total phenolic content and flavonoid content of <i>Mnium cuspidatum</i>. Exogeneous supply of different concentrations of Manganese and Lead over regular intervals on the selected moss for up to 60 days showed significant impact on primary as well as secondary metabolites. When treated with Manganese, the highest content of total free amino acids (11.15±.02mg/g) was observed at 80 ppm on 30th day, water-soluble carbohydrates (21.03±.03mg/g) at 80 ppm on 15th day, total phenolic content (40.1±.2mg/g) at 80 ppm on 15th day, total flavonoid content (15.7±.02mg/g) at 80 ppm on 15th day. Similarly, when treated with lead, the highest content of total free amino acids (9.16±.01mg/g) was observed at 5 ppm on 30th day, water soluble carbohydrates (18.42±.05mg/g) at 5 ppm on 15th day, total phenolic (32.3±.2mg/g) and flavonoid content (11.7±.05mg/g) at 5 ppm on 15th day. Lead was observed to be more toxic than Manganese.</p>
42.	<p><b>UNLOCKING THE THERAPEUTIC POTENTIAL OF <i>Aerides multiflora</i> ROXB.: A GC-MS ANALYSIS OF BIOACTIVE COMPOUNDS</b></p> <p><u>Shilpa Sharma</u>, Promila Pathak  <i>Orchid Laboratory, Department of Botany, Panjab University, Chandigarh.</i></p> <p><i>Aerides multiflora</i> commonly known as Draupadi Puspa belongs to the genus <i>Aerides</i> Lour. of the “foxtail orchids” from family Orchidaceae, especially known for its attractive flowers and foliage. The plant is indigenous to India, Bangladesh, Nepal, Myanmar, Thailand, Malaysia, Philippines, Laos, Cambodia, and Vietnam. In India, it is</p>

	<p>geographically distributed over North-Western Himalayas, Sikkim, West Bengal, and Arunachal Pradesh. The present investigation was carried out with an objective to identify the bioactive phytochemical constituents present in a therapeutically important orchid, <i>Aerides multiflora</i> using Gas Chromatography-Mass Spectrometry (GC-MS) technique. The major compounds identified from GC-MS analysis were Octadecanoic acid, Lidocaine, n-Hexadecanoic acid, 9,12-Octadecadienoic acid (Z, Z)-, Tetrapentacontane, Stigmasterol etc. Our study aimed to investigate the phytochemical profile of this orchid; identify a range of bioactive compounds through GC-MS analysis; pharmacological activities of these compounds demonstrating its potential as a source for novel drug development.</p>
43.	<p><b>CHEMICAL CHARACTERIZATION AND FORECASTING OF POTENTIAL ANTI-INFLAMMATORY TARGETS OF MOSS <i>Hyophila involuta</i> (HOOK.) JAEG. USING NETWORK PHARMACOLOGY AND MOLECULAR DOCKING APPROACH</b></p> <p><u>Shiwani Latwal, Anju Rao</u>  <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>Inflammation is an intricate adaptive defense reaction of bodily tissues against noxious factors like infection, tissue injury and pathogen invasion. It provokes the release of a wide range of local inflammatory-related mediators like leukocytes, nitric oxides, cytokines, chemokines and plasma proteins to the affected area. Certain inflammatory proteins like SRC and COX2 act as inflammatory proteins. Many synthetic drugs have been developed to block such inflammation-related proteins. Bryophytes being one of the most abundant plant species possess rare therapeutic bioactive compounds but their biological properties and chemical constituents remain relatively unexplored. In our study, we conducted chemical characterization of one of the Himalayan moss <i>Hyophila involuta</i> (Hook.) Jaeg. using the GC-MS technique and reported its anti-inflammatory mechanism using in-silico methodologies. The chemical constituents were isolated using GC-MS analysis and major bioactive compounds having pharmacological properties were screened out using ADME analysis. Network pharmacology and molecular docking studies showed SRC and COX2 being two major anti-inflammatory proteins. These proteins showed efficient binding affinity with screened compounds of <i>Hyophila involuta</i>. Therefore, by integrating GC-MS along with network pharmacology studies and molecular docking a robust approach to accessing active components of <i>Hyophila involuta</i> and their overall effectiveness in suppressing inflammation could be investigated. As many synthetic drugs have been developed to ease the inflammation. However, these drugs are costly and some have negative aftereffects, therefore, a shift towards medicinal plants and their derivative products has opened a new prophylactic management of inflammatory diseases.</p>
44.	<p><b>THERAPEUTIC PROPERTIES OF BAMBOO</b></p> <p><u>Soniya Thakur, Babita Joshi, Nirmala Chongtham</u>  <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>Bamboo is used since ancient time for food, medicine, art and craft as well as fodder. In Ayurvedic, Siddha and Unani system of medicine, several parts of bamboo such as shoot, leaf, bamboo sap (tabasheer), shavings, rhizome and seed have therapeutic application for</p>



	<p>various health ailments. Bioactive metabolites of bamboo such as polyphenols, flavonoids, phytosterol and dietary fibers play significant role in prevention of hypertension, hypercholesterolemia, cardiovascular disease, cancer, diabetes, obesity, inflammation, and microbial infection. Bamboo shoots are popular in Asian countries which forms a major component of their traditional cuisines and have rich quantities of micronutrients such thiamine, niacin, vitamin A, vitamin C, vitamin B6, and vitamin E along with potassium, phosphorus, sodium, calcium, magnesium some of which have antioxidant properties. Bamboo leaf beverages have for a long time been considered a delicious and healthy drink in Asian countries owing to its body cooling and skin moisturizing benefits. The leaves of bamboo are rich in anti-oxidants and also used as a folk medicine for the treatment of cough, fever and leprosy. Bamboo sap is used to treat cold, resolves phlegm, fever, or loss of consciousness associated with phlegm-heat. These properties of bamboo show prospects as a potent therapeutic agent to tackle contemporary health disorders that can be utilized in pharmaceutical and nutraceutical sectors.</p>
45.	<p><b>DIVERSITY OF ORCHIDS IN KULLU VALLEY OF NORTH- WESTERN HIMALAYAS</b></p> <p><u>Subodh Negi</u><sup>1</sup>, Jagdeep Verma<sup>2</sup>, Jaspreet Kaur Sembi<sup>1</sup></p> <p><sup>1</sup><i>Department of Botany, Panjab University Chandigarh,</i> <sup>2</sup><i>Department of Botany, Sardar Patel University, Mandi, Himachal Pradesh.</i></p> <p>The Kullu valley situated in the North-Western Himalayas is a biodiversity hotspot harbouring a diverse array of terrestrial orchids. Terrestrial orchids are renowned for their beautiful flowers and medicinal properties since ancient time. The study aims to investigate the diversity of some commonly growing threatened terrestrial orchids. The study provides insights into their ecological preferences and evolutionary relationships on the basis of their diversity, distribution, habitat and morphology. A comprehensive survey was conducted across different sites, spanning altitudinal ranges (1,200- 3,500 m) and habitat types (forests, grasslands, and riverbanks). Taxonomic keys were used for identification and classification of the species. The results show the presence of five species viz., <i>Calanthe tricarinata</i>, <i>Epipactis helleborine</i>, <i>Herminium lanceum</i>, <i>Platanthera edgeworthii</i> and <i>Spiranthes sinensis</i>, and their distribution along the different altitudinal range in the valley. From the study, a significant correlation was found between the distribution and type of habitat with <i>Epipactis helleborine</i> showing affinity for shady and partially moist type of habitat while <i>Spiranthes sinensis</i> growing in open grasslands with no shading or obstruction in intense sunlight. This study contributes to the knowledge of Himalayan orchid diversity and provides a foundation for future research on ecological and conservation aspects. Therefore, the study enhances the existing knowledge and provides new prospective on diversity and identification of terrestrial orchids in North-Western Himalayas. Thus, the study establishes the basis for informed conservation decision facilitating evidence-based conservation endeavours. Key Words: Conservation, Diversity, North- western Himalayas, Orchids, Taxonomy.</p>
46.	<p><b>AUGMENTATION OF MESOPOROUS SILICA AND AU-CU BIMETALLIC NANOPARTICLES FOR ELECTROCHEMICAL APTASENSING OF AMPICILLIN IN MILK SAMPLES.</b></p>

	<p><u>Surbhi Kumari, Nirmal Prabhakar</u> <i>Department of Biochemistry, Panjab University, Chandigarh.</i></p> <p><math>\beta</math>-lactam antibiotics are widely used in veterinary medicine to prevent infections and enhance production efficiency in dairy products. Ampicillin (AMP), a commonly used <math>\beta</math>-lactam antibiotic in veterinary practices, and the consumption of milk or dairy products containing antibiotic residues above the maximum residue limit (MRL) pose significant health risks such as antibiotic resistance, hypersensitivity reactions, and fluctuations in blood sugar levels, etc. In response to this concern, this study presents the development of a novel impedimetric aptasensor for the sensitive detection of ampicillin (AMP) residues in milk samples. The aptasensor was fabricated by electrodepositing Au-Cu bimetallic nanoparticles onto the mesoporous silica-supported FTO substrate, followed by the immobilization of AMP-specific aptamer functionalized with amine modifications, facilitating selective binding of the target molecule. The sensor's successful fabrication was confirmed through various characterization techniques, including scanning electron microscopy (SEM), energy-dispersive spectroscopy (EDS), contact angle analysis, and X-ray diffraction (XRD). Electrochemical techniques, including cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS), were employed to assess the sensor's performance. After optimization of operational parameters, the fabricated aptasensor was employed for the determination of AMP within a concentration range of 0.01 to 1000 ng mL<sup>-1</sup> through the EIS technique in [Fe(CN)<sub>6</sub>]<sup>3-/4-</sup>. The optimized sensor showed rapid detection of AMP within 20 minutes, achieving a detection limit of 0.01 ng mL<sup>-1</sup>. The aptasensor demonstrated excellent selectivity, reproducibility, and stability, making it a promising tool for the monitoring of antibiotic residues in milk samples.</p>
47.	<p><b>A PEEK INTO THE ALKALOID BIOSYNTHETIC PATHWAY IN ORCHIDS: A STUDY OF 3-HYDROXY-3-METHYLGLUTARYL COENZYME A REDUCTASES (HMGRS) GENE FAMILY</b></p> <p>Swati, Anju Rao and Jaspreet K. Sembi <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>Orchidaceae is one of the largest families, famous for its ornamental value and therapeutic potential. This therapeutic potential of orchids is attributed to the rich diversity of phytochemicals like alkaloids, bibenzyl derivatives, flavonoids etc. Alkaloids are one of the most important phytochemicals and were amongst the first secondary metabolites to be studied in orchids. Terpenoid-alkaloids are one of the major classes of the alkaloids found in orchids, synthesised via the mevalonate (MVA) or 2-C-methyl-D-erythritol-4-phosphate (MEP) pathway in plant cells. The first committed step in the MVA pathway is the conversion of HMG-CoA into mevalonate which is catalysed by an enzyme 3-hydroxy-3-methylglutaryl coenzyme A reductase (HMGR). The present study deals with the in silico characterization of HMGR gene family in various orchid species. A total of 27 putative HMGR proteins were identified and characterized from 20 orchid species. These proteins were approximately 311 to 651 amino acids long with their molecular mass ranging from 33.88- 59.90 KDa. These proteins were characterised by the presence of 'HMG-CoA_reductase_class_I' domain. Additionally, two HMG-CoA binding motifs (EMPGYVQIP and TTEGCLVA) and two NADP(H) binding motifs (DAMGMNM and GTVGGGT), were also found to be highly conserved in all the HMGR proteins. Phylogenetic analysis showed that HMGRs belonging to monocot and dicot plants clustered separately. The tissue specific expression profiling showed variable expression</p>

	<p>for all the genes in various vegetative and reproductive tissues. This study paves way to decipher functional characterization of HMGR genes in orchids and their role in regulation of terpenoid-alkaloid biosynthetic pathway.</p>
48.	<p><b>SEX BIAS IN SUSCEPTIBILITY TO TUBERCULOSIS</b></p> <p><u>Swati Sharma</u>, Nain Singh Dhiman, Vijay Kumar  <i>Department of Zoology, Panjab University, Chandigarh.</i></p> <p>Tuberculosis (TB) is a widespread infectious disease caused by <i>Mycobacterium tuberculosis</i> (MTB). It is reported that MTB has infected about one fourth of the world population, however only 5-10 percent of infected individuals show clinical symptoms of TB. According to WHO, this differential susceptibility to TB is further elevated in men by 1.7 times in comparison to women. This sex bias in susceptibility to TB can be attributed to differential immune response, hormonal differences, genomic variations as well as social construct of men and women. The higher level of estrogen and progesterone hormones in females leads to stronger immune responses against pathogens, while in males testosterone has been reported to suppress immune function. The genetic polymorphisms in sex linked and sex influenced genes may also affect immune regulation and pathogen recognition which can influence disease susceptibility and severity. Besides biological differences, the social construct also impacts TB exposure and access to healthcare. Men often have higher rates of TB infection, particularly in high-burden countries, due to greater occupational, environmental and behavioral exposure. Women, however, face unique barriers in accessing timely TB diagnosis and treatment due to stigma, caregiving roles, and limited healthcare autonomy, which may result in delayed treatment and worse outcomes. Thus, sex bias in TB susceptibility needs to be investigated in different populations of the world so as to manage this deadly disease more effectively.</p>
49.	<p><b>IMPACT OF LEAD AND CADMIUM ON CHLOROPHYLL AND CAROTENOID CONTENT OF <i>Taxiphyllum taxirameum</i></b></p> <p><u>Umesh Thakur</u>, Anju Rao  <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>Bryophytes are ancient group of green plants presently survived in three lineages. i.e. Anthocerotophyta (hornworts), Marchantiophyta (liverworts), and Bryophyta (mosses). Of these lineages, mosses are highly adaptable due to unique features like the absence of a root system, unistratose) leaves, and an exceptional capacity for ion exchange, allowing them to efficiently absorb nutrients and heavy metals from their environment. Their ability to bioaccumulate pollutants makes them sensitive indicators of air quality, with exposure to pollutants leading to observable effects such as increased mortality, visible damage, reduction in chlorophyll content, and smaller leaf cell sizes. The present investigation was carried out to study the effects of various phytotoxic concentrations of</p>

	<p>metals – Lead (Pb) and Cadmium (Cd) (for varying length of time) on the photosynthetic pigments, chlorophyll and carotenoid of <i>Taxiphyllum taxirameum</i>. It has been observed quantitatively that exogenously supplied Pb and Cd significantly stress the plant to various degrees, when treated with various concentrations (10 – 500ppm). Carotenoids, vital for protecting chlorophyll from oxidative damage, decline rapidly under Pb and Cd stress, increasing chlorophyll degradation. This reduction impairs photosynthetic efficiency, further accelerating chlorophyll loss. The findings suggest that Cd, even at low concentrations, poses a greater threat to moss physiology than Pb, emphasizing the importance of monitoring Cd pollution using <i>Taxiphyllum taxirameum</i> as bioindicator. This highlights its potential use in environmental pollution assessments, particularly in areas with heavy metals contamination</p>
50.	<p><b>EXPLORING THE POTENTIAL ROLE OF A TATLP GENE OF BREAD WHEAT</b></p> <p><u>Yashraaj Sharma</u><sup>1</sup>, Kashmir Singh<sup>1</sup>, Santosh Kumar Upadhyay<sup>2</sup>  <sup>1</sup><i>Department of Biotechnology, Panjab University, Chandigarh,</i> <sup>2</sup><i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>Plants are exposed to many environmental cues and pathogens, leading to serious plant growth and development impairment. This results in a reduction in crop yield and threatens global food security. The genetic responses to these stressors are among the most effective and sustainable approaches to controlling plant diseases. Thaumatin-like proteins (TLPs), which belong to the PR-5 family, play a crucial role in stress response. A total of 93 TLP genes have been identified in the genome of <i>Triticum aestivum</i> (bread wheat) using in-silico methods. In the current study, the <i>TaTLP14-B</i> gene was selected based on expression data, and overexpression lines of <i>Arabidopsis</i> were generated which will be used for comprehensive functional characterization against various stresses. The initial phenotypic data in overexpression lines indicated the involvement of TLP genes in drought stress tolerance. Additionally, the promoter of the selected gene was cloned in a plant expression vector and transgenic <i>Arabidopsis</i> lines were generated to study the regulation of the TLP gene under different stresses. Further, the TLP genes responsible for different stress can be utilized to address complex problems involving biotic stress. In addition, the antifungal properties of TLPs can be explored for pharmaceutical applications to treat human and animal fungal diseases in future studies.</p>
51.	<p><b>INSIGHTS TO HISTONE LYSINE METHYLTRANSFERASES (HKMTS) IN <i>Vanilla planifolia</i>: A GENOME-WIDE STUDY</b></p> <p><u>Neha Thakur</u>, Jaspreet K. Sembi  <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>Histone lysine methyltransferases (HKMTs) are an important group of histone modification proteins that contribute to the epigenetic control of biological processes. The HKMT protein family catalyses the methylation of histone proteins leading to alterations in the chromatin structure and regulation of the transcriptional machinery. The present study reports 35 putative VpHKMT genes from the genome of a highly valuable orchid, <i>Vanilla planifolia</i>. All the VpHKMT proteins contained the conserved SET domain. However, based on the presence of additional class-specific domains and conserved motifs, the VpHKMTs could be grouped into seven distinct classes, class I to VII Multiple</p>

	<p>sequence alignment and phylogenetic analysis supported the classification of VpHKMTs into seven clusters along with their HKMT counterparts in <i>Arabidopsis thaliana</i> and <i>Oryza sativa</i>. Prediction of physicochemical parameters, secondary and tertiary protein structures as well as gene structures provided further validation of this classification. Furthermore, expression profiling across different vegetative and reproductive tissues of <i>V. planifolia</i> and analysis of cis-regulatory promoter elements suggested their plausible roles in various aspects of growth and development. Since HKMT gene family constitutes an important group of epigenetic regulators, this study would facilitate functional validation to explain the important biological phenomenon in orchids. Keywords: HKMT; Histone methylation; epigenetics; <i>Vanilla planifolia</i>; orchids.</p>
<p><b>Research Scholars from Colleges and other Institutions (JRF, SRF, Project Fellow and Post Docs)</b></p>	
<p><b>S.No.</b></p>	<p><b>Abstract</b></p>
<p>52.</p>	<p><b>AMELIORATING EFFECTS OF QUERCETIN AGAINST NICOTINE-INDUCED GENOTOXICITY WITHIN GRANULOSA CELLS OF ANTRAL FOLLICLES</b></p> <p><u>Anshu Siwach</u>, Jitender Kumar Bhardwaj <i>Kurukshetra University.</i></p> <p>The detrimental effects of tobacco smoking on overall health have become widely known in the previous few decades. Nicotine (NIC) is one of the principal, toxic, and perhaps hazardous components in tobacco. It is an oxidant agent that can impact fertility in women. Therefore, the current study was designed to assess the NIC-induced reproductive toxicity in the female reproductive system. During this study, the granulosa cells were treated with nicotine at dosages of 0.1, 1, and 10mM with co-supplementation of an ameliorant Quercetin (10, 50, 100µM) at 24 and 48 hours. The results showed that NIC induces histomorphological alterations including pyknotic nuclei, fragmented nuclei, vacuolization, and empty spaces. As the dosage and duration of NIC exposure increased, lower cellular viability and a higher apoptosis rate were observed using the MTT assay and the fluorescence assay (EB/AO staining), respectively. However, the co-administration of quercetin effectively attenuated nicotine-induced alterations. An increase in cellular viability was reported with increasing dosage of quercetin in a time and dose-dependent manner. Our findings thus highlighted the protective role of quercetin against nicotine-induced reproductive toxicity.</p>
<p>53.</p>	<p><b>HARNESSING GUT MICROBIOTA AND INDIGENOUS PRACTICES FOR HEALTH AND WELLNESS: A PATHWAY TO VIKSIT BHARAT</b></p> <p><u>Arshiya Sood</u>, Gagandeep Singh, Neelam Thakur <i>Sardar Patel University Mandi H.P.</i></p> <p>Harnessing gut microbiota and indigenous practices for health and wellness: a pathway to viksit Bharat Arshiya Sood, Gagandeep Singh, and Neelam Thakur Department of Zoology, Sardar Patel University, Mandi (HP) Abstract The gut microbiota, a minuscule yet diverse ecosystem of microorganisms within the human gastrointestinal tract, plays a significant part in the sustenance of health by regulating digestion, immunity, and mental</p>

	<p>well-being. As India progresses towards sustainable development (Viksit Bharat), integrating microbiome-based strategies with indigenous food practices offers a promising avenue for the betterment of healthcare. Traditional Indian fermented foods such as dahi, kanji, handia, khorisa, kefir, koozh, and toddy are rich in beneficial bacteria like <i>Enterococcus lactis</i>, <i>Enterococcus durans</i>, <i>Lactobacillus</i>, <i>Bacillus</i>, and <i>Bifidobacterium</i>, and it aligns closely with modern probiotic science to promote gut health and mitigate chronic ailments like obesity, diabetes, and mental illnesses. This synergy also mirrors the holistic principles of Ayurveda, which accentuate the gut-brain connection for sustaining overall well-being. Recent studies have demonstrated that these fermented foods significantly improve microbial diversity, critical for maintaining gut health and preventing non-communicable diseases (NCDs). Similarly, advancements in microbiome-based therapies—including probiotic formulations and dietary interventions—furnish innovative solutions for addressing gastrointestinal ailments and supporting cancer treatments. This integration aligns with India's Ayushman Bharat initiative by promoting prophylactic care and supports Atmanirbhar Bharat by facilitating Indigenous healthcare innovations. Harnessing the restorative potential of gut microbiota can enrich immunity, improve food security, and boost general well-being. This coming-together of microbiome science with traditional practices proposes a holistic framework for sustainable healthcare, greatly.</p>
54.	<p><b>COMPARISON OF SEASON SPECIFIC SOLITARY AND MULTIPLE NEST FOUNDING STRATEGIES OF THE PRIMITIVELY EUSOCIAL PAPER WASP, <i>Polistes wattii</i></b></p> <p><u>Iva Patyal</u><sup>1</sup>, Kunika Malhotra<sup>2</sup>, Deepak Nain<sup>3</sup>, Rhitoban Raychoudhury<sup>2</sup>, Ruchira Sen<sup>1</sup>  <sup>1</sup><i>Sri Guru Gobind Singh College, Sector 26, Chandigarh,</i> <sup>2</sup><i>Indian Institute of Science Education and Research, Knowledge City, Sector 81, SAS Nagar, Mohali, Punjab, India,</i> <sup>3</sup><i>Department of Zoology, Panjab University, Chandigarh.</i></p> <p>Primitively eusocial wasp, <i>Polistes wattii</i>, is one of the most prevalent species in north India and also found throughout central Asia. It makes both open and cavity nests with single or multiple combs. Similar to the majority of <i>Polistes</i> species, here also the colony can be found either by a single wasp (solitary foundress) or a group of wasps (multiple foundresses). However, as it creates a colony twice a year, its distinctive nesting cycle and stunning nest construction set it apart from other species. It follows an annual nesting cycle with two rounds of season-specific nest initiation. In spring, overwintered, solitary foundresses initiate the nests while in summer nests are initiated by a group of nest founding wasps. Our work primarily focuses on the seasonal variation in body size, reproductive condition and behavioural comparison of single and multiple foundresses of <i>P. wattii</i> in newly initiated nests. Morphometric analysis showed that the queens of both seasons were similar in body size and mating status. However, the ovarian development of solitary queens and co-foundresses of multiple foundress colonies were similar. According to their behaviour, Solitary foundresses were similar to the co-foundresses of multiple foundress nests but clustered differently from the multiple foundress queens.</p>
55.	<p><b>COMPUTATIONAL ANALYSIS TO UNCOVER THE POTENTIAL OF <i>Lactobacillus rhamnosus</i> AS GLUTEN-DIGESTING BACTERIA</b></p>

	<p><u>Samridhi Pushkarna</u><sup>1</sup>, Pooja Suneja<sup>2</sup>, Amita Suneja Dang<sup>1</sup>  <sup>1</sup><i>Centre for Medical Biotechnology, Maharshi Dayanand University, Rohtak,</i>  <sup>2</sup><i>Department of Microbiology, Maharshi Dayanand University, Rohtak.</i></p> <p>Celiac disease (CeD), a multifactorial disorder develops when gluten, the toxic environmental inducer interacts with CeD susceptibility genetic markers, resulting in a chronic enteropathy. Several extra-intestinal complications may also arise in cases of delayed management. Still, there lies no definite line of treatment and a lifelong gluten-free diet remains the only effective treatment approach. Therefore, there is a growing demand to develop adjuvant treatment options that can help relieve symptoms and improve patient's quality of life. The present study conducted a bioinformatic approach to look into the potential of using <i>Lactobacillus rhamnosus</i> as gluten-digesting bacteria and provide the basis for future therapeutic developments. 49 <i>L. rhamnosus</i> strains with complete genome assembly level were selected and subjected to genome annotation using RAST and Prokka. As a result, an expansive range comprising 61 different peptidase-encoding genes was found. More importantly, upon conserved domain analysis, it was further unveiled that 9 (aminopeptidase N, Oligoendopeptidase F, neutral endopeptidase, proline iminopeptidase, dipeptidyl-peptidase 5, Xaa-Pro dipeptidyl-peptidase, aminopeptidase C, aminopeptidase E, and PII-type proteinase) of these enzymes shared important domains with previously identified gluten-digesting enzymes suggesting their potential role in degrading gliadin peptides. Hence, the in-silico analysis indicates that this well-known probiotic species in addition to showcasing a plethora of beneficial properties, may also hold great potential in terms of reducing gluten toxicity. With more in-depth studies in the future, <i>L. rhamnosus</i> can prove to be a promising candidate in CeD treatment and management.</p>
56.	<p><b>ROLE OF PROBIOTICS IN REGULATING CYTOTOXICITY: AN EVOLVING CONCEPT</b></p> <p><u>Shruti Kharod</u>, Anil Kumar, Amita Suneja Dang  <i>Maharshi Dayanand University.</i></p> <p>Cytotoxicity, which causes cellular damage or death as a result of environmental conditions, chemicals, chemotherapy, radiation, and other hazardous substances, continues to be a key difficulty in medical therapies, particularly oncology. Probiotics, that provide health benefits to the host, are gaining popularity because to their possible involvement in reducing cytotoxicity. There have been a lot of scientific studies that suggest the use of probiotics as a possible cytotoxic mitigation agent. Probiotics, have been revealed in studies to enhance gut health, change immunological responses, and reduce inflammation, all of which lead to greater cellular resilience. Probiotics may protect healthy cells from the negative effects of cytotoxic medicines by maintaining gut microbiota balance and promoting the production of beneficial metabolites like short-chain fatty acids. Probiotics have antioxidative activities and improve epithelial barrier integrity, which adds to their protective impact. Number of probiotic strains mainly belonging to genus <i>Lactobacillus</i>, <i>Saccharomyces</i>, <i>Bifidobacterium</i> and their beneficial effects in both <i>in vitro</i> and <i>in vivo</i> models of cytotoxicity. Probiotics promising in term of reducing intestinal damage and mucositis caused by chemotherapy, reducing oxidative stress, and reduce tissue damage caused by cytotoxic agents. Probiotic strains have been shown to boost the activity of mucosal IgA, NK cells and regulatory T cells both of which</p>

	<p>play significant roles in the body's defense. The gut-associated lymphoid tissue produces cytokines such as ILs and TNF-<math>\alpha</math>, which play a crucial role in autoimmune disorders, immunological regulation and cytotoxicity mitigation. Probiotics promise as a natural, non-invasive strategy to reducing cytotoxicity.</p>
57.	<p><b>A SYSTEMATIC REVIEW ON HUMAN-WILDLIFE CONFLICT RESEARCH TRENDS, KEY SPECIES, AND GLOBAL COLLABORATIONS</b></p> <p><u>Vineet Singh</u>, Sunidhi Sharma, Rakesh Kumar  <i>Central University of Himachal Pradesh.</i></p> <p>This article offers an in-depth analysis of human-wildlife conflict (HWC), focusing on nine prominent species, including the African and Asian elephants (<i>Loxodonta africana</i>, <i>Elephas maximus</i>), the nilgai (<i>Boselaphus tragocamelus</i>), the Asiatic black bear and brown bear (<i>Ursus thibetanus</i>, <i>Ursus arctos</i>), the tiger (<i>Panthera tigris</i>), the leopard (<i>Panthera pardus</i>), the hippopotamus (<i>Hippopotamus amphibius</i>), the wild pig (<i>Sus scrofa</i>), the hyena (<i>Crocuta crocuta</i>, <i>Hyaena hyaena</i>), and various raptors. These conflicts primarily arise due to competition over diminishing resources, resulting in severe consequences for both human livelihoods and wildlife conservation. In South Asia, human-elephant conflicts have surged due to habitat encroachment, leading to human casualties and significant damage to crops and property. Bears across North America, Europe, and Asia are increasingly drawn to human settlements in search of food, leading to frequent confrontations. Despite conservation efforts, tigers and leopards continue to experience conflict due to habitat loss and poaching. In Africa, hippos face population declines caused by habitat loss, illegal hunting, and retaliatory killings. Wild pigs, particularly invasive in the U.S. and India, cause substantial agricultural damage and pose zoonotic risks. In Africa, hyenas are often killed in retaliation for livestock predation. Lastly, raptors face unique challenges from human infrastructure and bird strikes, posing aviation risks. The article stresses the importance of effective mitigation strategies, conservation, and public awareness to manage these conflicts and promote coexistence.</p>
58.	<p><b>MICROPLASTIC DISTRIBUTION IN WATER AND SOIL SAMPLES FROM THE UHL RIVER, DISTRICT KANGRA, HIMACHAL PRADESH</b></p> <p><u>Yogita Thakur</u>, Abhishek Kumar, Reshma Sinha  <i>Central University of Himachal Pradesh.</i></p> <p>Microplastic (MPs) contamination in freshwater ecosystems is a critical environmental issue. This study investigates the extent of microplastic pollution in the Uhl River, originating from the Thamsar Glacier in the Dhauladhar range, Kangra district, Himachal Pradesh. Along the river, three sites based on economic importance with sample size (n=6) each of water and soil was analyzed. Concentration analysis showed spatial heterogeneity, with Kukargundha (site I) having &lt;100 particles per litre or kg, while Zero point and Barot (sites II and III) having particles ranging from 100 to 500 particles (per litre or kg). In water samples, fragmented MPs predominated with 50.17%, followed by pellets (32.99%), fibers (8.42%), and films (8.42%). MPs color analysis exhibited abundance of colorless MPs (41.08%), followed by blue (39.73%), purple (13.47%), yellow (5.05%) and green (0.67%). Soil samples showed fragments (50.66%), pellets (36.95%), fibers (6.42%), and films (5.97%), with colorless (42.25%), blue (38.72%), purple (15.27%) and yellow (3.76%) MPs. The FTIR analysis of water and soil samples</p>



	<p>identified common peaks at 761 cm<sup>-1</sup>, 872 cm<sup>-1</sup>, 977 cm<sup>-1</sup>, 1066 cm<sup>-1</sup>, 1186 cm<sup>-1</sup>, and 1410 cm<sup>-1</sup>. However, site-specific variations were evident, with unique peaks in water samples (1638 cm<sup>-1</sup>, 1716 cm<sup>-1</sup>, 2014-2230 cm<sup>-1</sup>, and 3215-3573 cm<sup>-1</sup>) and soil samples (1671 cm<sup>-1</sup>, 1895-2238 cm<sup>-1</sup>, and 3178-3558 cm<sup>-1</sup>), reflecting differences in polymer composition or degradation states details in discussion. Concluding the presence of MPs even in thought to be free of anthropogenic influence fresh water sources.</p>
<p><b>UG/PG Students of Panjab University Campus and Regional Centres</b></p>	
<p><b>S. No.</b></p>	<p><b>Abstract</b></p>
<p>59.</p>	<p><b>SUSTAINABLE FORENSIC PRACTICES USING INDIGENOUS BLOW FIES IN INDIA.</b></p> <p><u>Aditi Bhatnagar</u> <i>Department of Anthropology, Panjab University, Chandigarh.</i></p> <p>Sustainable forensic practices are increasingly important as a way to balance scientific investigation and with environmental sustainability. In India, the use of indigenous blow flies (Diptera, Calliphoridae) in forensic entomology offers a novel approach in developing eco-friendly methods in forensic science. Forensic entomology is the application of the study of insects and other arthropods to legal investigations, primarily to determine time and circumstances of death. These blow flies are the first insects to arrive at decomposing remains and their lifecycles are crucial for determining the post-mortem interval (PMI), a critical factor in death investigations. The present study focuses on the identification, behaviour and live stages of indigenous species of blowflies in various climatic regions of India. By utilising the local blowfly population, forensic scientists can reduce reliance on nonnative species and laboratory based chemical methods, which are often resource intensive and less environment friendly. The study also explores how factor such as temperature, humidity and altitude impact the lifecycle of these flies in different Indian habitats. Additionally, this approach supports biodiversity conservation by promoting the study of native species and their ecological roles while advancing forensic methodologies. This research seeks to establish a more sustainable cost-effective forensic framework that benefits both legal investigations and environmental conservation efforts in India.</p>
<p>60.</p>	<p><b>NOVEL PACKAGING FROM ARROWROOT STARCH DECORATED WITH GREEN SYNTHESIZED NANOSILVER DERIVED FROM CARICA PAPAYA PEEL EXTRACT</b></p> <p><u>Akashdeep Sharma, Surinder Singh</u> <i>Dr. S. S. Bhatnagar University Institute of Chemical Engineering &amp; Technology Panjab University, Chandigarh.</i></p>

	<p>The investigation of biodegradable polymers and green nanotechnology has been spurred by the increasing demand for environmentally friendly and sustainable packaging methods. The development of biodegradable packaging sheets using arrowroot starch and green-synthesised silver nanoparticles (Ag NPs) made from <i>Carica papaya</i> peel extract is the main topic of this paper. Papaya peel extract was used as a reducing agent in the synthesis of silver nanoparticles, which are very desirable due to their antibacterial characteristics. This review underscores the potential of arrowroot starch-based films reinforced with green-synthesized AgNPs as an innovative, eco-friendly packaging solution.</p>
61.	<p><b>CRIMINAL PROFILING: UNDERSTANDING THE CRIMINAL BEHAVIOUR IN FORENSIC PSYCHOLOGY</b></p> <p><u>Anjali</u>  <i>Department of Anthropology, Panjab University Chandigarh.</i></p> <p><i>Criminal profiling</i> refers to the process of using crime scene evidence to make inferences about potential suspects, including personality characteristics and <i>psychopathology</i>. It is used primarily in cases involving serial crimes, such as murder, arson, sexual assault, etc., where the perpetrator’s behaviour suggests certain patterns or traits that can help narrow down the suspect pool. <i>Forensic psychology</i> is the application of psychological principles and methods to the legal system, including both criminal and civil matters. It bridges the gap between psychology and the justice system, focusing on understanding the mental states, behaviours, and motives of individuals involved in legal proceedings. By integrating insights from behaviour and personality, forensic psychologists can create profiles that predict offender characteristics such as age, gender, socio-economic status, and personality traits. The main objective of this study is to provide an in-depth understanding of criminal profiling as a valuable tool in criminal investigation while dealing with complex cases with little physical evidence. Therefore, the present study sheds light on the history of criminal profiling, its methods, and the key steps involved in criminal profiling as well as the challenges in criminal profiling.</p>
62.	<p><b><i>Leishmania</i> ON THE MOVE: CLIMATE-INDUCED SPREAD OF VECTORS IN NON-ENDEMIC REGIONS</b></p> <p><u>Anoop Raj Tiwari</u>, Manvi, Jeenat, Sweta  <i>Department of Zoology, Panjab University Chandigarh.</i></p> <p><i>Leishmaniasis</i> is a neglected parasitic disease caused by the protozoan parasite of the genus <i>Leishmania</i>. It occurs mainly in tropical and subtropical regions, where its transmission is predominantly mediated by sandfly vectors belonging primarily to the genus <i>Phlebotomus</i> and <i>Lutzomyia</i>. In recent years, there have been cases of <i>Leishmaniasis</i> reported in non-endemic regions due to the expansion of the</p>

	<p>geographical area of its vector. Increasing global temperature, alteration in the rainfall pattern, and increased level of humidity have played a significant role in making a suitable breeding ground for sandfly vectors in the temperate regions of North America, Europe, and other non-endemic regions, which ultimately tends to increase their geographical distribution. This shift poses a significant public health risk as the population and the health care sector in these regions are unprepared for this outbreak. Additionally, due to climate change, animal reservoirs such as domestic and wild animals have shown movement toward climate shift, further contributing to the disease spread. The study will discuss the northward and altitudinal migration of sandfly vectors and how increased deforestation, and urbanization affects sandfly habitat, facilitating the urban spread of this disease and will focus on the future distribution of these vector borne diseases in non-endemic regions by studying the past 10 years pattern of distribution of <i>Leishmania</i>.</p>
63	<p><b>INDIGENOUS BIOFERTILIZERS</b></p> <p><u>Ashwin Goswami</u> <i>Department of Botany, Panjab University, Chandigarh</i></p> <p>This poster explores the pivotal role of indigenous biofertilizers in sustainable agriculture, specifically within the context of "Indigenous Technology for Viksit Bharat." By leveraging India's rich history of traditional agricultural practices, indigenous biofertilizers offer a sustainable and eco-friendly alternative to chemical fertilisers. They enhance soil fertility and crop productivity through nitrogen fixation, phosphorus solubilisation, and nutrient mobilization, while also promoting plant growth through multiple mechanisms. Despite their benefits, the adoption of biofertilizers in India faces challenges such as market unavailability, inconsistent quality, and transportation issues. This poster provides an overview of the types and benefits of biofertilizers, their market presence in India, and highlights the economic opportunities for expanding their use. By embracing these homegrown solutions, India can advance towards a sustainable and developed future, preserving its agricultural heritage and boosting economic growth.</p>
64.	<p><b>ORCHID INNOVATIONS: BRIDGING BIOTECHNOLOGY AND COMMERCE</b></p> <p><u>Ayush Thakur</u>, Promila Pathak <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>The increasing advantages and acknowledgement of orchids for humankind have resulted in significant research in the current decade. The family Orchidaceae, known for its remarkable diversity, includes over 705 genera, 29,481 species and more than 1,50,000 hybrids worldwide. Orchids, with their specialised structures and characteristics, have perpetually captivated researchers throughout history. The distinctive characteristics of orchids include the presence of lip or labellum, specialised pollination, tiny non-endospermic seeds, varied environments, mycorrhizal-dependent germination in nature, and adaptive mechanisms. Orchid biotechnology, a key player in commercialising innovative kinds, has created new opportunities in the orchid business and their distribution worldwide as cut flowers and pot plants. Besides its ornamental and aesthetic significance, the orchid business has effectively created employment opportunities for individuals in underdeveloped nations. Orchids represent the pioneering floriculture crop</p>

	<p>that transformed the orchid business; nonetheless, there are several challenges in the natural propagation and protection of various commercially important species nearing extinction. Orchid biology has significantly addressed the information gaps in orchid classification, phytochemistry, and cultivation methods. International organisations have intervened to tackle illegal global commerce and excessive exploitation of orchids, with the objective of conservation and legal commercial pursuits. This present examination offers extensive insights into the expanding momentum of orchid biology and its significant impact on orchid conservation, cultivation and commercialisation. It is essential to recognise the issues associated with the cultivation and preservation of orchid species and to foster awareness while establishing legislative frameworks at both domestic and international levels to enable a holistic approach.</p>
65.	<p><b>METAGENOMIC ANALYSIS OF MICROBIAL COMMUNITIES FROM DIVERSE SOIL ECOSYSTEMS: UNRAVELING FUNCTIONAL AND TAXONOMIC DIVERSITY.</b></p> <p><u>Babanpreet Kaur</u>  <i>Centre for Systems Biology and Bioinformatics, Panjab University.</i></p> <p>Soil ecosystems harbor diverse microbial communities that are essential for nutrient cycling, biogeochemical processes, and maintaining ecosystem resilience. However, environmental stressors such as pollution, low temperature, and high salinity can significantly alter microbial diversity and functionality. This study aims to conduct a comprehensive metagenomic analysis of microbial communities from distinct soil ecosystems, leveraging publicly available datasets and open-source software tools to characterize their taxonomic and functional diversity, as well as to identify key genetic elements associated with these diverse environments. Metagenomic data were processed using FastQC for quality control, followed by taxonomic profiling with Kraken2 and visualization with Krona . Functional gene annotation was performed using Prokka, while ResFinder and VirFinder were utilized to detect resistance genes and virulence genes, respectively. Our findings are expected to enhance the understanding of microbial diversity and functional capabilities, providing insights into how these communities contribute to ecosystem resilience and health.</p>
66.	<p><b>NUTRACEUTICAL APPROACHES FOR PCOS</b></p> <p><u>Bhawna, Manshi Sharma, Anureet Kaur, Udit</u>  <i>Department of Zoology, Panjab University, Chandigarh</i></p> <p>Polycystic ovarian syndrome (PCOS) is a prevalent hormonal disorder that impacts female individuals of reproductive age. Worldwide prevalence ranges between 6% and 20% depending on the population and diagnostic criteria, and both metabolic and reproductive health are affected. PCOS arises from a combination of genetic influences and hormonal imbalances, especially high levels of androgens and insulin resistance, exacerbated by obesity, dietary habits, and physical inactivity leading to irregular periods, hirsutism, ovarian cysts, weight gain, thinning hair, fertility challenges, a higher risk of endometrial cancer, and mental health challenges like depression, anxiety, and sleep disturbances. Conventional methods for PCOS often include medications such as oral contraceptives, letrozole, and metformin, which can help induce ovulation and lower the risk of endometrial cancer. However, these medications may come with side effects,</p>

	<p>including diarrhea, breast tenderness, discomfort in bones, muscles, and joints, and potential weight gain. To address these side effects, an alternative approach using nutraceuticals presents a substantially mild option. Plant derivatives like Jamun, Fenugreek, and Cumin seeds show great potential in managing insulin resistance. Jamun is rich in antioxidants and has anti-diabetic properties, regulating blood sugar levels and enhancing insulin sensitivity. Fenugreek aids in glucose metabolism, lowers androgen levels, and promotes regular menstrual cycles. Cumin aids digestion, reduces inflammation, and assists in weight management. These herbal supplements, which can be consumed in powder or capsule form, seem promising for PCOS management as well. However, lack of scientific evidence points for mechanistic evaluation of their efficacy specifically for dietary modifications-induced PCOS.</p>
67.	<p><b>EMPOWERING LOCAL VOICES: GRASSROOTS SOLUTIONS FOR SUSTAINABLE ENVIRONMENTAL CONSERVATION</b></p> <p><u>Bhupender Sharma</u>, Kajal, Prikshita  <i>Department of Zoology, Panjab University, Chandigarh.</i></p> <p>Empowering Local Voices: Grassroots Solutions for Sustainable Environmental Conservation Bhupender Sharma, Kajal, Prikshita Department of Zoology, Panjab University Chandigarh Abstract In the face of escalating climate challenges intensify, communities, governments, and organizations around the world are responding with innovative solutions and decisive actions to address the crisis. But the widespread failure of centralized approaches to managing natural resources has driven conservationists to seek sustainable and more effective alternatives. Community-driven environmental initiatives are grassroots movements where local communities take the lead in protecting and restoring their environment. These initiatives have gained momentum worldwide as effective ways to address ecological challenges by involving those who are most affected, plays a crucial role in addressing local ecological challenges and fostering sustainable practices. It generally exemplifies the power of local leadership in addressing ecological challenges. Therefore, the success highlights the effectiveness of decentralized approaches in conservation, demonstrating that when those most affected by environmental issues lead the charge, solutions become more innovative, resilient, and impactful.</p>
68.	<p><b>NEURONAL ART THROUGH THE INK OF CAJAL</b></p> <p><u>Chehak Goyal</u>, Diya Verma, Gurleen Kaur, Rimzhim Kansal, Shailbi  <i>Department of Zoology, Panjab University, Chandigarh</i></p> <p>Santiago Ramon Cajal has been credited as the father of modern neurosciences. Over the 5 decades he produced more than 2900 drawings that reveals about nervous system. This was done by examining thin slices of brain under microscope by staining them to highlight different brain cells and structure with the use of Golgi stain which colors the brain cells a deep rich black. Cajal improved this formulation of Golgi stain to obtain drawings of neuron that people are following still today after so many years. It was not until Cajal that information about electrical impulses in the brain was known. He discovered many of the components of brain neuron including dendrite spine, neural appendage, synaptic contact. Present study highlights his work on neuroanatomy of retina under light microscopy, as well as his excellent description and artistic drawings of its cells. Cajal suggests a series</p>

	<p>of specific function for each neuronal element of the retina. He was able to distinguish all the different layers of the retina i.e. retinal pigmented epithelium, photoreceptor layer, outer nuclear layer, outer plexiform form, inner plexiform layer, inner plexiform layer and ganglion cell layer. These structures were further delineated under electron microscope but still many questions remained unanswered on the dendritic neuronal connections. Then the techniques of confocal microscopy and immunocytochemistry provided more insights about the morphology of various cell types as synaptic connections between them and ratified the ideas proposals by Cajal.</p>
69.	<p><b>FROM CURE TO CUSTOMIZATION: THE ETHICAL CHALLENGES OF ENHANCING DESIGNER BABIES AND SUSTAINING HUMANITY</b></p> <p><u>Garima Parmar</u> <i>Department of Anthropology, Panjab University, Chandigarh.</i></p> <p>The idea of “<i>designer babies</i>”, made possible by advances in genetic engineering such as CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats). This technology has brought humanity to the frontier of both curing genetic disorders and customizing human traits. This research explores the realm where science meets humanity's deepest desires, distinguishing between therapeutic applications and genetic enhancements. It draws attention to the moral and societal dilemmas that emerge as we progress from healing illnesses to personalizing characteristics. From genetic screening to embryo manipulation, important steps in the production of <i>designer babies</i> are described. Even while there are many possible advantages, such as eradication of genetic diseases and personalized medications, there are also ethical issues that have come up, like consent, the commodification of children, and unforeseen effects. The study also presents a critical perspective on sustaining humanity, emphasizing the importance of genetic diversity and human dignity. A case study on the work of He Jiankui, who controversially edited human embryos, illustrates both the promises and dangers of unregulated genetic experimentation. The study concludes with regulatory frameworks that promote responsible innovation while safeguarding human values, ensuring that technological progress does not come at the expense of humanity’s core principles.</p>
70.	<p><b>AN INVESTIGATION OF SUSTAINABLE LIVELIHOOD BASED ON INDIGENOUS WEAVING TRADITIONS AMONG TRIBAL WOMEN IN ASSAM AND MANIPUR</b></p> <p><u>Gehna Sharma</u> <i>Department of Anthropology, Panjab University, Chandigarh.</i></p> <p>This present study is concerned with the indigenous tribal traditions of Assam and Manipur and their connections with the environmental richness and with the local culture. Taking particular interest in the traditional textile practices of Assam and Manipur the study reveals the distinctiveness of the patterns, ornamentations, spinning and weaving techniques as per the cultural practices of the region. The research shows these practices are coming to an end, and only few tribes are still active in the field of sericulture. In response to this trend, the research seeks to bring some new ideas in the traditional designs but still maintains the core objectives so as to uplift the women weavers in their socio-economic status. The inquiry also extends to the women’s status in the Northeast handloom industry and their position in the context of production and sale of handlooms,</p>

	<p>while addressing the multifaceted engagements of women and their constraints without industry. This research intends to revitalize tribal textiles in Northeastern India, raise ecological-consciousness, and enhance the status of women producers using a qualitative approach. In this way, achieving all these objectives would help protect the cultural heritage and promote women weavers in Northeast India.</p>
71.	<p><b>ANTIBIOTIC RESISTANCE: A GLOBAL HEALTH CRISIS IN MAKING</b></p> <p><u>Harnoor Kaur</u>  <i>Department of Anthropology, Panjab University, Chandigarh.</i></p> <p>Antibiotics have been used for more than seventy years to cure bacterial infections either by killing bacteria or preventing them from growing and spreading. These are the most significant class of pharmaceuticals, bioactive agents with low molecular weight and medicinal applications. However, the misuse and overuse of antibiotics develop antibiotic resistance. <i>Antibiotic resistance</i> is the ability of pathogenic bacteria to survive and grow in the presence of an antibiotic that would normally kill them or inhibit their growth it occurs through various processes due to selection. It is becoming a global health challenge as the disease becomes less treatable and even small pneumonias become difficult to treat. Therefore, it is very important to acknowledge the mechanisms it takes into account and what are its types. Thus, the present study aims to shed light on biological and industrial strategies and environmental causes of antibiotic resistance development, the current scenario, global action to address antibiotic resistance, and resolving social and economic reasons behind this. Overall, understanding these possible reasons will give us insight to develop a collaborative approach on how it can be controlled.</p>
72.	<p><b>EXPLORING INDIGENOUS WATER MANAGEMENT TECHNIQUES IN INDIA FOR MODERN WATER CRISIS</b></p> <p><u>Harshita Jain</u>  <i>Department of Anthropology, Panjab University, Chandigarh.</i></p> <p><i>Indigenous</i> peoples are the custodians of many of the world's most fragile and important ecosystems. These Native people indeed have centuries of experience and supply valuable insights on sustainable approaches deeply rooted within their surroundings. Interlinking indigenous ideas into a modern form of environmental planning and policy frameworks is central to achieving <i>Viksit Bharat</i>. The present study aims to highlight the importance of stakeholder appreciation of regional traditions and knowledge systems that may make water management plans more successful and culturally appropriate for national development objectives as well as the connection between the health of nature and what humans require to thrive. The study supports cooperative frameworks that mainstream indigenous people in decisions over water resources. Mainstreaming indigenous people may generate inventive solutions embracing resilience and sustainability through the integration of traditional ecological knowledge with sophisticated scientific methodologies into use. This study will discuss the integral importance of indigenous knowledge and customs in the efficient use of water resources, especially in the context of rising water scarcity and climate change impacts.</p>
73.	<p><b>CHALLENGES OF VECTOR CONTROL: INSECTICIDE RESISTANCE IN PHLEBOTOMUS SANDFLIES IN THE INDIAN SUBCONTINENT</b></p>

	<p><u>Jeenat</u>, Sweta, Manvi, Anoop Raj Tiwari  <i>Department of Zoology, Panjab University, Chandigarh.</i></p> <p>Visceral leishmaniasis (VL) is a significant public health challenge in Southeast Asia. Countries like Bangladesh, Bhutan, India, Nepal, Sri Lanka, and Thailand are endemic to the disease. The primary vector of VL in the Indian subcontinent, <i>Phlebotomus argentipes</i> was first confirmed in 1942, and reports of insecticide resistance emerged in 1987 in Bihar, India. This review analyses studies conducted on insecticide resistance in <i>P. argentipes</i> and <i>P. papatasi</i>—the vectors of visceral and cutaneous leishmaniasis respectively. Reports from endemic regions of Bihar and West Bengal indicate resistance of <i>P. argentipes</i> to DDT, while non-endemic areas show susceptibility. Additionally, border areas of Nepal have demonstrated resistance, and biochemical resistance is emerging in Sri Lanka. In contrast, sandfly vectors in Bangladesh remain susceptible to pyrethroids. The spread of insecticide resistance is posing a threat to current vector control efforts. It is therefore necessary to further study sandfly resistance to various insecticides in various kala-azar endemic areas. Entomological surveys and the development of insecticide management plans, therefore are very crucial. Recent trials in Bihar, using alpha-cypermethrin indoor residual spraying, offered promising results, but alternative vector control methods are essential to be explored for achieving the goal of VL elimination. This review underscores the importance of addressing insecticide resistance in the fight against kala-azar and the need for innovative and sustainable control strategies in the Indian subcontinent.</p>
74.	<p><b>TITANIUM CARBIDE (Ti<sub>3</sub>C<sub>2</sub>) QUANTUM DOTS AMELIORATE COLONIC INFLAMMATION BY REDOX MODULATION IN EXPERIMENTAL COLITIS</b></p> <p><u>Kirti Sharma</u>, Naveen Kaushal  <i>Department of Biophysics, Panjab University, Chandigarh</i></p> <p>Ulcerative Colitis (UC) is a subtype of Inflammatory Bowel Disease (IBD) with unknown etiology. It is characterized by chronic inflammation condition of the colon. Currently available treatments, such as 5-aminosalicylic acid (5-ASA) and corticosteroids, pose significant limitations, side effects and inconsistent effectiveness. In this regard, Nanotechnology, presents a potential alternative. Currently, the redox modulatory and antioxidant therapeutic efficacy of Titanium Carbide (Ti<sub>2</sub>C<sub>3</sub>) MXene Quantum Dots (MQDs) was examined in DNBS-induced experimental model of colitis in mice. Biophysical characterization of MQDs using UV-visible spectroscopy, zeta potential analysis, and (HR-TEM) indicated uniform spherical morphology with size of 8nm and surface charge of -20meV. These MQDs showed enhanced in vitro free radical scavenging activity as evaluated using DPPH and ABTS assays. In vivo experiments in DNBS-induced colitis model, demonstrated that intraperitoneal administration of MQDs effectively reduced colonic inflammation, improved stool consistency, and lessened intestinal bleeding. Further MQDs improved classical indicators of colitis such as body weights, colon length, and disease activity index (DAI) in a redox sensitive manner as studied by measuring various oxidative stress markers. Biodistribution and toxicity studies indicated their maximum availability in Intestine after administration with no adverse effects as measured by Liver and Renal function markers. In conclusion, although MQDs may offer a viable therapeutic alternative for targeting inflammatory pathologies</p>



	<p>such as UC. However, detailed research is required to refine MQD formulations for potential clinical use.</p>
75.	<p><b>ACOUSTICALLY COMMUNICATING CRICKETS OF PANJAB UNIVERSITY, CHANDIGARH</b></p> <p><u>Komal Chopra</u>, Aditi, Mehak Sharma, Rahul, Ranjana Jaiswara  <i>Department of Zoology, Panjab University, Chandigarh.</i></p> <p>Acoustic signals are crucial for allowing communication among individuals of the same species and for establishing reproductive isolation between different species before mating. Crickets have been thoroughly studied as species that utilize acoustic signals. Male crickets produce species-specific audio signals, termed calling songs, to entice females from a distance. These signals are produced by a stridulatory apparatus present on their forewings. The species-specific characteristics of acoustic signals serve as a reliable tool for identifying and characterizing cryptic species, as well as for doing comprehensive acoustic monitoring to evaluate species richness in a particular geographic area. This study focuses on the characterization of the acoustic signals produced by crickets. A total of 82 acoustic recordings were obtained from the Panjab University campus and categorized into nine species based on their acoustic characteristics.</p>
76.	<p><b>UNRAVELLING ALZHEIMER'S DISEASE PATHOLOGY: A MULTI-OMICS AND NETWORK-BASED APPROACH FOR PRECISION BIOMARKER IDENTIFICATION</b></p> <p><u>Kriti Panchal</u>, Anuj, Yashti Maddan  <i>Centre for Systems Biology and Bioinformatics (U.I.E.A.S.T.), Panjab University, Chandigarh.</i></p> <p>Alzheimer's disease (AD) is a multi-factorial neurodegenerative disorder characterized by cognitive decline, driven by processes such as amyloid-beta aggregation, tau hyperphosphorylation, and neuroinflammation. This study employs NCBI GEO database for multi-omics data retrieval and bioinformatics tools utilizing R Studio for differential gene expression analysis and Cytoscape for network analysis, to identify biomarkers associated with AD pathology. Initial findings reveal strong associations between key biomarkers and disease advancement, supporting the development of early, targeted therapeutic strategies. Our results demonstrate the value of systems biology approaches in unravelling the complex molecular networks underlying AD, paving the way for precision medicine tailored to individual patients.</p>
77-80.	<p><b>CELLS TO CURE: PERSONALISED IPSCS FOR DIABETES</b></p> <p>Stanzin Nordon, Roopreet Kaur, <u>Kritika Chandel</u>, Tenzin Tsognees, Ravinder Kumar  <i>Department of Zoology, Panjab University, Chandigarh</i></p> <p>Diabetes Mellitus is chronic medical condition in which body is not able to modulate blood sugar levels either due to insufficient production of insulin or utilisation of insulin. Diabetes mellitus type 1 is an auto-immune disease in which Beta cells of pancreas</p>

	<p>secreting insulin hormone are attacked by auto reactive CD8+ cytotoxic T cells. More than 532 million people are suffering from diabetes and is one of the leading causes of death worldwide. In India, more than 74 million people are affected by diabetes within the age group of 20-79. Recent biggest breakthrough - Reversal of Diabetes Type 1 using Induced Pluripotent Stem Cells (iPSCs). A successful clinical trial performed by Shusen Wang and his fellow researchers on a 25 years old female Type 1 diabetic patient by transplanting chemically induced pluripotent stem cells [CiPSCs] Islet in her abdominal muscle, chemically reprogrammed from her own adipose tissue. After 75 days, the female patient began producing her own insulin, with no indications of transplant related complications. Induced pluripotent stem cells [iPSCs] are kind of stem cells that are reprogrammed from adult cells using four of the most efficient transcription factors, namely Oct3/4, Sox2, Klf4, c-Myc. iPSCs are competent to differentiate into all cell types excluding extra embryonic membranes. Various other researches is also going on utilisation of iPSCs for treatment of various life threatening diseases such as Parkinson's disease. Other studies have demonstrated regenerative potential of iPSCs for cardiomyocytes.</p>
81.	<p><b>"FOREIGN FINS": THE UNDERWATER BATTLE BETWEEN EXOTIC AND NATIVE FISH IN GOBINDSAGAR RESERVOIR (INDIA)</b></p> <p><u>Manvi</u>, Anoop Raj Tiwari, Sweta, Jeenat  <i>Department of Zoology, Panjab University Chandigarh.</i></p> <p>India has introduced exotic fish species for over a century to support various industries, including recreational fisheries, aquaculture, sport fishing, mosquito control, and the ornamental fish trade. Aquaculture, in particular, plays a significant role in driving this trend to meet the high demand for fish production. One exotic species of concern is the silver carp (<i>Hypophthalmichthys molitrix</i>), a problematic invader native to East Asia. Introduced to boost fish production due to its rapid growth and efficient plankton consumption, silver carp has established itself in reservoirs like Gobindsagar, leading to unintended ecological consequences. Silver carp aggressively competes with native species, particularly for zooplankton—a vital food source for many indigenous fish. This competition is intensified by their prolific breeding patterns, which allow them to outnumber and outcompete native fish, causing a decline in native fish populations and resulting in biotic homogenization. This process not only diminishes the diversity of local fish species but also contributes to a broader decline in beta diversity across freshwater systems. The ecological impacts extend beyond aquatic life. The reduction in native fish populations disrupts food webs, affecting species that rely on these fish for survival, including various bird species. The decline in bird populations is a direct result of the reduced availability of their primary food sources, further disturbing the ecological balance. Strategies should focus on safeguarding native species and restoring ecological balance, protecting the country's aquatic biodiversity from further degradation.</p>
82.	<p><b>DESIGNING THE FUTURE OF CLIMATE RESILIENT CROPS</b></p> <p><u>Muskan Attwal</u>, Charu Sharma, Papiya Mukherjee  <i>Department of Botany, Panjab University, Chandigarh.</i></p> <p>To meet the demands of an ever-increasing human population, it is imperative to grow climate-resilient crops. This requires innovative breeding strategies to develop</p>

	<p>biofortified, pest and disease-resistant crops. Conventional crop improvement through plant breeding is a cumbersome and time-consuming process. These problems can be solved by genetic modification which introduces desirable traits from other organisms to enhance yield, nutritional quality, and disease resistance. Modern methods enable precise gene editing to improve breeding efficiency. For climate-resilient crops, these strategies focus on traits like drought tolerance, heat resistance, and water-use efficiency. Similarly, traits like disease and pest resistance can be incorporated into the genome of commercially important crops through editing. In the future, integrating conventional breeding, genetic modification and genome editing can accelerate crop improvement. An effective deployment of these modern strategies requires careful consideration of regulatory frameworks, public acceptance, and potential environmental impacts. Collaborative research efforts and strategic breeding programs can ensure the development of climate-resilient crops, enhancing global food security and mitigating the impact of climate change. Keywords: resilient crops, plant breeding, genetic modification, genome editing.</p>
83.	<p><b>NEUROPHARMACOLOGICAL INVESTIGATIONS ON NF-<math>\kappa</math>B PATHWAY IN EXPERIMENTAL PARADIGM OF HUNTINGTON'S DISEASE.</b></p> <p><u>Muzamil Qayoom Lone</u>, Sangeeta Pilkhwal Sah  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Huntington's disease (HD) is a neurodegenerative disorder characterized by motor, cognitive, and psychiatric disturbances. Nuclear factor kappa B (NF-<math>\kappa</math>B) pathway plays a pivotal role in HD pathogenesis, regulating inflammation, oxidative stress, and neuronal death. This study investigated neuropharmacological modulation of NF-<math>\kappa</math>B pathway against Quinolinic acid induced Huntington disease in animal model. This study examined the effects of NF-<math>\kappa</math>B inhibitors (ellagic acid and vanillic acid) on NF-<math>\kappa</math>B activation, inflammatory cytokines (IL-1<math>\beta</math>, IL-6, TNF-<math>\alpha</math>), oxidative stress markers (ROS, MDA), and neuronal survival. NF-<math>\kappa</math>B activation exacerbated neurodegeneration and motor dysfunction after Quinolinic acid administration. Results showed that pharmacological modulation of NF-<math>\kappa</math>B pathway by ellagic acid and vanillic acid improved motor and cognitive function in animals. Further, NF-<math>\kappa</math>B inhibitors reduced inflammatory cytokine expression and oxidative stress which was further supported by histopathological studies. Our findings demonstrate the critical role of NF-<math>\kappa</math>B pathway in HD and suggest that targeting this pathway by ellagic acid and vanillic acid may offer an adjuvant therapeutic strategy for disease modification.</p>
84.	<p><b>ADVANCING OZONE THERAPY IN AQUACULTURE: CHALLENGES AND OPPORTUNITIES</b></p> <p>Nitika, Janvi Mathur, Aditi Arya, Jaspreet Kaur  <i>Department of Zoology, Panjab University, Chandigarh.</i></p> <p>Aquaculture is one of the growing sectors in global food production but it faces significant challenges from various fish diseases that threaten fish health and productivity. This study evaluates that ozone treatment in aquaculture is a more sustainable and less harmful alternative to antibiotics. Ozone as a disinfectant controls fish diseases without leaving harmful residues to the environment. The use of ozone and its derivatives in aquaculture is still in its early stages. Due to its chemical instability, ozone must be freshly prepared</p>

	<p>for the treatment, so it is important to adhere to high-quality standards. Various administration methods across different fish species, a lack of consistent outcome evaluations, and the absence of standardized treatment protocols hinder broader acceptance and official approval. Understanding the mechanisms of action behind ozone therapy could enhance its application in aquaculture. A key requirement for this advancement is a better grasp of the qualitative and quantitative characteristics of ozone and its derivatives. This study seeks to enhance understanding, allowing the full benefits of ozone therapy to be recognized and leading to greater acceptance and use in aquaculture. Keywords: Ozone therapy, Aquaculture, Disinfectant, Fish diseases, Antibiotic alternatives, Therapeutic applications.</p>
85.	<p><b>CRYONICS; WILL THE DEAD RETURN?</b></p> <p><u>Nitika Chaudhary</u>, Sangeeta Pilkhwal Sah  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Today technology plays a vital role in every aspect of life. Cryogenics is one of them, which is the scientific study of the production and effects at ultra temperature. A further innovation that falls under the category of cryogenics is cryonics, which involves freezing a deceased person in the hope of resurrecting them in the future. Cryonics is a method that combines science, technology, and human desire to preserve human bodies and brains at -196°C for possible future resuscitation. It can be used for life extension, tailored therapy, and future revival. Though there are challenges associated with it like, preservation at these temperatures would preserve perhaps a portion of the structures' attractive qualities, which most of us would like to preserve, and ultra-low temperatures could halt some metabolic processes. However, life can be restored through the use of cryonics as few case studies support this concept, and majority of future efforts will be in the field of cryonics.</p>
86.	<p><b>THERAPEUTIC POTENTIAL OF VIRAL VECTORS GLIOMASTOMA MULTIFORME</b></p> <p><u>Pallak Bahl</u>  <i>Department of Biotechnology, Panjab University, Chandigarh.</i></p> <p>Glioblastoma multiforme, a highly aggressive brain tumor in adults, remains devastating despite standard treatments, including chemotherapy, radiation, surgery. To improve the effectivity, researchers have been looking for innovative therapies leveraging molecular biology advancements. Gene therapy offers potential, utilizing viral vectors to deliver therapeutic genetic material to tumor cells, triggering an anti-tumor response. Viral vectors have a great potential for modifications, and genetic transfer capabilities making them valuable tools. REFERENCE - Manikandan C, Kaushik A, Sen D. Viral vector: potential therapeutic for glioblastoma multiforme. Cancer Gene Ther. 2020 May;27(5):270-279. doi: 10.1038/s41417-019-0124-8. Epub 2019 Jul 18. PMID: 31316136</p>
87 & 88.	<p><b>NOURISH TO FLOURISH: PERSONALIZING NUTRITION FOR OPTIMAL MENTAL HEALTH</b></p>

	<p>Payal Goyal, <u>Savneet Kaur</u>, Mani Chopra, Vijay Kumar <i>Department of Zoology, Panjab University, Chandigarh</i></p> <p>A mental disorder is characterized by a clinically significant disturbance in an individual's cognition, emotional regulation, or behaviour. In 2019, 1 in every 8 people, or 970 million people around the world were living with a mental disorder, with anxiety and depressive disorders the most common. Globally, it is estimated that 40% of all children aged 6–59 months, 37% of pregnant women and 30% of women 15–49 years of age are affected by anaemia.(2) Furthermore, In India, approximately 490 million people are vitamin D deficient of which 31% are children and adolescents.(3) Vitamin D and iron are vital micronutrients crucial for neuropsychiatric health. Vitamin D regulates serotonin synthesis, affecting mood and cognition, with deficiencies linked to depression and anxiety. Iron is essential for neurotransmitter production and brain oxygenation, and its deficiency impairs cognitive function and contributes to fatigue and mood disorders. Deficiencies in either are linked to mood disorders, cognitive decline, and mental fatigue. While effective prevention and treatment options exist, most people with mental disorders do not have access to effective care. Therefore, personalized nutrition has gained significant attention as a tool to optimize mental health outcomes. This focuses on the key nutrients linked to mental health, the impact of the gut-brain axis, and the potential for customized dietary interventions to support mental well-being.</p>
89.	<p><b>HUMAN REMAINS AND ALGORITHMS: THE ROLE OF AI IN FORENSIC ANTHROPOLOGY</b></p> <p><u>Shreeji Aggarwal</u> <i>Department of Anthropology, Panjab University Chandigarh.</i></p> <p><i>Forensic anthropology</i> is the study of human skeletal remains within a legal framework and a key tool in personal identification. An individual's age, sex, and ancestry can be estimated by analyzing bones, which are integral to personal identification processes in criminal cases, mass disasters, or historical investigations, especially when other major evidence such as fingerprints or dental records are not available for more traditional identification. With technological advancements, AI has increased the accuracy and efficiency of forensic anthropological analyses. There are several AI models designed to automate age, sex, and ancestry estimation from skeletal remains. Machine learning algorithms applied to huge datasets improve accuracy and minimize human error. In this study, several AI models, their methodologies, and real-time applications in forensic anthropology are discussed. Additionally, the limitations such as challenges in data generalization, model biases, and the need for further refinement to ensure reliability in diverse populations are also highlighted.</p>
90.	<p><b>PARASITES AS BIOINDICATORS OF ENVIRONMENTAL CHANGE AND ECOSYSTEM HEALTH</b></p> <p><u>Shreya</u>, Harpreet Kaur <i>Department of Zoology, Panjab University Chandigarh.</i></p> <p>Parasites are attracting increasing interest from parasite ecologists as potential indicators of environmental quality due to the variety of ways in which they respond to</p>

	<p>anthropogenic pollution. The association between parasite diversity, prevalence, and heavy metal levels in several ecosystems is investigated in this study. Heavy metals can affect host-parasite interactions and upset ecological balance. They are frequently the product of human activity. Numerous studies have examined the effects of anthropogenic-induced environmental perturbations on parasitic organisms at both the population and the community level by examining parasite populations in contaminated versus uncontaminated sites, we highlight how shifts in parasite community structures reflect environmental stressors. This study emphasises how crucial it is to include parasitological evaluations in environmental monitoring programs since they offer a sensitive method of identifying and evaluating the ecological effects of heavy metal contamination. All things considered, parasites can be useful bioindicators that help determine the health of ecosystems and direct conservation initiatives in contaminated area.</p>
91.	<p><b>HARNESSING SUPERPARAMAGNETIC IRON OXIDE NANOPARTICLES (SPIONs) FOR ENHANCED BIOREMEDIATION</b></p> <p><u>Shweta Kumari</u> <i>University Institute of Engineering and Technology</i></p> <p>he urgent need for effective pollution remediation has led to the exploration of superparamagnetic iron oxide nanoparticles (SPIONs) as innovative agents in water treatment. SPIONs possess unique properties, including high surface area and magnetic responsiveness, facilitating the removal of pollutants such as heavy metals, organic dyes, and phenylhydrazine phosphate (PHPS). This study investigates how SPIONs enhance bioremediation through targeted delivery of beneficial microorganisms and enzymes, improving degradation rates beyond conventional methods. Comparative toxicity assessments using zebrafish (<i>Danio rerio</i>) reveal that while SPIONs can induce developmental toxicity at concentrations above 10 mg/L (Vázquez-Núñez et al. (2020), surface modifications with biocompatible materials significantly mitigate these effects. Integrating SPIONs with advanced oxidation processes (AOPs) further enhances the degradation of persistent organic pollutants by generating reactive species. Notably, SPIONs are effective in treating industrial wastewater contaminated with heavy metals, dyes, and PHPS, enabling efficient pollutant removal and easy recovery via magnetic separation. This review underscores the potential of SPIONs to transform environmental cleanup strategies while addressing ecological safety concerns through innovative modifications and integrated technologies. By harnessing the unique properties of SPIONs alongside bioremediation techniques, this poster will focus on their mechanisms of action, comparative toxicity studies, and future applications in sustainable water pollution management.</p>
92.	<p><b>INNOVATIVE VACCINATION STRATEGIES: PAVING THE WAY TO ERADICATE LEISHMANIASIS</b></p> <p><u>Sweta, Jeenat, Anoop Raj Tiwari, Manvi</u> <i>Department of Zoology, Panjab University Chandigarh.</i></p> <p><i>Leishmaniasis</i> is one of the most dangerous and neglected tropical diseases, caused by the protozoan <i>Leishmania</i> spp. It is a vector-borne illness transmitted by over 30 species of sand flies (<i>Phlebotomus</i> in the Old World and <i>Lutzomyia</i> in the New World), posing a major global health challenge. An estimated 50 000 to 90 000 new cases of VL occur</p>

	<p>worldwide annually, with only 25–45% reported to WHO 2024. In India as per report of 2023 decline has been noticed in <i>Leishmania</i> cases but the challenge remains to prevent a resurgence, especially with Post-Kala-Azar Dermal <i>Leishmaniasis</i> (PKDL). Due to drug resistance and side effects, there is an urgent need for effective vaccines, as they can induce a strong and long-lasting immune response that could eliminate the parasite. The focus now is on different types of vaccines: first-generation, second-generation, and third-generation, along with challenges in vaccine development and the use of indigenous technologies for anti-leishmanial vaccines. Recent advancements include recombinant protein-based vaccines, viral vector-based vaccines, bacterial vector-based vaccines, and nanoparticle delivery systems. Moreover, adjuvants, novel immunomodulatory agents, and the integration of technologies like CRISPR and bioinformatics are being explored for vaccine development. Collaborative efforts integrating immunology, molecular biology, and field studies are essential for translating these innovative approaches into effective vaccines. The poster emphasizes the importance of interdisciplinary research in addressing the complexities of host-pathogen interactions and the need for vaccines that are safe, effective, and scalable for diverse populations.</p>
93.	<p><b>INTEGRATING INDIGENOUS AGRICULTURAL PRACTICES FOR SUSTAINABLE NUTRITION AND FOOD SECURITY IN INDIA: ADVANCING TOWARDS ZERO HUNGER</b></p> <p><u>Navjyot Kaur Dyal</u>, Manoj Kumar, Komal Sehgal  <i>Centre for Public Health, Panjab University, Chandigarh</i></p> <p>This research underscores the critical role of indigenous agricultural practices in enhancing food security, nutrition, and sustainable food systems, directly aligning with the United Nations SDG of Zero Hunger. To combat malnutrition and address micronutrient deficiencies in urban populations we look at centuries of traditional knowledge which have been historically employed by rural and tribal populations to facilitate the cultivation of highly nutritious, drought-resistant crops such as millets (Ragi, Bajra, Jowar) and pulses. Through systematic review we collated existing case studies from sustainability organisations across India, focusing on successful sustainable agriculture practices influenced by indigenous technologies. These practices align with global efforts advocating for the right to nutritious, affordable, safe, and sustainable food, contributing to reducing diet-related diseases like diabetes and obesity. Indigenous techniques like mixed cropping, agroforestry, and seed preservation, have been proven to build climate-resilient agricultural systems, ensuring food security in the face of climate change. Therefore, integrating these traditional practices with modern agricultural innovations and national policies is critical for advancing Zero Hunger. Furthermore, to effectively address food security, industry stakeholders, researchers, and policymakers must engage with indigenous knowledge holders, fostering collaborative, bottom-up approaches to sustainable agriculture and food systems. These Indigenous methods emphasize self-sufficiency, biodiversity and soil conservation, thus, fostering resilient systems that reduce reliance on chemical inputs and promote ecological balance. Therefore, by valuing indigenous knowledge and aligning it with national strategies, India can make significant strides toward achieving the SDG of Zero Hunger and ensuring food and nutritional security for all.</p>
<p><b>UG/PG Students from Colleges and Other Institutions</b></p>	

S. No.	Abstract
94.	<p data-bbox="297 268 1427 373"><b>NANOTECHNOLOGY IN ALZHEIMER'S DISEASE: ADVANCEMENTS IN DIAGNOSIS AND TARGETED THERAPY THROUGH BIOCOMPATIBLE NANOPARTICLES</b></p> <p data-bbox="297 415 862 491"><u>Ashish Kumar</u> <i>Centre of Nanoscience and Nanotechnology</i></p> <p data-bbox="297 533 1427 1188">Alzheimer's disease (AD) is a progressive neurodegenerative disorder that severely affects cognitive functions, including memory, thinking, and behaviour. Notably, brain alterations associated with AD can commence 10 to 20 years prior to the onset of clinical symptoms, complicating early diagnosis and timely intervention due to a lack of reliable biomarkers. Recent advancements in nanotechnology offer promising solutions for the diagnosis and treatment of AD. Nanoparticles (NPs), measuring between 1 to 100 nm, enable targeted drug delivery, allowing medications like Rivastigmine to be administered directly to the brain while minimizing systemic side effects by effectively crossing the blood-brain barrier. Furthermore, biocompatible nanoparticles improve imaging modalities, facilitating earlier and more precise detection of AD, which is crucial for timely therapeutic interventions. The increasing body of research supporting the use of NPs in the central nervous system underscores their potential to revolutionize the management of Alzheimer's disease. This review highlights the current challenges faced in AD diagnosis and therapy and discusses the multifaceted advantages of biocompatible nanoparticles as both imaging agents and drug carriers. By enhancing our ability to detect and treat AD at earlier stages, nanotechnology has the potential to transform the landscape of Alzheimer's disease management, offering hope for improved patient outcomes and quality of life.</p>
95.	<p data-bbox="297 1230 1427 1335"><b>LIFE CYCLE AND BEHAVIORAL STUDY OF TAGIADES LITIGOSA AT THE BOTANICAL GARDEN OF SRI GURU GOBIND SINGH COLLEGE, CHANDIGARH</b></p> <p data-bbox="297 1377 1192 1453"><u>Deepali, Diksha Maurya</u> <i>Department of Zoology, Sri Guru Gobind Singh College, Chandigarh.</i></p> <p data-bbox="297 1495 1427 2011">We discovered <i>Tagiades litigosa</i> in the Botanical Garden of Sri Guru Gobind Singh College, Sector 26, Chandigarh, specifically on the leaves of <i>Dioscorea bulbifera</i>. During our observation, we encountered different developmental stages of <i>T. litigosa</i>, from egg to adult, along with their unique nesting behaviors. The leaf margins were intricately folded, creating a protective environment for the larvae, shielding them from harsh external conditions, including rain, predators, and desiccation. Eggs, which were solitary and spherical with fibrous projections, were found on the leaf surfaces. This contrasts with most lepidopteran eggs, which are typically located beneath the leaves. The larvae had a yellowish-green body on the abdomen and a distinct triangular, reddish-brown head, feeding voraciously on the leaves of <i>D. bulbifera</i>. To further investigate, we isolated larvae and observed their entire developmental process. We documented key life stages, including defecation patterns, pupation, and metamorphosis into an adult. This research presents a detailed analysis of the life cycle of <i>T. litigosa</i>, contributing to our understanding of the species' behaviour.</p>



96.	<p><b>ENHANCING QUINESTROL BIOAVAILABILITY FOR RODENT PEST MANAGEMENT: A NANOTECHNOLOGY-BASED APPROACH</b></p> <p><u>Dimple Mandla</u><sup>1</sup>, Neena Singla<sup>1</sup>, Anu Kalia<sup>2</sup>  <sup>1</sup><i>Department of Zoology, Punjab Agricultural University, Ludhiana,</i>  <sup>2</sup><i>Department of Soil Science, Punjab Agricultural University, Ludhiana.</i></p> <p>This research investigates the use of poly (lactic-co-glycolic acid) (PLGA) nanoparticles, infused with quineestrol, for long-term fertility regulation in rodents. Quineestrol, a synthetic version of estrogen, is promising for managing rodent populations; however, its quick breakdown in the organism leads to its reduced bioavailability. The study examines the use of PLGA nanoparticles to enhance the stability and availability of quineestrol in the body. Both blank PLGA nanoparticles (PNP) and quineestrol-loaded PLGA nanoparticles (QNP) were produced through the emulsion-evaporation technique and assessed for their size and controlled-release properties. The QNP, with a size of 337.93±6.51 nm, was more compact than the PNP, which measured 354.33±3.87 nm, suggesting successful drug incorporation. The release study showed that quineestrol was steadily released from the nanoparticles over a period of 96 hours. The study also measured the effect of these nanoparticles on reproductive hormone levels in female rats (<i>Bandicota bengalensis</i>) using ELISA. The rats received the drug orally via specially prepared cereal baits containing either bulk quineestrol (QB) or QNP. Notably, the quineestrol dosage delivered via nanoparticles was significantly lower (10 ppm) than that of the bulk form (100 ppm). The QNP's ability to alter the levels of estradiol, progesterone, FSH, and LH was observed for up to 75 days of observation, outlasting the QB's 45-day effectiveness, thus indicating the extended potency of QNP in modulating reproductive hormones. The findings indicate that PLGA nanoparticles are an effective method for the extended and controlled delivery of quineestrol, offering a viable solution for prolonged rodent management.</p>
97.	<p><b>EVALUATION OF ANXIOLYTIC AND LOCOMOTOR ACTIVITY OF ETHANOLIC EXTRACT OF PRUNUS PERSICA LEAVES IN WISTAR RATS</b></p> <p><u>Shalini Thakur</u>, Arshdeep Kaur, Jaswinder Kaur, Gurinder Singh  <i>G.H.G Khalsa College of Pharmacy, Gurusar Sadhar, Ludhiana, Punjab.</i></p> <p>The aim and objective of the present research were to evaluate the anxiolytic and locomotor activity and to investigate several oxidative stress markers of ethanolic extract of <i>Prunus persica</i> leaves. Wistar rats were divided into four groups, with group I receiving no treatment, group II receiving diazepam, and group III and IV administered EEPP (200 and 400 mg/kg, p.o. respectively). The treatment was continued for 8 days. On the 8th day, after 45 mins of treatment, rats were evaluated for anxiolytic activity and locomotor activity, and their brains were homogenized for biochemical parameters assessment. EEPP administration significantly increased cumulative time spent and number of entries in open arms and lighted side (<math>P &lt; 0.05</math>) compared to the control group at both tested doses in the elevated plus maze model and light-dark apparatus. In locomotor activity evaluation, treatment with EEPP, at both the tested doses, significantly (<math>P &lt; 0.05</math>) increased the number of mobility counts as compared to the control group. In the neuroprotective assay, treatment with EEPP significantly (<math>P &lt; 0.05</math>) decreased the lipid peroxidation levels while, a significant (<math>P &lt; 0.05</math>) increase in GSH, SOD, and catalase levels was recorded versus the control group. Further, levels of LPO and Catalase</p>

	<p>recorded in brain homogenates on EEPP treatment, at 400 mg/Kg dose, were comparable to that obtained on treatment with the standard drug, diazepam. Taken altogether, the present study demonstrates that the EEPP leaves have an anxiolytic effect. The drug might act on GABAA receptors to give anxiolytic activity.</p>
98.	<p><b>ISOLATION AND CHARACTERIZATION OF PLANT GROWTH PROMOTING ENDOPHYTIC BACTERIA FROM DIRECT SEEDED RICE AND BIOENZYMES</b></p> <p><u>Swetha Muduku</u><sup>1</sup>, Anu Kalia<sup>2</sup>, Sreelakshmi M V<sup>1</sup>, Suman Kumari<sup>1</sup>, Buta Singh Dhillon<sup>3</sup>, Urmila Gupta<sup>1</sup></p> <p><sup>1</sup> Department of Microbiology, College of Basic Sciences and Humanities, <sup>2</sup> Electron Microscopy and Nanoscience Laboratory, <sup>3</sup> Department of Plant Breeding and Genetics, College of Agriculture.</p> <p>Conventional rice cultivation involves flooding of the rice fields which negatively affects the groundwater availability. Direct seeded rice or DSR cultivation has advantages such as improved water efficiency, reduced labor costs, and earlier harvests. However, the challenges such as low seed germination rates and stunted growth affect the rice yield cultivated through DSR approach. These two issues can be effectively circumvented through use of plant growth-promoting bacteria (PGPB) which can enhance plant growth through a variety of mechanisms spanning over phosphorus solubilization, hydrogen cyanide and organic acid production, and the synthesis of phytohormones like indole acetic acid and gibberellic acid. To improve germination and early growth in direct-seeded rice, this study investigates the effects of seed priming with PGPB and microbial cultures obtained from bioenzyme formulations. The bacterial cultures were isolated from root tissues (endophytic bacteria: 8 cultures) and rhizosphere (rhizospheric bacteria: 19) of rice plants. Furthermore, six rhizospheric isolates were obtained from the maize crop while six bacterial isolates were obtained from the mixed fruit and citrus fruit bioenzyme formulations. All bacterial isolates and bioenzymes demonstrated positive results for phosphorus solubilization and organic acid production, while none exhibited hydrogen cyanide production. The promising bacterial cultures were bioprimered on the rice seeds of varieties PR-126 and PB-1121 and in-vitro filter paper study was performed to evaluate the growth promotion effects on two weeks old rice seedlings. The bacterial cultures isolated from the rice rhizosphere and citrus fruit bioenzyme formulation exhibited significantly best results for direct seeded rice crop.</p>



# Management Sciences

- University Institute of Applied Management Sciences (UIAMS)
- University Business School (UBS)
- University Institute of Hotel & Tourism Management, (UIHTM)
- Fashion Technology and Vocational Development (UIFT)

## **CO-ORDINATORS**

*Sectional President*

**Prof. Monika Aggarwal**

**9855024332**

*Sectional Secretary*

**Dr. Manu Sharma**

**9463327969**

**CHASCON 2024**  
**NATIONAL CONFERENCE ON**  
**“Indigenous Technologies for Viksit Bharat”**  
**SECTION: MANAGEMENT SCIENCES**

**Program (Thursday, November 07, 2024)**  
**Venue: UIAMS, Panjab University, Sector-25, Chandigarh**

<b>Sectional President</b> Prof. Monika Aggarwal 9855024332		<b>Sectional Secretary</b> Dr. Manu Sharma 9463327969	
<b>Time</b>	<b>Program</b>		
<b>09:00-09:45</b>	Registration		
<b>09:45-10:00</b>	Inauguration of Sectional Program -Speaker 1 -Speaker 2 <i>Venue:</i> Room 101, UIAMS		
<b>10:00-10:45</b>	<b>Session Chair and Evaluator:</b> Professor Sanjeev K Sharma Oral Presentation - Faculty		
<b>10:45-11:30</b>	<b>Session Chair and Evaluator:</b> Professor Upasna Joshi Oral Presentation- Research Scholars		
<b>11:30-12:00</b>	Tea Break		
<b>12:00-1:00</b>	<b>Session Chair and Evaluator:</b> Professor Nishi Sharma Oral Presentation –Research Scholars		
<b>1:00-2:00</b>	Lunch		
<b>2:00 – 3:00</b>	Poster presentations		

ABSTRACTS OF  
ORAL  
PRESENTATIONS

<b>Oral Presentation: management</b>			
<b>S. No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>			
1.	Dr. Aman Khera	University Institute of Applied Management Sciences, Panjab University, Chandigarh.	Empowering Viksit Bharat: Leveraging Indigenous Technologies for Renewable Energy
2.	Dr. Harsh Tuli	University Institute of Applied Management Sciences, Panjab University, Chandigarh.	Impact of Board independence on firm performance: A study of top Indian firms
3.	Dr. Jagandeep Singh	University Institute of Applied Management Sciences, Panjab University, Chandigarh.	Adoption of digital marketing in MSMEs to advance the vision of 'Viksit Bharat'
4.	Dr. Jaswinder Kumar	University Institute of Hotel and Tourism Management, Panjab University, Chandigarh.	Rural tourism for Viksit Bharat: exploring opportunities and impacts.
5.	Dr. Monika Sharma	Cordia Institute of Business Management, Sanghol, Punjab.	Mentoring as a Catalyst for Leadership Excellence: A Review.
6.	Prof. Nishi Sharma, Kiran Jindal, Arshdeep	UIAMS, Panjab University, Chandigarh, MCM DAV College For Women, Chandigarh.	Social Stock Exchange: An Innovative Tool for Philanthropy
7.	Dr. Ramandeep Bawa	University Institute of Fashion Technology, Panjab University, Chandigarh	Exploring The Factors That Mediate Between Peer Pressure, Anxiety and Formation of Fashion Choices Among Young Adults.
8.	Ms. Savita Kumari	Panjab University, Chandigarh.	Evaluating the effectiveness of open-source digital library software in India: Adoption Trends, Challenges, and Impacts.

<b>Faculty/Scientists from Colleges and Other Institutions</b>			
9.	Mrs. Bharti Pahuja,	National Institute of Fashion Technology Panchkula.	Empowering India's Craft Sector: From Indigenous Fibers to Sustainable Production and E-Commerce.
<b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b>			
10.	Mr. Arshdeep Singh	University Institute of Applied Management Sciences, Panjab University, Chandigarh.	Mapping The Research Landscape of Impact Investing: A Bibliometric Analysis and Future Research Agenda.
11.	Ms. Akanksha Garg	University Institute of Fashion and Lifestyle Technology, Panjab University Chandigarh.	Conscious Fashion: Driving sustainability and Innovation in the Fashion Industry.
12.	Ms. Deeksha	University Institute of Applied Management Sciences, Panjab University, Chandigarh.	Mapping the conceptual framework of Intellectual Capital research.
13.	Ms. Diksha	University Institute of Fashion and Lifestyle Technology, Panjab University Chandigarh.	Designing A Sustainable Fashion Ensemble from Textile Waste with Templesaffron Flower And Turmeric Dyes
14.	Mr. Divyang Goel	University Institute of Applied Management Sciences, Panjab University, Chandigarh.	An Empirical Study On National And International Factors Affecting Gold Prices.
15.	Ms. Ginni Singh	University Institute of Fashion Technology and Vocational Development, Panjab University Chandigarh.	Exploring Sustainable Garment Design Through Eco-Printing Technique Using Flowers And Leaves
16.	Ms. Kanika	University Institute of Applied Management Sciences, Panjab University, Chandigarh.	What Drives the Intention To Buy Electric Vehicles In India? Investigating The Role of Personality Traits, Environmental Consciousness, And Demographic Variables.



17.	Mr. Karandeep Bhayana	University Institute of Applied Management Sciences, Panjab University, Chandigarh.	Fuelling India's growth: Role of Microfinance Institutions
18.	Ms. Kiran Sharma	University Institute of Applied Management Sciences, Panjab University, Chandigarh.	Unveiling impact of behavioural finance on women's investment decisions.
19.	Ms. Kirandeep Kaur	University Institute of Applied Management Sciences, Panjab University, Chandigarh.	The Role of Microfinance in Women's Empowerment
20.	Ms. Mitali Jain	University Institute of Fashion and Lifestyle Technology, Panjab University Chandigarh.	Exploring Fashion Illustration Preferences among Fashion Design Students
21.	Ms. Mona	University Institute of Applied Management Sciences, Panjab University, Chandigarh.	Mapping the Landscape of Cloud-Based Accounting: A Comprehensive Review of Emerging Trends and Practices.
22.	Ms. Neha Verma	University Institute of Applied Management Sciences, Panjab University, Chandigarh.	Walking the Talk during the ESG Era: Exploring Greenwashing and Authenticity in Corporate Sustainability Reporting.
23.	Ms. Nikita	University Business School, Panjab University Regional Centre, Ludhiana	Bibliometric Analysis Of Augmented Reality Research In Indian Business: Trends, Influences, And Future Directions
24.	Ms. Parneet Kaur	University Institute of Applied Management Sciences, Panjab University, Chandigarh.	Beyond Hiring: Exploring Organisational Attractiveness Through a Systematic Literature Review
25.	Ms. Payal Gupta	University Business School, Panjab University, Chandigarh.	Understanding Motivators and Barriers Towards Purchase of Handicraft Items Through Indigenous Online Platforms: A Study of Panjab University, Chandigarh.

26.	Ms. Pooja Singh	University Institute of Applied Management Sciences, Panjab University, Chandigarh.	Green Banking- A path leading to sustainable growth.
27.	Ms. Prachi Singla	University Institute of Applied Management Sciences, Panjab University, Chandigarh.	Personal characteristics and strategic business practices of rural women entrepreneurs: A study of Punjab.
28.	Ms. Preeti	University Institute of Applied Management Sciences, Panjab University, Chandigarh.	Influence Of HR Practices on Innovative Work Behaviour.

<b>List of Abstracts</b>	
<b>Oral Presentation</b>	
<b>S. No.</b>	<b>Abstract</b>
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>	
1.	<p><b>EMPOWERING VIKSIT BHARAT: LEVERAGING INDIGENOUS TECHNOLOGIES FOR RENEWABLE ENERGY</b></p> <p><u>Dr. Aman Khera</u> <i>University Institute of Applied Management Sciences, Panjab University, Chandigarh.</i></p> <p>India aspires to become a Viksit Bharat (Developed India), renewable energy plays a crucial role in achieving sustainable development, energy security, and environmental stewardship. Leveraging indigenous technologies in renewable energy, such as solar, wind, bioenergy, and hydropower, offers transformative potential for powering India's growth while reducing its carbon footprint. With abundant natural resources and innovative capabilities, India is well-positioned to lead the global transition towards clean energy. Indigenous technologies, like advanced solar panel manufacturing, wind turbine innovations, and bioenergy from agricultural waste, can meet the country's growing energy demands while creating economic opportunities. Solar energy, in particular, holds immense promise, with India's favourable climate allowing for large-scale deployment of photovoltaic systems. Wind energy harnessed from coastal and inland areas further diversifies the energy mix. Additionally, bioenergy solutions can convert organic waste into fuel, providing sustainable alternatives to fossil fuels while addressing waste management challenges. Empowering India's renewable energy sector requires strategic policies, research, and investments in indigenous technologies to increase efficiency, lower costs, and scale up adoption. Expanding local manufacturing capabilities and encouraging innovation will foster selfreliance, reduce dependence on imported technologies, and create green jobs. Collaborative efforts between the government, industry, and scientific communities are essential to achieving India's ambitious renewable energy targets. India can not only meet its energy needs sustainably but also set an example for the global transition to clean energy, supporting the vision of a Viksit Bharat. Indigenous technologies in renewable energy. This paper explores indigenous technologies driving India's renewable energy (RE) revolution, empowering Viksit Bharat.</p>
1.	<p><b>IMPACT OF BOARD INDEPENDENCE ON FIRM PERFORMANCE: A STUDY OF TOP INDIAN FIRMS</b></p> <p><u>Dr. Harsh Tuli</u> <i>University Institute of Applied Management Sciences, Panjab University, Chandigarh.</i></p> <p>The changes in the Companies Act 2013 brought the limelight on some very crucial elements of governance. Some of the major changes were related to independent directors, representation of women on boards among others. As per the new guidelines</p>

	<p>boards were mandated to have 1/3rd independent directors on the board. This was a major change in Indian business landscape of family run businesses. The present paper not only checks the compliance on the matter by the top firms in India but also checks for the impact of Board independence on firm's performance. The sample for the study were NSE 500 index with the final sample not including financial and public sector companies due to them being governed by rules and guidelines other than just those of the Companies' Act 2013. The time period for the study was 5 years since the announcement of the new laws and thus the years 2013-2018 were taken as period of the study. Following a fixed effect panel regression analysis the results showed that there is a significant relationship between board independence and firm performance. But the results were different for different performance variables which tell a separate story in itself. Also as for the compliance, there was a shift as firms in India had largely 50% independent directors on board. But still a lot needs to be done as close to 36% companies in 2017-18 failed to comply with mandate set by the new guidelines under the Companies' Act 2013.</p>
2.	<p><b>ADOPTION OF DIGITAL MARKETING IN MSMEs TO ADVANCE THE VISION OF 'VIKSIT BHARAT'</b></p> <p><u>Jagandeep Singh</u>  <i>University Institute of Applied Management Sciences, Panjab University, Chandigarh.</i></p> <p>Digital marketing can play a significant role in empowering Indian MSMEs (Micro, Small &amp; Medium Enterprises) to thrive in the present-day evolving economy. This growth, in turn, can advance the vision of a 'Viksit Bharat'. This paper explores various digital marketing strategies that can be used to enhance the visibility, competitiveness, and growth prospects of Indian MSMEs. Key strategies include leveraging social media platforms, optimizing search engine visibility, and using content marketing to provide valuable and relevant information to potential customers. The paper also addresses challenges such as resource constraints and gaps in digital literacy that are specific to Indian SMEs. Determining the efficacy of digital marketing strategies in light of operational and financial metrics of organizations remains a challenge. The paper provides solutions to overcome these limitations. Adoption of digital marketing strategies will enable MSMEs to compete with larger players and also contribute to India's economic development and thus advance the vision of 'Viksit Bharat'.</p>
3.	<p><b>RURAL TOURISM FOR VIKSIT BHARAT: EXPLORING OPPORTUNITIES AND IMPACTS</b></p> <p>Dr. Jaswinder Kumar  <i>University Institute of Hotel and Tourism Management, Panjab University, Chandigarh.</i></p> <p>Rural India is largely untapped by the tourism industry, with most visitors drawn primarily to the country's major cities and attractions. However, in recent years there has been a growing trend in rural tourism in India, driven by the desire for authentic cultural experiences, sustainable tourism practices and opportunities for rural economic development. This article discusses the growth and opportunities of rural tourism to achieve the objectives of Viksit Bharat and the challenges and opportunities of the</p>

	<p>sector. The paper provides an overview of the current state of rural tourism in India and highlights some of the key players and initiatives working to promote and develop the sector. Finally, the paper explores the economic, social and environmental impacts of rural tourism in India and how the sector can be developed to benefit both visitors and local communities. The paper concludes with recommendations for industry stakeholders to maximize the potential of rural tourism in India and minimize.</p>
<p>4.</p>	<p><b>MENTORING AS A CATALYST FOR LEADERSHIP EXCELLENCE: A REVIEW</b></p> <p>Dr. Monika Sharma <i>Cordia Institute of Business Management, Sanghol.</i></p> <p>Mentoring has emerged as a transformative strategy for cultivating leadership excellence, precipitating a paradigm shift in organizational development. This comprehensive review distills the essence of existing literature, synthesizing 50 seminal studies published between 2010 and 2024. The findings unequivocally underscore mentoring's profound impact on leadership efficacy, self-awareness, and career ascendancy. Effective mentorship programs yield remarkable dividends, including enhanced decision-making acumen, augmented job satisfaction, and heightened organizational commitment. This review elucidates the nuances of mentoring's influence on leadership development, highlighting pivotal factors such as mentor-protégé chemistry, regular feedback, and contextualized guidance. Conversely, challenges including temporal constraints, mentor-protégé mismatch, and institutional inertia are adeptly addressed. By harnessing the potential of mentoring, organizations can foster a culture of leadership excellence, catalyzing innovation, and intellectual curiosity. This study informs evidence-based practice, underscoring mentoring's indispensable role in leadership development.</p>
<p>5.</p>	<p><b>SOCIAL STOCK EXCHANGE: AN INNOVATIVE TOOL FOR PHILANTHROPY</b></p> <p><u>Nishi Sharma</u>, Kiran Jindal, Arshdeep <i>UIAMS, Panjab University, Chandigarh, MCM DAV College For Women, Chandigarh.</i></p> <p>Social stock exchanges (SSE) have revolutionized the traditional stock exchanges. The SSE has been introduced as a special segment at stock exchanges to provide digital platform for fundraising to social enterprises including Non-Profit Organizations as well as For-Profit Enterprises. At global level, the first SSE was introduced by Brazil in 2003 and then six more countries such as South Africa, Portugal, Canada, Singapore, United Kingdom and Jamaica have launched their SSEs. India has also recently announced to introduce SSE in its capital market in 2019 to channelize the funds to social enterprises in more transparent and systematic manner. The SSE segment of Indian stock exchange has two innovative features to make it distinct from its counterparts viz., Zero Coupon and zero principal bond and mandatory social audit. The SSE is an innovative model of Philanthropy in Atmanirbhar Viksit Bharat. The present paper aims at identifying various issues and challenges that may impede the success of this model in India.</p>

<p>6.</p>	<p><b>EXPLORING THE FACTORS THAT MEDIATE BETWEEN PEER PRESSURE, ANXIETY AND FORMATION OF FASHION CHOICES AMONG YOUNG ADULTS</b></p> <p>Ankita Devi, <u>Ramandeep Bawa</u>, Bharti Sharma  <i>MSc Student, University Institute of Fashion Technology, Panjab University, Chandigarh., Guest Faculty, University Institute of Fashion Technology, Panjab University, Chandigarh, Research Scholar, University Institute of Fashion Technology, Panjab University, Chandigarh.</i></p> <p>Peer pressure is defined as the phenomenon in which individuals within a social group impact one another to engage in activities they may not be inclined to do on their own and Fashion is about getting noticed, and presenting oneself. Clothes are the main indicator of taste and social standing. Fashion choices are influenced by range of factors such as including personal preferences, cultural norms, trends, and social influences like peer pressure. Peer pressure, often experienced through social interactions, can heavily influence individual choices, including fashion preferences. This study investigates the impact of peer pressure on fashion decision-making and its relationship to anxiety and the factors that mediate between peer pressure, anxiety and formation of fashion choices among young adults. The sample size consisted of 50 female respondents. The results were assimilated through random sampling technique. The researchers investigated that at many instances the respondent made their choice on the approval made by peer pressure. The researchers also found out that anxiety and peer pressure in clothing are closely related where appearance play a significant role. People often compare them self to others. Seen peers dressed in certain way created pressure on the respondent leading to anxiety over ‘not measuring’ or fitting in the group. The pressure to follow trends and the fear of being judged for not wearing right clothes can lead to social anxiety. In dealing with these issues, developing self- confidence and embracing personal style, uniqueness over conformity can help reduce anxiety.</p>
<p>7.</p>	<p><b>EVALUATING THE EFFECTIVENESS OF OPEN SOURCE DIGITAL LIBRARY SOFTWARE IN INDIA: ADOPTION TRENDS, CHALLENGES, AND IMPACTS</b></p> <p><u>Savita Kumari</u>  <i>Library Assistant ,Panjab University, Chandigarh.</i></p> <p>Open-source digital library software has become an increasingly popular choice for libraries worldwide, offering a cost-effective and customizable alternative to proprietary solutions. In India, where financial and infrastructural constraints often limit access to such systems, open-source platforms like DSpace, Koha, and Greenstone have gained traction across various sectors, including academic, public, and specialized libraries. This review article evaluates the effectiveness of open- source digital library software in India by examining key adoption trends, the challenges faced during implementation, and the overall impact on library operations. Drawing on existing literature, case studies, and user surveys, this study highlights the widespread adoption of these systems due to their flexibility and the ability to tailor them to local needs. However, challenges persist, including inadequate technical expertise, limited infrastructure in rural and underserved regions, and insufficient training for library staff</p>

and users. These factors often lead to underutilization and inefficiency in system implementation, reducing the expected impact on resource management and access to knowledge. The review also explores the role of government initiatives, institutional support, and collaborations that can help mitigate these issues. Future prospects are promising, as open-source software continues to evolve, offering more user-friendly interfaces and enhanced functionality. By addressing the technical, infrastructural, and training gaps, Indian libraries can fully harness the potential of open-source systems, making them powerful tools for digital transformation. This article offers recommendations to optimize the effectiveness and sustainability of open-source digital library software in India, positioning it as a key solution for libraries in developing regions.

**Faculty/Scientists from Colleges and Other Institutions**

8. **EMPOWERING INDIA'S CRAFT SECTOR: FROM INDIGENOUS FIBERS TO SUSTAINABLE PRODUCTION AND E-COMMERCE**

Mrs. Bharti Pahuja, Prabhdeep Brar  
*National Institute of Fashion Technology Panchkula, and Punjab University Chandigarh.*

India can lead the world economy, with an average age of 29. On the other hand, China, our main competitor, has a serious problem with an aging population; as of right now, their average age is 39. In addition to demographic advantage, India is rich in natural resources, especially raw materials like banana, pineapples, and hemp fibers. These sustainable fibers, derived from plant biomass, are often wasted but have the potential. These fibers have more or less similar properties to cotton and other natural fibers and can be used in apparel as well as industrial application. However, research is needed to simplify the extraction processes for broader use. Furthermore, India's ancient textile methods—such as pre-treating fabric with castor oil and cow dung—offer environmentally friendly, sustainable alternatives that can be revived to create efficient processes. Encouraging these environmentally friendly practices can improve the sustainability of the textile sector. Viksit Bharat should concentrate on integrating craftsmen into the digital marketplace so they may contact customers directly and lessen their reliance on middlemen, genuinely boosting economic growth. Fusing traditional crafts with technology textiles, like creating stylish khaki jackets with conductive yarn, can also boost the value and usefulness of craft products. This approach will strengthen the sector and boost demand for India’s unique offerings. This article will explore various approaches to help India become a self-reliant and sustainable economy.

**Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)**

9.	<p><b>MAPPING THE RESEARCH LANDSCAPE OF IMPACT INVESTING: A BIBLIOMETRIC ANALYSIS AND FUTURE RESEARCH AGENDA</b></p> <p><u>Arshdeep Singh, Naveen Kumar</u>  <i>University Institute of Applied Management Sciences, Panjab University, Chandigarh.</i></p> <p>Impact investing, which emerged in 2007, aligns financial returns with measurable social and environmental outcomes. Despite its rapid growth, the academic literature remains limited. This study presents a bibliometric analysis of articles sourced from Web of Science and Scopus, mapping the field of impact investing research. We analyse the field's growth, geographical distribution, key authors, influential journals, and interdisciplinary themes, including the state of impact investing market, challenges faced by impact investors, social entrepreneurship, role of public and private actors, impact measurement and assessment practices. To advance the field, future research should focus on ecosystem development, behavioural insights, innovative financial instruments, standardized reporting, and regulatory frameworks for developed and emerging economies.</p>
10.	<p><b>CONSCIOUS FASHION: DRIVING SUSTAINABILITY AND INNOVATION IN THE FASHION INDUSTRY</b></p> <p><u>Akanksha Garg, Prabhdeep Brar</u>  <i>University Institute of Fashion Technology &amp; Vocational Development, Panjab University, Chandigarh.</i></p> <p>This research paper explores the intersection of conscious fashion, sustainability, and innovation within the fashion industry. The first objective is to analyse conscious design principles foster sustainability, emphasizing the importance of eco-friendly materials, ethical production methods in reducing the industry's environmental impact. The second aim investigates the role of conscious fashion as a catalyst for innovation, highlighting emerging technologies and creative practices can lead to more sustainable solutions, such as circular economy models and digital fashion. Finally, the paper evaluates the strategies employed by pioneering fashion brands that successfully merge innovations with conscious fashion practices, showcasing case studies that illustrate their commitment to sustainability while driving business growth. Through this comprehensive analysis, the research underscores the potential of conscious fashion to transform the industry into a more sustainable and responsible entity, fostering a culture of innovation that aligns with the global demand for environmental and social accountability.</p>
11.	<p><b>MAPPING THE CONCEPTUAL FRAMEWORK OF INTELLECTUAL CAPITAL RESEARCH</b></p>



	<p><u>Deeksha</u><sup>1</sup>, Meena Sharma<sup>2</sup>, Monika Aggarwal<sup>1</sup>  <sup>1</sup><i>University Institute of Applied Management Sciences, Panjab University, Chandigarh,</i> <sup>2</sup><i>University Business School, Panjab University, Chandigarh.</i></p> <p>Intellectual capital in today’s knowledge economy is considered as an asset which is capable of driving innovation, technical and scientific expertise. Knowledge economy utilizes “human capital” as a business product for generating profits at various levels, like individual level, organisational level and for the economy as a whole, thereby exhibiting that this component has a substantial dependence on intellectual competence in lieu of natural resources or physical contributions of a nation. Undoubtedly Intellectual capital is difficult to quantify due to its intangible character and consequently researchers face difficulty in measuring IC. Therefore, the present paper aims to explore the literature available on intellectual capital and shed some light on various approaches which can be used to measure Intellectual Capital.</p>
12.	<p><b>DESIGNING A SUSTAINABLE FASHION ENSEMBLE FROM TEXTILE WASTE WITH TEMPLE-SAFFRON FLOWER AND TURMERIC DYES</b></p> <p><u>Diksha</u>, Kirti  <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>This study attempts to discuss the design process of the ensemble made by the use of waste textile fabric and natural colours. Floral waste from nearby temples, such as marigold flowers and turmeric, was utilized to dye fabric scraps at home using the tie and die process. This resulted in the fabric scraps having beautiful, natural colours and reducing their impact on the environment. Making the skirt and top out of the waste fabric by meticulously assembling these parts that have been coloured utilizing the waste fabric. To construct the skirt and the top, the garment required the careful assembly of all the parts of the garment. Wooden buttons contributed to the overall appearance of the clothing as well as its sustainability. This study will discuss the design process the ensemble made The primary objective of this research is to make fashion more sustainable by reducing textile waste, using local materials, and bringing back traditional dyeing techniques. By using eco-friendly methods to make clothes the research shows that sustainable fashion is possible and helps people value Indian craftsmanship. In the end, this research is a real-life example of how creating a design and smart use of resources can make fashion more eco-friendly encouraging both consumers and designers to make greener choices. Keywords: Eco-friendly, Natural dyeing, Textile waste, Floral waste.</p>
13.	<p><b>AN EMPIRICAL STUDY ON NATIONAL AND INTERNATIONAL FACTORS AFFECTING GOLD PRICES</b></p>

	<p><u>Divyang Goel</u> <i>University Institute of Applied Management Sciences, Panjab University, Chandigarh.</i></p> <p>Gold prices are influenced by a complex interplay of national and international factors, making the precious metal a dynamic investment and economic indicator. This empirical study investigates the key determinants of gold price fluctuations, focusing on both domestic and global variables. At the national level, factors such as inflation, interest rates, currency exchange rates, and domestic demand for gold are examined. Internationally, influences include geopolitical tensions, global inflation trends, central bank policies, and movements in the US dollar, given gold's traditional inverse relationship with the currency. Additionally, investor sentiment, gold reserves, and the role of gold as a safe-haven asset during periods of economic instability are considered. By analyzing historical data and economic models, the study provides a comprehensive understanding of how these factors interact and impact gold prices. The findings are expected to offer valuable insights for investors, policymakers, and financial institutions by highlighting the key drivers behind gold's value and its role in the global economy.</p>
14.	<p><b>EXPLORING SUSTAINABLE GARMENT DESIGN THROUGH ECO-PRINTING TECHNIQUE USING FLOWERS AND LEAVES</b></p> <p><u>Ginni Singh</u>, Prabhdeep Brar PhD <i>University Institute of Fashion Technology and Vocational Development, Panjab University Chandigarh.</i></p> <p>Eco-printing is a unique and captivating approach to creating intricate designs on natural fabrics. This paper documents the art of Eco-printing to create a stunning collection of garments that embody the perfect blend of style and sustainability. The collection was made under the supervision of the authors and presented on stage at the annual fashion show, ‘Shears &amp; Ruban’, UIFT&amp;VD, Panjab University, Chandigarh. Fresh flowers and leaves were carefully selected and arranged on natural fabrics. The process involves bundling plant materials and fabric together, then steaming or boiling the bundle to transfer the color and patterns from the plants to the fabric. This traditional technique eliminates the need for synthetic dyes, ensuring a truly eco-friendly production process. The collection, named “HippiEco” by Ms. Nandita, was inspired by the hippie lifestyle, garments were designed to reflect the carefree, eclectic spirit of the hippie culture. Flowing silhouettes, natural fabrics, and fringe and feather accessories defined the aesthetic of this collection. To further emphasize the sustainable element, jute fabric was incorporated as patches and yokes, which created a truly unique and earthy look. This project showcased the potential of sustainable fashion to merge style, creativity, and environmental responsibility. By embracing traditional techniques and eco-friendly materials, designers can create stunning collections that appeal to consumers seeking more than just aesthetic appeal. As the fashion industry continues to evolve, innovations like floral hammer printing will play a crucial role in shaping a more sustainable future.</p>
15.	<p><b>WHAT DRIVES THE INTENTION TO BUY ELECTRIC VEHICLES IN INDIA? INVESTIGATING THE ROLE OF PERSONALITY TRAITS, ENVIRONMENTAL CONSCIOUSNESS, AND DEMOGRAPHIC VARIABLES</b></p>

	<p><u>Ms. Kanika</u>, Prof. Sanjeev Kumar Sharma, Prof. Upasna Joshi Sethi <i>University Institute of Applied Management Sciences, Panjab University, Chandigarh.</i></p> <p>The shift towards sustainable transportation has sparked growing interest in electric vehicles (EVs), particularly in emerging markets like India. However, the factors driving consumer intentions to purchase EVs are not yet fully understood. This study examined the influence of personality traits along with environmental consciousness and demographic variables, on the intention to buy EVs, especially electric cars in India. Using a survey approach, data was gathered from potential Indian EV buyers, and multiple regression analysis was conducted to identify the relative impact of these factors. The results revealed that individuals with higher levels of openness to experience, highly extroverted, proactive and environmentally conscious are more likely to adopt EVs. Additionally, demographic factors such as age, gender, and income had a significant role in shaping EV purchase intentions. These insights offer valuable guidance for automobile manufacturers, policymakers, and marketers aiming to design more targeted strategies to accelerate EV adoption in India. By bridging the gap in existing research, this study contributes to the broader discourse on sustainable mobility and consumer behavior in the Indian context. <b>Keywords:</b> <i>Personality Traits, Environmental Consciousness, Electric Vehicles, Intention to Purchase, Demographics.</i></p>
16.	<p><b>FUELLING INDIA’S GROWTH: ROLE OF MICROFINANCE INSTITUTIONS</b></p> <p><u>Karandeep Bhayana</u>, Prof (Dr) Nishi Sharma <i>UIAMS, Panjab university, Chandigarh.</i></p> <p>In September 2015, United Nations came up with Sustainable Development Goals (SDGs) which comprised of a set of 17 new objectives for all the participant nations to achieve by 2030. Among the SDGs, the first and foremost SDG calls for the end of extreme poverty by 2030. India has a huge potential with 250 million people under extreme poverty and the efforts of Microfinance Institutions have been pioneer in catering to this challenge. Under this study, efficiency of 573 Indian MFIs have been computed from 2010-11 to 2019-20 to analyse their robustness in delivering the promise of reaching out to the poorest and at the same time being financially sustainable in order to continuously fuel India’s growth. This has been done by calculating efficiency estimates with the help of Data Envelopment Analysis (DEA). The results exhibit that on an average Indian MFIs are 79.2 % efficient in terms of Overall technical efficiency (OTE) using constant returns to scale while the efficiency is 82.9% in terms of Pure Technical Efficiency (PTE) using variable returns to scale and scale efficiency (SE) has also been derived by dividing OTE with PTE which has revealed an average efficiency of 95.8%. Indian MFIs have suffered a huge shock during 2010 Andhra Pradesh Microfinance crisis, after which several measures have been taken to improve the delivery of MFIs. Results of the study also justifies the corrective measures and shows a growth trajectory for Microfinance Institutions and India as well.</p>
17.	<p><b>UNVEILING IMPACT OF BEHAVIOURAL FINANCE ON WOMEN'S INVESTMENT DECISIONS</b></p> <p>Kiran Sharma</p>

	<p><i>University Institute of Applied Management Sciences, Panjab University, Chandigarh.</i></p> <p>This study explores the impact of behavioral finance on women’s investment decisions, focusing on working women in Tricity area, shedding light on the psychological, emotional, and social factors that influence their financial behavior. Women often demonstrate distinct investment patterns compared to men, marked by greater risk aversion, lower overconfidence, and a preference for long-term security over short-term gains. Key behavioral finance concepts, such as loss aversion, regret aversion, and herding behavior, shape these investment choices, often leading women to adopt more conservative strategies. Additionally, societal roles, financial literacy and emotional factors play a significant part in their decision-making processes. This research aims to unveil the underlying biases and tendencies that drive women's investment behavior, offering insights into how financial education, tailored investment strategies, and a deeper understanding of behavioral finance can empower women to make more confident, informed, and successful financial decisions. The study highlights the potential for behavioral finance to bridge gender gaps in investment, promoting financial empowerment and equity in the broader economic landscape.</p>
18.	<p><b>THE ROLE OF MICROFINANCE IN WOMEN’S EMPOWERMENT</b></p> <p><u>Kirandeep Kaur</u> <i>University Institute of Applied Management Sciences, Panjab University, Chandigarh.</i></p> <p>Microfinance plays an important role in empowering women by offering financial services customized in order to meet their matchless needs, particularly in developing economies. Access to microcredit, savings accounts, and insurance products enables women to start and expand small businesses, improving their income stability and economic independence. Through microfinance initiatives, women gain opportunities to enhance their financial literacy, which enhances better financial decision-making and savings habits. Microfinance programs often include community-based support structures, which can help women to build networks and gain social capital, further enhancing their empowerment. This financial inclusion not only contributes to poverty alleviation but also advances gender equality by fostering a stronger sense of agency and independence among women. Despite of its benefits, challenges remain, including cultural barriers and the risk of over-indebtedness. Nonetheless, when implemented effectively, microfinance can be a transformative tool for women which lead to broader socio-economic improvements within the communities.</p>
19.	<p><b>EXPLORING FASHION ILLUSTRATION PREFERENCES AMONG FASHION DESIGN STUDENTS</b></p> <p><u>Mitali Jain, Prabhdip Brar PhD</u> <i>University Institute of Fashion and Lifestyle Technology and Vocational Development,</i></p>

	<p><i>Panjab University, Chandigarh.</i></p> <p>This study investigates fashion design students' preferred methods of illustration, comparing hand sketching and software-based techniques. A questionnaire-based survey gathered data on students' experiences, preferences, and challenges. The study aimed to identify the primary methods of fashion illustration used by students and to analyze the advantages and disadvantages of hand sketching and software-based illustration.</p>
<p>20.</p>	<p><b>MAPPING THE LANDSCAPE OF CLOUD-BASED ACCOUNTING: A COMPREHENSIVE REVIEW OF EMERGING TRENDS AND PRACTICES</b></p> <p><u>Mona</u>, Naveen Kumar  <i>University Institute of Applied Management Sciences, Panjab University, Chandigarh.</i></p> <p>The rapid evolution of cloud technology has transformed accounting practices, offering innovative solutions for businesses to manage financial data more efficiently. This paper presents a comprehensive bibliometric review of emerging trends and practices in cloud-based accounting, drawing from a vast array of academic literature and research articles. The study identifies key themes, including the adoption of cloud accounting platforms, their impact on financial transparency, data security challenges. By analyzing citation networks, co-authorship patterns, and keyword clusters, this review highlights the growing academic interest in cloud-based accounting and its implications for the accounting profession. This paper contributes to the understanding of how cloud-based accounting is shaping the future of financial management, providing insights for both researchers and practitioners on the evolving landscape of accounting in the digital age.</p>
<p>21.</p>	<p><b>WALKING THE TALK DURING THE ESG ERA: EXPLORING GREENWASHING AND AUTHENTICITY IN CORPORATE SUSTAINABILITY REPORTING</b></p> <p><u>Neha Verma</u>, Monika Aggarwal  <i>University Institute of Applied Management Sciences, Panjab University, Chandigarh.</i></p> <p>This systematic literature review highlights a holistic review of the academic work and discussion on Greenwashing and ESG reporting in Corporate Sustainability. The research aims to identify the connection between ESG Disclosures and greenwashing practices and to examine their impact on stakeholders' trust and the authenticity of sustainability initiatives. By employing a systematic approach, the study examines 57 academic publications from Scopus and Web of Science (WoS) that are pertinent to the topic of Greenwashing practices in the ESG Era and synthesizes their findings to extract crucial insights and trends. Findings indicate a considerable increase in published articles in the said field over the past decade, with Italy being the primary contributor. The highlighted themes encompass the prevalence of Greenwashing practices; ESG Reporting and performance gap; board traits and corporate greenwashing; and Legitimacy strategies. Beyond academic discourse, this study offers</p>

	<p>managerial, social, and theoretical implications, aiming to attract the attention of researchers, policymakers, and businesses to mitigate greenwashing by recognizing its key drivers and contributing to the integrity and transparency of sustainability reporting.</p>
22.	<p><b>BIBLIOMETRIC ANALYSIS OF AUGMENTED REALITY RESEARCH IN INDIAN BUSINESS: TRENDS, INFLUENCES, AND FUTURE DIRECTIONS</b></p> <p><u>Nikita</u>, Ashish Saihjal, Rachita Sambyal  <i>University Business School, Panjab University Regional Centre, Ludhiana, University Institute of Applied Management Sciences, Panjab University, Chandigarh.</i></p> <p>Augmented reality (AR) has emerged as a game-changing technology capable of altering the way businesses interact with their customers. Increased use of AR helps in maintaining a competitive edge in the digital age, a growing corpus of research indicates its growing importance in defining corporate strategies and customer interactions throughout India. The present situation suggests a significant development in the usage of AR by Indian businesses, particularly in the retail and marketing sectors, where AR considerably improves product visualization and delivers individualized shopping experiences. Despite the tremendous increase in AR use in these sectors, research and applications in other domains such as healthcare, education, tourism, real estate and logistics are still relatively unexplored. The demand for research and practical insights on the broad use of AR technology in Indian businesses is imperative than ever. This study attempts to map the research landscape of application of AR in Indian business and management by conducting bibliometric analysis. The documents were extracted from Scopus database using keywords as (“Augmented Reality” OR “AR”) AND (“India”) limited to subject area of Business, Management and Accounting. A bibliometric analysis was performed using VOSviewer software and Biblioshiny app. The study reveals key contributors, research themes, and developing trends. The findings highlight substantial research on customer involvement and marketing innovation using AR, while also pointing to gaps in other industries that provide potential for future research. The study concludes with a framework that lays down the blueprint for future research.</p>
23.	<p><b>BEYOND HIRING: EXPLORING ORGANISATIONAL ATTRACTIVENESS THROUGH A SYSTEMATIC LITERATURE REVIEW</b></p> <p>Parneet Kaur, Arunachal Khosla  <i>University Institute of Applied Management Sciences, Panjab University, Chandigarh.</i></p> <p>The increasing interest in organisational attractiveness has led to unsystematic research on the conceptualisation and study of this phenomenon. Studies tend to make minimal conceptual differentiation about who employers should be appealing to, and so examine the views of both potential and current employees who work in organisations for lengthy periods. Our arguments in this study centre on how well-defined the phenomenon is conceptually and how it differs from other notions that are related. Using the Preferred Reporting Items for Systematic Reviews (PRISMA) approach, a systematic literature review was conducted to find and compile the most pertinent</p>

	<p>papers published during the past years on these subjects. We have methodically examined studies that have been published in business and management journals, concentrating on organisational attractiveness for present employees. Using this method, we were able to highlight important gaps in the present understanding of organisational attractiveness from the viewpoint of employees and suggest directions for further investigation. The results show that developing an organisational brand at the organisational level is becoming increasingly important, but surprisingly, countries are also starting to look at this idea to draw in skilled workers. Next, we have proposed that organisational branding in businesses should focus more on present employees to outline the future research agenda.</p>
24.	<p><b>UNDERSTANDING MOTIVATORS AND BARRIERS TOWARDS PURCHASE OF HANDICRAFT ITEMS THROUGH INDIGENOUS ONLINE PLATFORMS: A STUDY OF PANJAB UNIVERSITY, CHANDIGARH</b></p> <p><u>Neha Gulati, Payal Gupta</u> <i>University Business School, Panjab University, Chandigarh.</i></p> <p>The study aims to explore motivators and barriers towards purchase of handicraft items through indigenous online platforms among different generations (Generation X, Y and Z). Methodology: Survey instrument with eight items on motivators and 9 items on barriers using five-point Likert scale has been administered to 100 respondents of Panjab University, Chandigarh. Descriptive statistics, cross-tabulations and Chi-square tests have been applied for data analysis. Findings: Majority of the respondents (53%) are not familiar with indigenous online platforms for purchasing handicraft items. Out of 47% of the respondents who were found to be aware only 27% have purchased through these platforms. Respondents from Generation X, Y and Generation Z exhibit high level of willingness to purchase handicraft items through indigenous online platforms in future. There is no significant difference in the purchase intentions of Generation X, Y and Gen Z. Thus, there is a positive trend towards acceptance of these platforms across different generational cohorts Respondents perceive “Access to a wider variety of handicraft items” (Mean = 4.01) and “Wide variety of payment options” (Mean=4.00) as significant motivators for engaging with these platforms. “Product quality” (Mean = 3.57) and “Concerns regarding damaged product” (Mean = 3.53) are perceived as the most prominent barriers. Contributions: Product quality and concerns regarding damage identified as the prime barriers pose a question of concern for policymakers and entrepreneurs thus highlighting the need to incorporate effective measures for promoting indigenous technologies for Viksit Bharat. Keywords: Handicraft items, Indigenous online platform, Viksit Bharat.</p>
25.	<p><b>GREEN BANKING- A PATH LEADING TO SUSTAINABLE GROWTH</b></p> <p><u>Pooja Singh</u> <i>University Institute of Applied Management Sciences, Panjab University, Chandigarh.</i></p>

	<p>Green banking represents a forward-thinking approach in the financial sector, aligning banking practices with environmental sustainability to promote sustainable growth. By integrating eco-friendly policies and sustainable finance initiatives, green banking aims to minimize the ecological footprint of the banking industry and support environmentally responsible projects. Key strategies include promoting green loans, financing renewable energy projects, encouraging energy-efficient operations, and adopting digital banking to reduce paper use. Through green banking, financial institutions play a pivotal role in steering capital towards sustainable development goals, such as combating climate change, conserving natural resources, and fostering sustainable business practices. This paper explores how green banking can act as a catalyst for sustainable economic growth by reducing environmental risks, promoting corporate social responsibility, and creating a resilient financial ecosystem that balances profitability with environmental stewardship.</p>
<p>26.</p>	<p><b>PERSONAL CHARACTERISTICS AND STRATEGIC BUSINESS PRACTICES OF RURAL WOMEN ENTREPRENEURS: A STUDY OF PUNJAB</b></p> <p>Prachi Singla, <u>Ashish Mittal</u>  <sup>1</sup>University Institute of Applied Management Sciences, Panjab University, Chandigarh, <sup>2</sup>Chitkara University, Rajpura.</p> <p>Rural women's business journeys are characterized by a distinct fusion of strategic approaches and personal traits. Despite confronting many obstacles, they frequently use their fortitude, ingenuity, and ties to the community to build long-lasting enterprises. Literature suggests that by giving them access to markets, resources, and education, rural women entrepreneurs can become even more empowered and contribute more to the local and national economies. The present study attempts to identify the personal traits and strategic business methods adopted by rural women entrepreneurs in Punjab by conducting indepth interviews with 20 such women entrepreneurs from various districts. Several important personality qualities were identified, including risk-taking capacity, creativity and invention, community-oriented mentality, resilience and perseverance, family-oriented approach, education, and skills. Resourcefulness and local resource utilization, networking and collaborations, cost-effective operations, sustainable practices, niche marketing, technological adaptability, small-scale and gradual expansion, and social impact are the strategic business practices that have been embraced. Besides these, the study also identifies some of the challenges faced by women entrepreneurs like limited access to finance, cultural barriers, limited market access, geographical isolation, lack of infrastructure, educational barriers etc. The researchers' next step will be to create a questionnaire based on these constructs in light of these findings, which will be subsequently pilot tested.</p>
<p>27.</p>	<p><b>INFLUENCE OF HR PRACTICES ON INNOVATIVE WORK BEHAVIOUR</b></p> <p><u>Preeti</u>, Arunachal Khosla  University Institute of Applied Management Sciences, Panjab University, Chandigarh.</p> <p>This study explored the influence of human resource (HR) practices on innovative work behaviour (IWB), examining how specific HR policies and strategies foster</p>



	<p>creativity and innovation within organizations. With businesses increasingly emphasizing innovation to remain competitive, understanding the role HR practices play in encouraging employee-driven innovation is essential. The paper is based on empirical study based on IT sector. The research investigated key HR dimensions in analyzing their impact on employees' ability to generate, promote, and implement new ideas. data was collected from employees to assess how these HR practices shape innovative behaviors. The data was analyzed using correlation and regression analysis. The findings indicated that HR practices aligned with employee empowerment, continuous learning, and intrinsic motivation significantly contribute to fostering IWB. This study provides valuable insights for HR professionals and organizational leaders aiming to create an environment that nurtures and supports innovation.</p>
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ABSTRACTS OF  
POSTER  
PRESENTATIONS

**Poster Presentation: Management**

<b>S. No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>			
1.	Dr. Anu H. Gupta	UIFT & VD, Panjab University, Chandigarh.	Circular Design In Home Décor: Repurposing Textile Waste With Terracotta For Eco-Friendly Living Spaces
2.	Gargi Kharbanda	UIFT & VD, Panjab University, Chandigarh.	Using Terracotta to Repurpose Textile Waste for Eco-Friendly Living Spaces through Circular Design in Home Décor

**Abstract File****Poster Presentation****S. No.**    **Abstract****Faculty/Scientists of Panjab University Campus and Regional Centres****1. CIRCULAR DESIGN IN HOME DÉCOR: REPURPOSING TEXTILE WASTE WITH TERRACOTTA FOR ECO-FRIENDLY LIVING SPACES**

Gargi Kharbanda, Dr. Anu H. Gupta  
*UIFT & VD, Panjab University, Chandigarh.*

The global shift towards sustainability has brought circular design principles to the forefront of the home décor industry, with innovative approaches being sought to reduce waste and create eco-friendly living environments. This research explores the integration of terracotta and textile waste in home décor, focusing on how these materials can be repurposed to design sustainable, aesthetically pleasing, and functional home furnishings. By utilizing terracotta—a naturally abundant, biodegradable material—alongside textile waste, this research examines how traditional waste products can be transformed into innovative design elements that enhance the sustainability of living spaces. The study delves into the environmental and aesthetic potential of repurposed materials, evaluating their application in soft furnishings, wall treatments, and decorative elements. A circular design approach is applied to extend the life cycle of these materials, aligning with global efforts toward zero-waste living. This research also addresses the challenges and opportunities in incorporating textile waste and terracotta in modern interior design, offering insights into how these eco-conscious materials can create harmonious, sustainable homes. A survey was conducted to gather insights into the market's perception of sustainability and circular design in home décor. The findings suggest a growing demand for eco-friendly products and highlight the potential of terracotta and textile waste in shaping future home décor trends. Keywords: Circular Design, Sustainable Home Décor, Textile Waste, Terracotta, Upcycling.

**2. USING TERRACOTTA TO REPURPOSE TEXTILE WASTE FOR ECO-FRIENDLY LIVING SPACES THROUGH CIRCULAR DESIGN IN HOME DÉCOR**

Gargi Kharbanda, Dr. Anu H. Gupta  
*UIFT & VD, Panjab University, Chandigarh.*

The importance of circular design principles has been brought to light by the home décor industry's transition towards sustainability. In order to create living environments that are environmentally sustainable, practical, and aesthetically beautiful, this work investigates the integration of terracotta and textile waste in home furnishings. Repurposed textile waste and terracotta, a biodegradable material, are used to create creative design components that support sustainability. The study explores the application of circular design to prolong the life cycle of these materials in soft furnishings, wall treatments, and decorative elements. According to a market analysis, there is a growing need for environmentally friendly items, and terracotta and textile waste may have an impact on upcoming trends in home décor.

# Mathematical Sciences

- Mathematics
- Statistics
- Computer Sciences

## **CO-ORDINATORS**

*Sectional President*

**Mrs. Suman Bala**

**9417018749**

*Sectional Secretary*

**Dr. Charanjit**

**9878888286**

**CHASCON 2024**  
**NATIONAL CONFERENCE ON**  
**“Indigenous Technologies for Viksit Bharat”**  
**SECTION: MATHEMATICAL SCIENCES**

**Program (Thursday, November 07, 2024)**  
**Venue: Department of Mathematics, Panjab University, Sector-14, Chandigarh**

Sectional President Mrs. Suman Bala 9417018749		Sectional Secretary Dr. Charanjeet 9878888286	
Time	Program		
09:00-09:45	Display of posters by participants <i>Venue:</i> Ground Floor Corridor of the Department of Mathematics		
09:45-10:00	Inauguration of Sectional Program <i>Venue:</i> Seminar Room, Department of Mathematics		
10:00-11:30	Oral Presentation (UG/PG, Research Scholars) <i>Venues:</i> <ol style="list-style-type: none"> <li>1. Seminar Room, Department of Mathematics (Research Scholar)</li> <li>2. Seminar Room, Department of Statistics (UG/PG)</li> </ol> Poster Presentation (UG/PG) <i>Venue:</i> Ground Floor Corridor of the Department of Mathematics		
11:30-12:00	Tea Break		
12:00-1:00	Oral Presentation (UG/PG Cont. / Faculty) <ol style="list-style-type: none"> <li>1. Seminar Room, Department of Mathematics (Faculty)</li> <li>2. Seminar Room, Department of Statistics (UG/PG)</li> </ol>		
1:00-2:00	Lunch		
2:00-2:45	<b>Session Chair:</b> Dr. Anuj Sharma <b>Speaker:</b> Prof. Kapil Kumar Sharma Professor, South Asian University, Delhi <i>“Computational Methods for Solving Real Life Problems”</i>		
2:45-3:15	Tea Break		
3:15-4:00	<b>Session Chair:</b> Prof. Narinder Kumar <b>Speaker:</b> Prof. Gaurav Prakash Professor, Clinical Haematology and Medical Oncology, PGIMER, Chandigarh. <i>“Understanding cancer, it's causes and prevention.”</i>		

## KEY SPEAKERS

S.No.	Name of Participant	Affiliating Institution	Title of Abstract
1.	Dr. Kapil Kumar Sharma	Professor & Proctor, Department of Mathematics, South Asian University (SAU), Delhi.	Computational Methods for Solving Real Life Problems.
2.	Prof. Gaurav Prakash	Professor, Clinical Haematology And Medical Oncology, PGIMER, Chandigarh.	Understanding cancer, it's causes and prevention.

# COMPUTATIONAL METHODS FOR SOLVING REAL LIFE PROBLEMS.



DR. KAPIL KUMAR SHARMA

Professor & Proctor, Department  
of Mathematics, South Asian  
University (SAU), Delhi.

## Abstract

After the evolution of high computing power machines, the application of mathematics to solve real-life problems is more visible. To solve real-life problems using mathematics, the first step is to convert the real-life problem into an equivalent mathematical problem which is known as a mathematical model. The next step is to study the well-posedness of the mathematical model. The final step is to find the solution of the mathematical model. The mathematical models, which simulate the real-life problems are very complicated, and in most cases, there is no method available to find the exact solution of the models. Now, there are two ways, either change the mathematical model to the model whose exact solution is known or develop computable methods, which give approximate solution of the mathematical model. The main goal of this talk is to introduce the audience to how computational methods can be used to answer real-life problems.



# UNDERSTANDING CANCER, IT'S CAUSES AND PREVENTION.



PROF. GAURAV PRAKASH

Professor, Clinical Haematology  
And Medical Oncology, PGIMER,  
Chandigarh.

## Abstract

Cancer is a multifaceted disease with numerous causes and risk factors. Environmental factors, such as exposure to carcinogens like tobacco smoke, asbestos, and ultraviolet radiation, are major contributors. Lifestyle choices, including poor diet, lack of physical activity, and excessive alcohol consumption, can further elevate cancer risk. Additionally, chronic infections from viruses like HPV and hepatitis B and C can lead to cancer development. Hormonal imbalances and chronic inflammation are other factors that can contribute to the disease. Genetic predisposition also plays a significant role, as certain inherited mutations can increase the likelihood of developing cancer.

Prevention strategies are crucial in reducing cancer incidence. Adopting a healthy lifestyle is paramount—this includes maintaining a balanced diet rich in fruits, vegetables, and whole grains, engaging in regular physical activity, and avoiding tobacco and excessive alcohol. Protecting skin from excessive sun exposure by using sunscreen and wearing protective clothing can prevent skin cancers. Vaccinations against cancer-causing viruses, such as HPV and hepatitis B, are effective preventive measures. In India, cervical cancer is a very big menace for women's health. Hence, vaccination against HPV become very important for young women including men. Regular screenings and early detection are vital, as they can identify precancerous conditions or early-stage cancers when they are most treatable. Public health initiatives and education campaigns play a crucial role in raising awareness about cancer prevention and encouraging healthy behaviors. By understanding the causes and implementing preventive measures, we can significantly reduce the burden of cancer on individuals and society. There is a need to make cancer a topic of discussion in families and friend circles. It shall be helpful in increasing awareness among common people and will help in shedding social inhibitions amongst common man to seek help for a symptom suspicious of cancer.

ABSTRACTS OF  
ORAL  
PRESENTATIONS

<b>Oral Presentations – Mathematical Sciences</b>			
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
1.	Dr. Surinder Pal Singh Kainth	Department of Mathematics, Panjab University, Chandigarh.	Axiom of choice in proofs: When can it be avoided?
<b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b>			
<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
2.	Mr. Amit Kumar Maurya	Department of Statistics, Panjab University, Chandigarh.	Improved simultaneous confidence intervals for successive pairwise differences of exponential location parameters under heteroscedasticity of scale parameters.
3.	Mrs. Devki	Department of Computer Science and Applications, Panjab University, Chandigarh.	A comprehensive analysis of object detection in images.
4.	Ms. Dimple Rani	Department of Mathematics, Panjab University, Chandigarh.	A characterisation of matrix rings.
5.	Ms. Gurpreet Kaur	Department of Mathematics, Panjab University, Chandigarh.	Thermal convection in the presence of an internal heat source.
6.	Ms. Iknum	Department of Mathematics, Panjab University, Chandigarh.	Effect of nonlocality in space and time on wave propagation in an incompressible transversely isotropic elastic solid with initial stress.
7.	Mr. Jatender Kumar	Department of Computer Science and Applications, Panjab University, Chandigarh.	Automated cancer detection from medical images using machine learning models: A comprehensive review.

8.	Mrs. Mamta Rani	Department of Computer Science, Govt. College, Abohar, Punjab.	Multimodal sentiment analysis: A comprehensive survey of current research and future directions.
9.	Mrs. Rajni Garg	Department of Computer Science and Applications, Panjab University, Chandigarh.	Optimizing cloud resource management: A deep learning and AHP-based VM consolidation framework.
10.	Ms. S Ratna	Department of Computer Science and Applications, Panjab University, Chandigarh.	Hybrid generalized aggregation and topology adaptive graph convolutional networks.
11.	Ms. Swaranjeet kaur	Department of Computer Science and Applications, Panjab University, Chandigarh.	A critical study of multilingual plagiarism checker in text.
12.	Veerpal Kaur	Department of Computer Science and Applications, Panjab University, Chandigarh.	A review of methods to recognize degraded Gurmukhi text along with challenges and advances.

**UG/PG Students of Panjab University Campus and Regional Centres**

S.No.	Name of Participant	Affiliating Institution	Title of Abstract
13.	Ms. Akshita	Department of Statistics, Panjab University, Chandigarh.	Analysis of cybercrimes.
14.	Ms. Himani		
15.	Mr. Ankit	Department of Statistics, Panjab University, Chandigarh.	Steering towards tomorrow: Evaluating India's journey to automated vehicles.
16.	Ms. Chahat Baweja	Department of Mathematics, Panjab University, Chandigarh.	Benford's law in action: From finance to forensics.
17.	Ms. Chetanya Sharma	Department of Statistics, Panjab University, Chandigarh.	Survival analysis of melanoma patients: A kaplan – meier and cox proportional hazards approach.
18.	Mr. Hardik	Department of Statistics, Panjab University, Chandigarh.	Jacobi elliptic function method for the nonlinear generalised camassa holm- kadomtsev- petviashvili (g-CHKP) equation.

19.	Ms. Harleen Kaur	Department of Statistics, Panjab University, Chandigarh.	Malicious-URL detection using logistic regression.
20.	Ms. Osheen		
21.	Ms. Komal Preet Kaur	Department of Mathematics, Panjab University Chandigarh.	Euler's number.
22.	Ms. Nancy Sheokand	Department of Statistics, Panjab University, Chandigarh.	The impact of AI adoption on job growth and automation risk.
23.	Ms. Nishita Virmani	Department of Statistics, Panjab University, Chandigarh.	Pricing of a life insurance product.
24.	Mr. Paras Thakur	Department of Statistics, Panjab University, Chandigarh.	Predicting target audience for car sales: A comparative analysis of k- NN, SVM, and logistic regression.
25.	Ms. Parul	Department of Statistics, Panjab University, Chandigarh.	Airline baggage complaints analysis.
26.	Ms. Samridhi Jain	Department of Statistics, Panjab University, Chandigarh.	Suicide: An Indian perspective.
27.	Ms. Sarru Jindal	Department of Statistics, Panjab University, Chandigarh.	Data detective statistics game.
28.	Ms. Sirjan Kaur	Department of Statistics, Panjab University, Chandigarh.	Digit recognition simplified: Exploring neural networks with pre-trained data.

<b>Abstract File</b>	
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>	
<b>S.No.</b>	<b>Abstract</b>
1.	<p><b>AXIOM OF CHOICE IN PROOFS: WHEN CAN IT BE AVOIDED?</b></p> <p><u>Surinder Pal Singh Kainth</u>  <i>Department of Mathematics, Panjab University, Chandigarh.</i></p> <p>This talk will discuss some results whose popular proofs inherently rely on the axiom of choice. Often, such results do not depend on this axiom, and a slight modification to the standard proofs makes them choice-free. Sometimes, a drastically different proof is required to achieve this. However, there are cases where the use of the axiom of choice cannot be avoided. Such results depend on, or are sometimes even equivalent to, this axiom. I will discuss all of this, along with some related ideas.</p>
<b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b>	
<b>S.No.</b>	<b>Abstract</b>
2.	<p><b>IMPROVED SIMULTANEOUS CONFIDENCE INTERVALS FOR SUCCESSIVE PAIRWISE DIFFERENCES OF EXPONENTIAL LOCATION PARAMETERS UNDER HETEROSCEDASTICITY OF SCALE PARAMETERS</b></p> <p><u>Amit Kumar Maurya</u><sup>1</sup>, Vishal Maurya<sup>2</sup>, Narinder Kumar<sup>1</sup>  <sup>1</sup><i>Department of Statistics, Panjab University, Chandigarh,</i> <sup>2</sup><i>Department of Statistics and Information Management, Reserve Bank of India, Mumbai.</i></p> <p>In this article, we propose one-stage and two-stage procedures for multiple comparisons of successive pairwise differences of exponential location parameters under heterogeneity of scale parameters, keeping the advantage of the Kharrati-Kopaei (2015) procedure and being more powerful than existing procedures. For the construction of simultaneous confidence intervals (SCIs) in cases of one-stage and two-stage procedures for successive pairwise differences of location parameters, we use a lemma given by Kharrati-Kopaei (2015) and Haibing (2009) methodology. Also using simulation, we compare the proposed procedure with Maurya <i>et al.</i> (2011) and Kharrati-Kopaei (2015) with respect to coverage probability and power. A simulation study shows that the proposed procedure has better coverage probability and more power than both above-mentioned procedures. The outlined procedure is illustrated with real-life numerical data.</p>
3.	<p><b>A COMPREHENSIVE ANALYSIS OF OBJECT DETECTION IN IMAGES</b></p> <p><u>Devki</u><sup>1</sup>, Anu Gupta<sup>1</sup>, Maroti Deshmukh<sup>2</sup>  <sup>1</sup><i>Department of Computer Science and Applications, Panjab University, Chandigarh,</i> <sup>2</sup> <i>Department of Computer Science and Engineering NIT,</i></p>

	<p><i>Uttarakhand.</i></p> <p>One of the most significant and challenging problems in computer vision, Object Detection, has drawn a lot of attention in recent years. A number of advancements have been made over a period of time in computer vision history. In Image cryptography, secret sharing schemes (SSS) are combined with Object Detection to provide the secure and efficient transmission of image data. Secret-Sharing Schemes (SSS) is a method by which a dealer who has a secret image, partitions the image into shares and then distributes them to a set of <math>n</math> parties such that only authorised subsets of <math>k</math> parties can reconstruct the original secret image. Object Detection detects the instances of objects of a certain set of classes, such as humans, animals, or cars, in digital images or videos. Models such as R-CNN, Fast-RCNN, Faster R-CNN, YOLO (You Only Look Once), etc. face challenges while detecting objects such as tiny, blurred, rotated, or partially visible objects. Object Detection is used in many applications these days, such as pedestrian detection, face detection, text detection, etc. This paper makes a comprehensive analysis of these Object Detection techniques and their challenges in recent years.</p>
4.	<p><b>A CHARACTERISATION OF MATRIX RINGS</b></p> <p><u>Dimple Rani</u>, Dinesh Khurana  <i>Department of Mathematics, Panjab University, Chandigarh.</i></p> <p>It is interesting and useful to know when a ring is a matrix ring over some other ring. In this lecture we discuss a new criterion for a ring to be a matrix rings. This leads to some new results generalising the existing results and also easier proofs of some known results. Also, we discuss necessary and sufficient conditions for a ring to have a corner ring which is a matrix ring.</p>
5.	<p><b>THERMAL CONVECTION IN THE PRESENCE OF AN INTERNAL HEAT SOURCE</b></p> <p><u>Gurpreet Kaur</u>, Renu Bajaj  <i>Department of Mathematics, Panjab University, Chandigarh.</i></p> <p>The onset of instability of thermal convection in an inclined layer of viscous, incompressible fluid having internal heat source is studied using linear stability analysis. The heat source consists of a uniform component as well as a temperature-dependent component. The boundaries of the layer are maintained at different constant temperatures. The thermal Rayleigh number <math>R_1</math> and the dimensionless parameters <math>R_2</math> and <math>R_3</math> determining the strength of the internal heat source are used to establish the onset of instability. The collocation method utilizing Chebyshev polynomials is adopted to obtain the critical values of various parameters.</p>
6.	<p><b>EFFECT OF NONLOCALITY IN SPACE AND TIME ON WAVE PROPAGATION IN AN INCOMPRESSIBLE TRANSVERSELY ISOTROPIC ELASTIC SOLID WITH INITIAL STRESS</b></p> <p>Baljeet Singh<sup>1</sup>, <u>Iknum</u><sup>2</sup>  <sup>1</sup><i>Department of Mathematics, Post Graduate Government College, Chandigarh,</i>  <sup>2</sup><i>Department of Mathematics, Panjab University, Chandigarh.</i></p>

	<p>For modelling of nano systems, wave propagation phenomena are a topic of current interest in engineering science research. In this paper, the governing equations of an incompressible nonlocal transversely isotropic elastic solid with initial stress are formulated in context of nonlocality in space and time. These specialized equations in a plane are solved for homogeneous plane waves and Rayleigh surface waves. The velocity equations for plane wave and Rayleigh surface wave are derived. A numerical example is considered to illustrate the effects of initial stress, transverse isotropy and nonlocality parameters on the speeds of both plane and Rayleigh surface waves.</p>
7.	<p><b>AUTOMATED CANCER DETECTION FROM MEDICAL IMAGES USING MACHINE LEARNING MODELS: A COMPREHENSIVE REVIEW</b></p> <p><u>Jatender Kumar</u><sup>1</sup>, Munish Kumar<sup>2</sup>, Manish Kumar<sup>3</sup></p> <p><sup>1</sup><i>Department of Computer Science and Applications, Panjab University, Chandigarh,</i></p> <p><sup>2</sup><i>Department of Computational Sciences, Maharaja Ranjit Singh Punjab Technical University, Bathinda, Punjab,</i></p> <p><sup>3</sup><i>Department of Computer Science and Applications, Panjab University Regional Centre, Muktsar, Punjab.</i></p> <p>Cancer is among the greatest killers globally. Cancer requires more advanced methods for correct diagnosis and treatment planning to enable better outcomes for the patients. Medical imaging including histopathological images is pivotal for visualizing the tumours, assessing their properties, and guiding clinical decisions. Conventional diagnostic processes are mainly manual interpretations carried out by pathologists or radiologists. Manual interpretation is time-consuming, subjective, and frequently varies between observers, making it necessary to switch to an automated solution. The recent advancement of machine learning (ML) and artificial intelligence (AI) offers powerful tools for analysing complex imaging data and obtain unsupervised features or patterns that may not be obvious to manual observers. In this paper we focused on reviewing the performances of machine learning models and techniques to diagnose cancers accurately. The purpose of this review is to demonstrate how machine learning has changed in the last decade to improve the speed and accuracy of cancer detection. We have analysed and reviewed the current state of research by identifying its strengths and limitations. We propose future directions to make these technologies more reliable and clinically useful and improving early cancer detection.</p>
8.	<p><b>MULTIMODAL SENTIMENT ANALYSIS: A COMPREHENSIVE SURVEY OF CURRENT RESEARCH AND FUTURE DIRECTIONS</b></p> <p><u>Mamta Rani</u><sup>1</sup>, Anu Gupta<sup>2</sup></p> <p><sup>1</sup><i>Department of Computer Science, Govt. College, Abohar,</i> <sup>2</sup><i>Department of Computer Science and Applications, Panjab University, Chandigarh.</i></p> <p>With the rapid expansion of the internet era, social networking platforms have emerged as a crucial medium for expressing views and emotions. Consequently, analysing this social media content becomes essential for deeper understanding and prediction. Multimodal Sentiment Analysis (MSA) aims to automatically infer the emotional content or sentiment conveyed by different modalities. Firstly, image segmentation can be applied to identify and extract salient regions within visual content. Then, by identifying where attention is drawn, segmenting these regions, and then analysing the</p>



	<p>sentiment conveyed by these segments, we can achieve a multifaceted understanding of both visual and textual data. This integrated approach enhances the precision and depth of sentiment analysis, offering valuable insights and benefits across a wide range of applications, including e-commerce, stock market, education, and beyond. In this paper, we present a detailed survey of MSA, highlighting future directions. Specifically, we first introduce MSA, followed by an in-depth review of existing work that highlights key advancements. Finally, we identify potential gaps in the literature. The survey focuses on the challenges faced by various models for multimodal sentiment classification, including cross domain and cross-lingual data, image captioning, the simultaneous mutual influence of image and text, and the issue of small-scale data. Additionally, it provides a comprehensive review of state-of-the-art techniques in sentiment analysis aimed at addressing these challenges. Ultimately, this work seeks to enhance the understanding of sentiment analysis, enabling practitioners and researchers to select appropriate methods for sentiment classification based on the specific type of data being analysed.</p>
9.	<p><b>OPTIMIZING CLOUD RESOURCE MANAGEMENT: A DEEP LEARNING AND AHP BASED VM CONSOLIDATION FRAMEWORK</b></p> <p><u>Rajni Garg</u>, Indu Arora, Anu Gupta  <i>Department of Computer Science and Applications, Panjab University, Chandigarh.</i></p> <p>The growing complexity of cloud computing environments has heightened the challenge of efficient resource management, particularly in minimizing energy consumption and optimizing Virtual Machine (VM) performance. Inefficient VM placement and migration lead to resource contention, increased energy usage, and SLA violations. To tackle these issues, this research presents a novel VM Consolidation framework that integrates advanced VM selection policies, predictive forecasting, and resource management techniques. A VM selection policy, based on the Analytic Hierarchy Process (AHP), is employed to identify suitable VMs for consolidation by evaluating critical factors such as resource usage patterns and migration costs. The framework incorporates a deep learning-based forecasting model, which uses multivariate input from historical and present VM utilization data to predict future CPU resource demand, identifying temporal and spatial dependencies for better resource allocation. This estimation is incorporated in Virtual Machine placement decision in order to ensure long term sustainability of Virtual Machines on destination servers. Moreover, the algorithm balances resource optimization and execution performance by packing multiple virtual machines that exhibits complementary resource demand on a same physical server. VMs with similar resource demands are placed separately to prevent resource contention and avoid re-migration. Experiments conducted using the Cloud Sim toolkit with real workload traces from Planet Lab and Bit Brains data centres validate the effectiveness of the proposed approach. The results show significant improvements in resource utilization and energy efficiency, with enhancements in the Energy Performance Metric. This novel framework offers a comprehensive solution for optimizing cloud infrastructure by addressing both immediate and future resource demands.</p>
10.	<p><b>HYBRID GENERALIZED AGGREGATION AND TOPOLOGY ADAPTIVE GRAPH CONVOLUTIONAL NETWORKS</b></p> <p><u>S Ratna</u>, Anuj Sharma  <i>Department of Computer Science and Applications, Panjab University, Chandigarh.</i></p>

	<p>Graph Neural Networks (GNNs), a subfield of deep learning, have become a popular technique for processing graph-structured data. Graphs are powerful tools for representing complex patterns and relationships, making them essential for various tasks such as node and graph classification. While there are numerous concepts, both new and derived, supporting GNN development, the potential of hybrid approaches has not been thoroughly explored. A hybrid approach can be effectively employed to handle both sequential and static data. In this context, we propose a method that integrates generalized aggregation networks and topology-adaptive graph convolutional networks to process both types of data, applicable to both node and graph classification tasks. Our analysis shows that the results are comparable to those found in the literature, and even outperform them for handwritten strokes as sequential data, an area where graph structures remain largely unexplored.</p>
11.	<p><b>A CRITICAL STUDY OF MULTILINGUAL PLAGIARISM CHECKER IN TEXT</b></p> <p>Swaranjeet kaur<sup>1</sup>, Manish Jindal<sup>2</sup>, Vishal Gupta<sup>3</sup></p> <p><sup>1</sup><i>Department of Computer Science and Applications, Panjab University, Chandigarh,</i> <sup>2</sup><i>Panjab University Regional Centre, Sri Muktsar Sahib,</i> <sup>3</sup><i>UIET Panjab University, Chandigarh.</i></p> <p>Multilingual Plagiarism checkers have been gaining more and more attention in recent years. The effectiveness of plagiarism detection is challenging because of the huge quantity of accessible words of multiple languages on the internet. This paper examines the current landscape of Multilingual Plagiarism detection tools, assessing their effectiveness in identifying and managing plagiarism across diverse linguistic contexts. The need for a robust plagiarism detection system that accommodates more than one language has become very critical. We analyse various tools, focusing on their algorithms, language support, and accuracy in detecting multiple forms of textual similarity, including direct copying and paraphrasing. Our findings reveal significant discrepancies in detection accuracy, with many tools performing exceptionally well in one language context but struggling in a multilingual context. We also explore the algorithm these tools employ and their ability to handle content. Several systems have been developed for plagiarism detection, but none of them deal with such documents that are written in Punjabi, English, and Hindi text format.</p>
12.	<p><b>A REVIEW OF METHODS TO RECOGNIZE DEGRADED GURMUKHI TEXT ALONG WITH CHALLENGES AND ADVANCES</b></p> <p>Veerpal Kaur<sup>1</sup>, Manish Kumar<sup>2</sup>, Munish Kumar<sup>3</sup></p> <p><sup>1</sup><i>Department of Computer Science and Applications, Panjab University, Chandigarh,</i> <sup>2</sup><i>Department of Computer Science and Applications, Panjab University Regional Centre, Muktsar, Punjab,</i> <sup>3</sup><i>Department of Computational Sciences, Maharaja Ranjit Singh Punjab Technical University, Bathinda, Punjab.</i></p> <p>The recognition of degraded Gurmukhi text is a significant area of research as preserving historical documents is important due to which improving OCR accuracy in Punjabi language is crucial. Gurmukhi script presents various challenges such as touching characters, diacritics and ligatures which becomes more difficult when text is blur or faded, paper is deteriorated, faded ink, and smudging. This review paper analyses</p>

various methods that are proposed to address these challenges and their limitations and strengths. Nowadays, machine learning and deep learning technologies are being used to tackle with various challenges in image processing field. Previously, Hidden Markov Models (HMM) and Support Vector Machines (SVM) were being used for character recognition tasks which improved accuracy on moderately degraded Gurmukhi text. As soon as, deep learning came into effect, various techniques like Convolutional Neural Network (CNN) and Long Short-Term Memory (LSTM) networks were used to significantly improve the accuracy of Gurmukhi text recognition by learning hierarchical features directly from data. CNN-based models came out to be effective in handling noise and distorted character shapes, as well as, beneficial in hybrid models that helped in advancing recognition accuracy by concentrating on key text features. Despite such techniques and methods there are significant challenges that needs to be addressed such as extremely faded text or touching or overlapping characters. This paper aims to identify research gaps and available techniques for future work for further improvements in recognizing degraded Gurmukhi text script.

**UG/PG Students of Panjab University Campus and Regional Centres**

<b>S.No.</b>	<b>Abstract</b>
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13.	<p><b>ANALYSIS OF CYBER CRIMES</b></p> <p><u>Akshita, Himani</u> <i>Department of Statistics, Panjab University, Chandigarh.</i></p> <p>The Cyber Crime dataset serves as a vital resource for understanding the landscape of cybercrime across various regions, specifically focusing on state and union territory (UT) data. This comprehensive compilation encompasses a wide range of incidents, detailing not only the frequency of occurrences but also the nature and types of cybercrimes reported. By analysing this dataset, researchers can uncover trends and patterns in cybercrime, identifying which regions experience the highest rates of incidents and what specific types of crimes are most prevalent. This information is crucial for developing effective strategies to combat cybercrime and enhance public awareness. Law enforcement organizations can leverage the insights gained from the dataset to allocate resources more effectively, target areas with rising crime rates, and tailor their training programs to address the unique challenges posed by cybercriminal activities. Furthermore, by understanding regional differences, they can foster collaboration among different jurisdictions to improve information sharing and response strategies. Legislators can utilize the findings from this analysis to inform policy decisions and craft legislation that addresses the evolving nature of cybercrime. Cybersecurity specialists, meanwhile, can benefit from the detailed insights into the types of cyber threats that are most prevalent in different regions. This knowledge can guide the development of targeted cybersecurity measures, threat intelligence strategies, and educational programs aimed at both individuals and organizations to reduce vulnerability.</p>
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14.	<p><b>STEERING TOWARDS TOMORROW: EVALUATING INDIA'S JOURNEY TO AUTOMATED VEHICLES.</b></p> <p><u>Ankit, Priya, Prerana</u> <i>Department of Statistics, Panjab University, Chandigarh.</i></p>
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	<p>Automated vehicles have transitioned from a futuristic concept to a present-day reality, driven by technological advancements that enhance safety and reliability. Their potential benefits are significant, particularly in India, where they could reduce accidents and improve transportation efficiency. However, challenges such as cybersecurity threats, job displacement, traffic issues, and poor road conditions must be addressed. To ensure the successful integration of automated vehicles in India, improvements in road infrastructure, strict enforcement of safety regulations, and public awareness are essential. Furthermore, developing indigenous technologies tailored to Indian needs can greatly support this transition. By addressing these challenges, India can move closer to realizing its vision of "VIKASIT BHARAT" and harness the full potential of automated vehicles.</p>
15.	<p><b>BENFORD'S LAW IN ACTION: FROM FINANCE TO FORENSICS</b></p> <p><u>Chahat Baweja</u>  <i>Department of Mathematics, Panjab University, Chandigarh.</i></p> <p>While there are many methods for investigating data, most tend to be highly subjective and rely heavily on human judgment. Benford's Law offers a fresh, objective approach to data analysis, making it especially useful in today's world, where vast amounts of data, such as millions of transactions, are processed daily. Traditional methods often fall short in helping forensic investigators analyse, evaluate, and assess such large datasets. Benford's Law, however, provides a straightforward and reliable way to detect irregularities. The idea behind Benford's Law is that, in many naturally occurring datasets, the first digit of a number does not appear randomly. In fact, smaller digits, like 1, are more likely to appear as the first digit than larger digits, such as 9. This phenomenon was first observed by Frank Benford, who noticed that certain pages in logarithmic tables, used for manual calculations, were more worn out than others. Through his research, he calculated that the probability of 1 being the first digit is about 30.1%, while 2 appears about 17.6% of the time, 3 appears 12.5%, and so on, with the probability decreasing as the digits increase. Interestingly, the second and third digits follow a more equal distribution. This predictable pattern allows auditors and investigators to determine if data follows this natural distribution. If the numbers deviate significantly from Benford's Law, it can indicate possible fraud or manipulation. Benford's Law is now widely used not only in fraud detection but also in areas such as computer science.</p>
16.	<p><b>SURVIVAL ANALYSIS OF MELANOMA PATIENTS: A KAPLAN – MEIER AND COX PROPORTIONAL HAZARDS APPROACH</b></p> <p><u>Chetanya Sharma, Pallavi</u>  <i>Department of statistics, Panjab university, Chandigarh.</i></p> <p>Melanoma, a highly aggressive form of skin cancer, has survival outcomes that are closely linked to various clinical and histological factors. This study analyses the survival of 205 melanoma patients who underwent radical surgery at Odense University Hospital, Denmark, from 1962 to 1977. By the end of 1977, 134 patients were still alive, while 71 had died, with 57 succumbing to malignant melanoma and 14 to other causes. The primary objective is to evaluate the influence of risk factors such as sex, age at operation, tumour thickness, ulceration, level of invasion, inflammatory cell infiltration (ICI), and the presence of epithelioid cells on patient survival. We apply the Kaplan-Meier method to estimate survival probabilities and calculate mean and median survival times. The Kaplan-Meier curve provides a clear visualisation of the survival distribution</p>

	<p>over time. To further assess the impact of multiple covariates, we implement the Cox proportional hazards model, which accounts for the combined effects of the factors above on survival. The findings from this study could help identify vital prognostic indicators, offering valuable insights for personalised treatment strategies and improving clinical decision-making for melanoma patients. The dataset for this analysis was sourced from the ‘MASS’ package in R, which includes patient records from Odense University Hospital’s melanoma study.</p>
17.	<p><b>JACOBI ELLIPTIC FUNCTION METHOD FOR THE NONLINEAR GENERALISED CAMASSA–HOLM–KADOMTSEV-PETVIASHVILI (G-CHKP) EQUATION</b></p> <p>Ruchi Kaur<sup>1</sup>, <u>Hardik</u><sup>2</sup>  <sup>1</sup><i>Department of Mathematics, Sri Guru Tegh Bahadur Khalsa College, University of Delhi, India,</i> <sup>2</sup><i>Department of Statistics, Panjab University, Chandigarh.</i></p> <p>In this study, various types of travelling wave solutions for the nonlinear (2+1) and (3+1) dimensional generalised Camassa-Holm-Kadomtsev-Petviashvili (g-CHKP) equation are obtained using the Jacobi Elliptic Function Expansion (JEFE) method. Several new forms of the travelling wave solutions of the said equation are listed and dynamics of different forms of solutions are demonstrated graphically for varied parameters.</p>
18.	<p><b>MALICIOUS-URL DETECTION USING LOGISTIC REGRESSION</b></p> <p><u>Harleen Kaur</u>, <u>Osheen Sahni</u>  <i>Department of Statistics, Panjab University, Chandigarh.</i></p> <p>Over the last few years, the Web has seen a massive growth in the number and kinds of web services. Web facilities such as online banking, gaming, and social networking have promptly evolved as has the faith upon them by people to perform daily tasks. As a result, a large amount of information is uploaded daily to the Web. As these web services drive new opportunities for people to interact, they also create new opportunities for criminals. URLs are launch pads for any web attacks such that any malicious intention user can steal the identity of the legal person by sending the malicious URL. Malicious URLs are a keystone of Internet illegitimate activities. The dangers of these sites have created a mandate for defences that protect end-users from visiting them. The proposed approach is that classify URLs automatically by using a Machine-Learning algorithm called logistic regression that is used for binary classification. The classifiers achieve 97% accuracy by learning phishing URLs. This project discusses the same.</p>
19.	<p><b>EULER’S NUMBER.</b></p> <p><u>Komalpreet Kaur</u>  <i>Department of Mathematics, Panjab University, Chandigarh.</i></p> <p>The number e is a mathematical constant approximately equal to 2.71828. Euler's number is named after the Swiss mathematician Leonhard Euler.</p>
20.	<p><b>THE IMPACT OF AI ADOPTION ON JOB GROWTH AND AUTOMATION RISK</b></p>

	<p><u>Nancy Sheokand, Ritika</u> <i>Department of Statistics, Panjab University, Chandigarh.</i></p> <p>This project investigates the transformative impact of artificial intelligence (AI) on the job market, focusing on how AI adoption varies across industries and job roles. A key objective is to perform skill gap analysis by identifying the skills in high demand and understanding the influence of AI on these trends. Additionally, the study provides insights to assist policymakers in recognizing job roles at high risk of automation, enabling them to strategize workforce transitions effectively. The analysis further explores the relationship between AI adoption levels and salary ranges across different roles and locations, providing valuable guidance to job seekers, employers, and policymakers for navigating the evolving employment landscape.</p>
21.	<p><b>PRICING OF A LIFE INSURANCE PRODUCT</b></p> <p><u>Nishita Virmani, Nitasha</u> <i>Department of Statistics, Panjab University, Chandigarh.</i></p> <p>Insurance pricing is all about finding the optimum premium to charge – not too low to avoid losses, not too high to remain affordable and competitive. Here, our objective is to find the optimum premium in the Group Term Life Product. It is a one-year product which employers take for their employees. Pricing insurance products involves several key considerations:</p> <ul style="list-style-type: none"> <li>• Finding the optimum premium to cover claims payouts, expenses, and profits.</li> <li>• Determining appropriate prices based on factors like likelihood of claims, cost of coverage, and potential profit.</li> <li>• Evaluating product profitability and underlying risks.</li> <li>• Focusing on the value of the insurance product to customers rather than just the price.</li> </ul> <p>Factors that have been considered while calculating the premium are: Claim history, IALM Payout, expenses, IALM &amp; Reinsurer Mortality rate, occupation class, medical history. With these parameters &amp; after making few assumptions, premium rate is obtained in the Excel model.</p>
22.	<p><b>PREDICTING TARGET AUDIENCE FOR CAR SALES: A COMPARATIVE ANALYSIS OF KNN, SVM, AND LOGISTIC REGRESSION</b></p> <p><u>Paras Thakur, Bittu</u> <i>Department of Statistics, Panjab University, Chandigarh.</i></p> <p>In today's digital world, determining the target audience can make or break a marketing campaign. This study examines how machine learning models—K-Nearest Neighbours (K-NN), Support Vector Machine (SVM), and Logistic Regression—can help predict which users are most likely to buy a car after seeing an advertisement. The data on variables like age, salary, occupation, region, and climate are used to classify potential car buyers and help companies make smarter advertising decisions. The aim is to determine which model best predicts potential car buyers. The performance of these three models is evaluated using several metrics, including average accuracy from cross-validation and ROC curves. The most effective model among the three is selected based</p>

	<p>on the evaluated performance metrics. A model that best predicts the potential buyers for the given predictor variables is better suited for this problem, enabling efficient targeting and reducing efforts on less relevant segments.</p>
23.	<p><b>AIRLINE BAGGAGE COMPLAINTS ANALYSIS</b></p> <p><u>Parul</u> <i>Department of statistics, Panjab University, Chandigarh.</i></p> <p>In the airline business customer satisfaction is greatly impacted by baggage handling and mishandled baggage is a common cause of customer complaints. This study focuses on the analysis and the prediction of airline baggage related complaints using time series analysis. The study uses historical baggage complaint data and seeks to detect trends, seasonality and periods of high complaining. The analysis studies the modelling of time series using such techniques as ARIMA (Autoregressive Integrated Moving Average) to predict the volume of complaints in the future. These models assist in risk management in regard to the increasing lattice of complaints and outliers that arise during the high seasons. The issue on the reasons for such tendencies is investigated which helps the airlines to prepare for the problems in their operations. With such information and knowledge gained out of the analysis, airlines management can improve their baggage services and consequently complaints will be lowered. This research highlights the forecasting especially baggage forecasting brings in enhancing the customer service and operational aspects of the airline industry.</p>
24.	<p><b>SUICIDE: AN INDIAN PERSPECTIVE</b></p> <p><u>Samriddhi Jain, Arpita Jain</u> <i>Department of Statistics, Panjab University, Chandigarh.</i></p> <p>Suicide is defined as death caused by self-directed injurious behaviour with intent to die as a result of the behaviour. It is among the top three causes of death among youth worldwide. The economic and human costs of suicide to individuals, families, communities and society make suicide a major public health problem in India. This paper is the systematic review investigating socioeconomic risk factor such as unemployment or poverty for suicidal behaviours (suicidal ideation, attempted suicides, and completed suicides) in India. To access trends of suicide mortality, statistical techniques like regression analysis is used. While analysing the socioeconomic risk factors, we made a comparative study of suicide rates among the different age groups, gender, states and a temporal contrast from 2010 - 2022. The purpose of this paper is to aid government and community sector organizations that are undertaking strategic planning on addressing suicide. We hope that exposure of the problem will facilitate primary prevention planning.</p>
25.	<p><b>DATA DETECTIVE STATISTICS GAME</b></p> <p><u>Sarru Jindal, Arvind Kaushal</u> <i>Department of Statistics, Panjab University, Chandigarh.</i></p>

	<p>Data Detective is a statistics-based puzzle game that challenges players to analyse data to solve mysteries. The game is designed to teach players about statistical concepts, such as data visualization, correlation and inference. Players will progress through levels, solving increasingly challenging puzzles to unlock the next level and ultimately solve the overarching mystery.</p>
26.	<p><b><u>DIGIT RECOGNITION SIMPLIFIED: EXPLORING NEURAL NETWORKS WITH PRE-TRAINED DATA</u></b></p> <p><u>Sirjan Kaur, Shyam Sunder</u>  <i>Department of Statistics, Panjab University, Chandigarh.</i></p> <p>The key aspect of user authentication is handwriting. In the era of information technology, the recognition of handwritten numbers has recently become an important aspect. The ability of a machine to detect handwritten digits that are collected through numerous sources like papers, touch screens, and pictures, and finally categorize these digits into number groups is called human handwritten digit recognition. Our focus is on the practical advantages of utilizing pre-trained models rather than building and training new models from scratch. We walk through key stages, including preprocessing, feature extraction, and performance analysis, showing how these stages work together to achieve accurate results. By bypassing the model training process, we focus on assessing the generalization capability of pre-trained networks and their effectiveness in classifying handwritten digits. Digit recognition has long been a benchmark in machine learning, providing insights into the capabilities of neural networks for pattern and image recognition. This presentation focuses on the application of pre-trained neural networks, specifically convolutional neural networks (CNNs), to digit recognition using the MNIST dataset. By utilizing pre-defined models, we streamline the digit classification process, eliminating the need for training from scratch and instead analysing the effectiveness of existing architectures.</p>



**ABSTRACTS OF  
POSTER  
PRESENTATIONS**

**Poster Presentations – Mathematical Sciences****UG/PG Students of Panjab University Campus and Regional Centres**

<b>S.No.</b>	<b>Name Of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
1.	Ms. Bharti Gupta	Department of Mathematics, Panjab University, Chandigarh.	When numbers mislead: The curious case of Simpson's paradox.
2.	Ms. Chandrima Seal	Department of Statistics, Panjab University, Chandigarh.	Analysing income generation trends with changes in educational policy using regression analysis.
3.	Mr. Goyam	Department of Mathematics, Panjab University, Chandigarh.	Exploring infinity in mathematics.
4.	Ms. Jasmine Kaur	Department of Mathematics, Panjab University, Chandigarh.	Uncountability of reals and the Cantor set.
5.	Ms. Kritika Satia	Department of Statistics, Panjab University, Chandigarh.	Deepfakes: The new age of deception.
6.	Ms. Nisha Sharma	Department of Statistics, Panjab University, Chandigarh.	Harnessing statistical tools to boost Local economic resilience.
7.	Ms. Shivani		
8.	Ms. Srishti Kansal	Department of Mathematics, Panjab University, Chandigarh.	The birthday paradox.

**Abstract File – Mathematical Sciences**

**UG/PG Students of Panjab University Campus and Regional Centres**

**S.No. Abstract**

**1. WHEN NUMBERS MISLEAD: THE CURIOUS CASE OF SIMPSON'S PARADOX**

Bharti Gupta

*Department of Mathematics, Panjab University, Chandigarh.*

In statistical analysis, appearances can be deceiving. This poster delves into Simpson's Paradox, a striking phenomenon where a trend seen in separate groups reverses when these groups are combined into a single set of numbers. The paradox underscores how conclusions based on aggregate numbers can conflict with the more nuanced truths revealed by subgroup analysis. At its heart, Simpson's Paradox offers a lesson in the complexity of averages and proportions. This poster highlights the key factors that lead to the paradox, such as differences in subgroup sizes and the influence of hidden variables. It aims to shed light on why these counterintuitive outcomes occur and the dangers they pose to accurate interpretation. In its final section, the poster provides practical insights for researchers, offering strategies to avoid common missteps in interpreting numerical patterns and to draw more reliable conclusions from complex datasets.

**2. ANALYZING INCOME GENERATION TRENDS WITH CHANGES IN EDUCATIONAL POLICY USING REGRESSION ANALYSIS**

Chandrima Seal

*Department of Statistics, Panjab University, Chandigarh.*

Post 15th August 1947, India's educational system, earlier formed on the principles of Macaulay's unjust minutes and Lord William Bentinck's so called momentous ideals, entered a new chapter in educational policy catering to the problems and challenges that had surfaced in the country due to the sheer diverse character of Indian society. India after independence has witnessed major educational policy shifts, starting from the University Education Commission (1948) to the latest National Educational Policy (2020). Policy makers aimed to keep the educational commissions relevant to the problems of the generation. Evidently, these policies impacted a student's professional life. But do these Commissions aid to the money-making aspect of their career? Do such policies facilitate students to land a hefty paying job? Taking into consideration factors such as market conditions, inflation, etc. have these policies been beneficial financially? This research study shall try to answer all these questions, primarily by decoding the correlation between the educational policies implemented post-independence (relevant to college and university levels) and the income generation trends, using regression analysis, taking into consideration independent variables such as the number of universities in a generation, number of graduates, percentage access to non-privileged students (women, SC, ST etc), inflation, unemployment rate, and the dependent variable as the wages earned by the batch of students from the era. The regression equation hence obtained will be used to predict the job opportunities available to the NEP batch, who are yet to graduate and join the workforce.

3.	<p><b>EXPLORING INFINITY IN MATHEMATICS</b></p> <p><u>Goyam</u> <i>Department of Mathematics, Panjab University, Chandigarh.</i></p> <p>Infinity, a concept both captivating and enigmatic, has fascinated mathematicians and philosophers for centuries. This poster delves into the intriguing realm of infinite sets, sequences, and series, revealing the intricate beauty of mathematical infinity. We explore paradoxes of Zeno and Cantor; limits of calculus; infinite-dimensional vector spaces; distinction between countable and uncountable infinity; implications of Gödel's incompleteness theorem and Turing's halting problem; discover how infinity shapes modern mathematical disciplines (topology, category theory); influences philosophical and computational perspectives; challenges human understanding. This poster unveils the profound impact of infinity on mathematics, science, and philosophy.</p>
4.	<p><b>UNCOUNTABILITY OF REALS AND CANTOR SET</b></p> <p><u>Jasmine Kaur</u> <i>Department of Mathematics, Panjab University, Chandigarh.</i></p> <p>The set of real numbers is uncountable. This means that there is no bijection between the set of natural numbers and the set of real numbers. Cantor's diagonal argument is a proof by contradiction that shows that the set of real numbers is uncountable. The Cantor set is a fascinating mathematical object that demonstrates the intricacies of infinite sets and their properties. It is a subset of the real number line constructed through a process of successive removals of middle thirds. Despite its seemingly sparse nature, the Cantor set possesses several counterintuitive properties like measure zero and uncountability.</p>
5.	<p><b>DEEPFAKES: THE NEW AGE OF DECEPTION</b></p> <p><u>Kritika Satia</u> <i>Department of Statistics, Panjab University, Chandigarh.</i></p> <p>Deepfake technology is rapidly reshaping the way we interact with digital media, often in ways that are not immediately noticeable. By using artificial intelligence and machine learning, deepfakes can create incredibly realistic but fake images, videos, and audio, making it difficult to distinguish between what is real and what is not. This technology is becoming more common in media, entertainment, and communication, significantly impacting how we consume and trust information. While deepfakes open new creative possibilities by altering existing media, they also present serious ethical and security concerns. Analysing how deepfakes are used reveals both positive and negative aspects. They offer new opportunities in entertainment, advertising, and education, but also pose dangers such as spreading misinformation, enabling identity theft, and increasing public mistrust of digital content. As deepfakes become more advanced, spotting fake media is increasingly challenging, raising urgent questions about privacy, security, and the integrity of information. To address these challenges, researchers and technologists are</p>

	<p>developing sophisticated detection tools that utilize deep learning and pattern analysis to identify manipulated media. Additionally, policymakers are exploring regulatory frameworks to curb the negative impacts of deepfakes on society. As this technology evolves, its implications are likely to extend beyond current concerns, affecting industries, public trust, and even democratic institutions. Striking a balance between innovation and prevention of misuse is critical. Deepfake technology reflects both the vast potential and risks of AI, underscoring the need to understand its power and limitations to ensure trust in our increasingly digital world.</p>
6.	<p><b>HARNESSING STATISTICAL TOOLS TO BOOST LOCAL ECONOMIC RESILIENCE</b></p> <p><u>Nisha Sharma</u>, Shivani  <i>Department of Statistics, Panjab University, Chandigarh.</i></p> <p>In our poster, we will highlight the use of various statistical methods like time series forecasting and regression analysis to support local economic growth. By analysing small business trends, employment data, and market dynamics, we demonstrate how data-driven insights can guide for decision-making and resource allocation, fostering resilience and sustainable development in local economies.</p>
7.	<p><b>THE BIRTHDAY PARADOX</b></p> <p><u>Srishti Kansal</u>  <i>Department of Mathematics, Panjab University, Chandigarh.</i></p> <p>The birthday paradox is a fascinating concept in probability theory that shows how our intuition about chances can be misleading. It explores the surprising likelihood that in a group of randomly selected people, at least two will share the same birthday. Although it might seem unlikely in small groups, the paradox reveals that with just 23 people, the probability of a shared birthday is over 50%. This result often surprises people because we tend to think of the problem as our own birthday matching someone else's, rather than considering the chance of any two people in the group sharing a birthday. The paradox arises because the number of possible birthday pairs grows quickly as the group size increases. Each new person does not just add one more comparison but creates many new possible pairs, which dramatically increases the odds of a match. Beyond this thought experiment, the birthday paradox has real-world applications, especially in fields like cryptography and data security. Overall, the birthday paradox is not only a fun example of counterintuitive probability but also a powerful tool for understanding large-scale real-world problems and security systems.</p>

# Pharmaceutical Sciences

- UIPS

## **CO-ORDINATORS**

*Sectional President*

**Dr. Neelima Dhingra**

**9876573312**

*Sectional Secretary*

**Dr. Amita Sarwal**

**8283815428**

**CHASCON 2024**  
**NATIONAL CONFERENCE ON**  
**“Indigenous Technologies for Viksit Bharat”**  
**SECTION: PHARMACEUTICAL SCIENCES**

**Program (Thursday, November 07, 2024)**  
**Venue: UIPS, Panjab University, Sector-14, Chandigarh**

Sectional President Dr. Neelima Dhingra 9876573312		Sectional Secretary Dr. Amita Sarwal 9818705428	
Time	Program		
09:00-09:45	<b>Activity:</b> Display of posters by participants and Quiz Competition <b>Venue:</b> Display of posters (UIPS Lawn) Quiz Competition (UIPS LH1)		
09:45-10:00	Inauguration of Sectional Program <b>Venue:</b> UIPS Block 2 Ground floor LH1		
10:00-10:45	<b>Speaker:</b> Prof. (Dr.) Samrat Ghosh Department of Chemical Sciences, IISER, Mohali, Punjab <i>“Frugal Grassroot Level Innovations for Societal Benefits”</i>		
10:45-11:30	<b>Speaker:</b> Mr. Barinder Singh Founder and Director at Pharmacovidence®, Mohali, Punjab <i>“An Overview of Health Economics and Outcomes Research (HEOR) Domain”</i>		
11:30-12:00	Tea Break		
12:00-1:00	Poster Presentation (UG/PG) <b>Venue:</b> UIPS Lawn Oral Presentation (UG/PG) <b>Venue:</b> UIPS Block 2 Ground floor LH1		
1:00-2:00	Lunch		
2:00-5:00	Oral Presentation (Faculty) <b>Venue:</b> UIPS LH2 Oral Presentation (Research Scholars) <b>Venue:</b> UIPS LH1 Poster Presentation (Research Scholar) <b>Venue:</b> UIPS Lawn		
3:30-4:00	Tea break		

## KEY SPEAKERS

<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
1.	Dr. Samrat Ghosh	Assistant Professor, Department of Chemical Sciences, IISER, Mohali.	Frugal Grassroot Level Innovations for Societal Benefits.
2.	Dr. Barinder Singh	Founder & CEO, Pharmacovidence, Mohali.	An Overview of Health Economics and Outcomes Research (HEOR) Domain.



# FRUGAL GRASSROOT LEVEL INNOVATIONS FOR SOCIETAL BENEFITS



Dr. Samrat Ghosh

Assistant Professor, Department of  
Chemical Sciences, IISER, Mohali.

## Abstract

In my presentation, I will highlight how some of the problems, I observed in our society, whether it be educational establishments, home/work place or elsewhere, were taken up by me as challenges. I saw them as unique opportunities to contribute in my own way towards Viksit Bharat. In my endeavours, I was successful in developing a few indigenous solutions to some of the issues faced by our society. I will also show some medical related innovations employed during COVID and can be used in future for similar health related issues at home and in hospital with high load of air-borne pathogens

# AN OVERVIEW OF HEALTH ECONOMICS AND OUTCOMES RESEARCH (HEOR) DOMAIN.



Dr. Barinder Singh  
Founder & CEO,  
PharmacoEvidence, Mohali.

## Abstract

This session will offer a comprehensive overview of evidence synthesis and health economic modeling within the Health Economics and Outcomes Research (HEOR) domain. Key topics will include systematic literature reviews and statistical methodologies, such as meta-analyses and network meta-analyses, which are essential for comparing treatment outcomes and supporting informed healthcare decision-making. The session will also discuss health economic modeling approaches, including cost-effectiveness and budget impact models, to demonstrate how these methods quantify the economic value of healthcare interventions

ABSTRACTS OF  
ORAL  
PRESENTATIONS

**Pharmaceutical Sciences – Oral Presentation****Faculty/Scientists of Panjab University Campus and Regional Centres**

<b>S. No.</b>	<b>Name of Participant</b>	<b>Affiliating Institutions</b>	<b>Title of Abstract</b>
1.	Dr. Amita Sarwal	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Incubation centres for nurturing an innovation in India: A brief overview.
2.	Dr. Anurag Kuhad	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	A novel dorsal root ganglion (DRG) targeted nanogel for neuropathic pain.
3.	Dr. Ashok Kumar Yadav	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Design, synthesis and biological evaluation of N-(2- and 3-pyridinyl) alkyl/arylamide derivatives as quorum sensing inhibitors against <i>Pseudomonas aeruginosa</i> .
4.	Dr. Ashwani Kumar	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	HPLC analysis of daidzein in isoflavone containing tablets.
5.	Ms. Beenta Kumari	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Biomarkers in parkinson's disease: approaches for better therapy & management in PD.
6.	Dr. Divya Dhawal Bhandari	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Role of B-Cells in hepatitis B infection.
7.	Dr. Gurpal Singh	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Biosensing nanomaterials for bioimaging and biosensing applications.
8.	Dr. Jai Malik	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	A comparative study on sivanarvembu: A siddha Drug of controversial origin.
9.	Dr. Monika	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Harnessing the potential of lantadene scaffold as NF-KB inhibitor: <i>In silico</i> investigations.

10.	Dr. Neelima Dhingra	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Identification and evaluation of steroidal derivatives as 5 $\alpha$ -reductase inhibitors: Hope of a therapy for benign prostatic hyperplasia.
11.	Dr. Sangeeta Pilkhwah Sah	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Protective effects of zingerone on chronic restraint stress induced depressive-like behavioural and biochemical alterations.
12.	Mrs. Shilpa Bhasin	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Preparation and characterization of ketoprofen loaded poly- (lactic acid) microspheres for parenteral delivery.

**Faculty/Scientists from Colleges and Other Institutions**

S.No.	Name of Participant	Affiliating Institutions	Title of Abstract
13.	Mrs. Heena Jindal	School of Pharmaceutical Sciences, Apeejay Stya University, Gurgaon, Haryana.	Unraveling trends in FDA-approved anticancer Drugs: Insights into approvals, toxicity, and routes of administration.
14.	Ms. Shabeena	Shree Dhanvantary Pharmacy College, Kim, Surat, Gujarat.	Efficacy of methanol extract of the herbal queen: A life-giving remedy for streptozocin-induced diabetic neuropathy in swiss albino mice.

**Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)**

S.No.	Name of Participant	Affiliating Institutions	Title of Abstract
15.	Mr. Ajay	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Synthesis and study of some coumarin-oxadiazole conjugates as potential candidates for the treatment of cognitive decline.
16.	Mr. Akshay Kumar	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Analytical method development and characterization of degradation products of seratrodoast by UPLC-ESI-QTOF-MS.
17.	Ms. Anisha Sharma	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Antidiabetic effect of <i>Pongamia pinnata</i> Pierre in streptozotocin-induced diabetic rat model.
18.	Mr. Bhavneesh Kumar	University Institute of Pharmaceutical	Targeting glutamine metabolism suppresses smooth muscle cell

		Sciences, Panjab University, Chandigarh.	phenotypic modulation and neointimal hyperplasia.
19.	Ms. Mansi Prashar	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Preparation and optimization of famotidine-sorbic acid co-crystal using liquid-assisted grinding technique.
20.	Ms. Parveen Kumari	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Formulation and evaluation nanostructured lipid carriers (NLCs) of raloxifene hydrochloride and vitamin D for postmenopausal osteoporosis.
21.	Ms. Priyanka Rana	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Accelerating prostatic research using computational tools.
22.	Ms. Saloni Rahi	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Altered physical and sensorimotor developmental trajectory in rat offspring prenatally exposed to valproic acid as a model of autism spectrum disorder.
23.	Ms. Tanvi Sharma	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Synthesis and pharmacological evaluation of substituted indole derivatives as combined anti-dopaminergic and anti-serotonergic agents.

**UG/PG Students of Panjab University Campus and Regional Centres**

<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institutions</b>	<b>Title of Abstract</b>
24.	Ms. Kanika Sharma	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Harnessing siRNA: A revolutionary approach to combat COVID-19 and other viral infections.
25.	Ms. Meenal Batra	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Revitalizing the traditional use of berberine: Bridging heritage and innovation for enhanced health benefits.
26.	Ms. Tanya Sarwal		
27.	Mr. Meet Yashraj Singh	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Integration of Ayurveda in modern pharmacology: Bridging traditional wisdom with contemporary science.
28.	Ms. Nishika Kapoor	University Institute of Pharmaceutical	Evaluation of diabetic wound healing potential of topically applied silymarin.

		Sciences, Panjab University, Chandigarh.	
29.	Ms. Purvi Arora	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Formulation and evaluation of trigonelline loaded nanoshots for the treatment of gastric ulcer.
30.	Ms. Ramanpreet Kaur	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Synthesis and study of some chalcones as potential candidates for the treatment of cognitive decline.
31.	Ms. Shruti Goyal	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	The living Drug nexCAR19: India's first indigenous CAR-T therapy.
<b>UG/PG Students from Colleges and Other Institutions</b>			
<b>S. No</b>	<b>Name of Participant</b>	<b>Affiliating Institutions</b>	<b>Title of Abstract</b>
32.	Mr. Arun Gautam	GHG Khalsa College of Pharmacy, Ludhiana Punjab.	ε-polylysine crosslinked oxidised sodium alginate composite films for potential antibacterial wound dressing or packaging film application.
33.	Mrs. Riya Rani	Department of Pharmaceutical Sciences and Drug Research, Punjabi University, Patiala.	Revealing fused benzimidazobenzodiazepine as LOX inhibitors with added cytotoxic effects: Synthesis and evaluation.

**Abstract file****Faculty/Scientists of Panjab University Campus and Regional Centres****1. INCUBATION CENTRES FOR NURTURING AN INNOVATION IN INDIA: A BRIEF OVERVIEW**

Amita Sarwal

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Incubation centres are important houses that incubate innovation and entrepreneurship by developing the perfect environment needed for a startup to take an idea to the practical business level. Such houses provide critical support that ranges from mentorship, infrastructure and funding, networking, and incubation of innovation-based practices, enabling the culture of innovation. India has 400+ incubators, with most of them at a developing stage. Recent endeavors undertaken by the Indian government-the Atal Innovation Mission and Startup India-were aimed at strengthening the ecosystem of startups. These are efforts at collaboration between the academy, industry, and the government towards innovation. Incubation centers serve as some form of palliative to part of the challenges that are experienced by startups in terms of resources, market understanding, and regulatory compliances. From these incubation hubs, businesses located in these areas have found great space to grow their businesses on a large scale, creating large-scale employment opportunities, and driving the progress of India as a global innovator. The incubation centers have been of massive value to the Indian innovation landscape, thus offering a glimpse of significant improvement in socio-economic development in India.

**2. A NOVEL DORSAL ROOT GANGLION (DRG) TARGETED NANO GEL FOR NEUROPATHIC PAIN**

Anurag Kuhad

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The 7–10% of individuals who have neuropathic pain frequently have high-risk conditions like diabetes, HIV, and chemotherapy patients. A regulated, prolonged release of gabapentin and capsaicin is provided by a targeted nanogel, which may increase therapeutic efficacy and lessen side effects. Our study describes a new nanogel system loaded with gabapentin and capsaicin (GC) for the treatment of neuropathic pain. Delivered specifically to the dorsal root ganglia, the technology combines GABA-PLGA nanoparticles with TET-1 and capsaicin. With its stable formulation, regulated release profiles, and great efficiency, the GC-nanogel is impressive. It offers a promising approach to treating neuropathic pain, as evidenced by animal experiments demonstrating its superiority over basic gels in pain alleviation and functional growth.

**3. DESIGN, SYNTHESIS AND BIOLOGICAL EVALUATION OF N-(2- AND 3-PYRIDINYL) ALKYL/ARYLAMIDE DERIVATIVES AS QUORUM SENSING INHIBITORS AGAINST *Pseudomonas aeruginosa***

Dr. Ashok Kumar Yadav

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	<p>The development of bacterial resistance to chemical therapy poses a severe danger to the efficacy of treating bacterial infections. One of the key factors for resistance to antimicrobial medications is the development of biofilm. Quorum sensing (QS) inhibition was created as an alternative therapy by developing novel anti-biofilm medicines. QS inhibition targets the QS signalling system by impeding cell-cell communication. N-(2- and 3-pyridinyl) alkyl/arylamide derivatives were selected to design and synthesis. The compounds were designed based on literature and in-silico and docking studies. Further, in vitro pharmacokinetic profiles were studied. The synthesized compounds were characterized by various spectral techniques like IR, <sup>1</sup>H NMR, <sup>13</sup>C NMR and mass spectrometer. Next, the synthesized compounds were evaluated for their quorum sensing activity in in-vitro. Molecular dynamic simulation was also used to better understand the stability of the protein and ligand complex. Overall, it was concluded that N-(2- and 3-pyridinyl) alkyl/arylamide derivatives might hold the key to developing more potent anti-quorum sensing Drugs that work against various bacteria.</p>
4.	<p><b>HPLC ANALYSIS OF DAIDZEIN IN ISOFLAVONE CONTAINING TABLETS</b></p> <p><u>Ashwani Kumar</u>, Vinit Channa <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>The main sources of isoflavones are legumes belonging to the family Fabaceae, namely soybean (<i>Glycine max</i>) as a source of daidzein, genistein, and glycitein and red clover (<i>Trifolium pratense</i>) as a source of formononetin and biochanin A. Daidzein is one of the isoflavones which has a number of pharmacological activities including neuroprotective, anticancer, antiaging, antidiabetic and antioxidant. In the present study, the quality of the tablet was assessed by quantifying the daidzein content using HPLC. Shimadzu HPLC system equipped with PDA detector was used. A mobile phase consisting of 0.1% formic acid and acetonitrile (72:28) at a flow rate of 1.0 ml per minute was used. The injection volume was 20 uL, the detection wavelength was 248 nm while run time was 10 minutes. Daidzein showed peak having Rt 7.8 minutes. The method was validated as per ICH guidelines. The LOD and LOQ were 0.3 µg and 1.0 µg respectively. The linearity coefficient was 0.998 and the accuracy was more than 98%. The content of daidzein was 1.77 mg/g, 2.30 mg /g and 3.47 mg /g respectively. The method can be used for the quality control of the commercial preparations containing daidzein.</p>
5.	<p><b>BIOMARKERS IN PARKINSON'S DISEASE: APPROACHES FOR BETTER THERAPY &amp; MANAGEMENT IN PD</b></p> <p><u>Beenta Kumari</u> <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Parkinson's disease (PD) is a neurodegenerative disease characterised with motor symptoms of akinesia/bradykinesia, rest tremor, and muscle rigidity along with postural instability together with various non-motor symptoms. These result from the loss of the dopaminergic neurons of the substantia nigra pars compacta. Being a complex and progressive neurodegenerative disease diagnosis of PD is also complicated as the misdiagnosis rate are high. Therefore, to predict occurrence and progression of the disease reliable biomarkers facilitate the early and accurate diagnosis. These biomarkers serve as the characteristic evaluation indicators of</p>

	<p>normal biological processes and pathogenic processes of the disease. A variety of clinical, biochemical, genetic and neuroimaging biomarkers are available and are being developed for diagnosis of PD. Many non-motor features, including hyposmia, rapid eye movement (REM) sleep behavior disorder, and constipation can occur during all stages of the PD and may even be highly observed a few years before motor symptoms onset, may be helpful in the detection of prodromal PD serving as clinical biomarkers for the disease. Biochemical biomarkers also play an essential role in the detection of prodromal PD. Also, the decreased BDNF levels in the serum of PD patients in early stages of the disease may be of use for early diagnosis of PD which is also an important biomarker in early detection of PD. This early and accurate diagnosis of PD with the help of various biomarkers can delay the progress of the disease &amp; would help in the management of the disease also.</p>
6.	<p><b>ROLE OF B-CELLS IN HEPATITIS B INFECTION</b></p> <p><u>Divya Dhawal Bhandari</u>  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Hepatitis B is a viral disease which is caused by Hepatitis B Virus (HBV) and is one of the leading causes of liver inflammation resulting in liver cirrhosis, and acute liver failure. After the viral infection, there is an essential role of adaptive immunity in the patients which have no pre-infection or innate immunity towards the virus. B-cells play the primary role through production of specific antibodies against the HBc Ag antigen on HBV virus. While helper T-cells fuel the B-cell antibody production, B-cells express the antibody mIg. It performs the specific function of uptake of viral antigen. Although, B-cells specific for any given antigen are very rare but are quite active in identifying HBc Ag antigen due to its highly immunogenic potential (Bauer, Sprinzl, and Protzer 2011). The HBc Ag-specific B-cells function as the APCs or antigen presenting cells for primary T cells, and act as co-stimulatory molecules for naive B-cells. This often is followed by internalization of HBc Ag antigen resulting in limited B cell clonal expansion and differentiation. Plasma B-cells are effectively known to produce antibodies including self-antibodies, anti-HBc antibodies, and anti-HB antibodies along with the role of memory B-cells in forming innate memory of the viral antigen. These antibodies are responsible for complement activation, immune complex formation, and essential neutralization and inhibition of HBV entry and replication. This further generates cell-mediated immunity by recruiting natural killer (NK) cells, causing increased apoptosis of HBV-infected hepatocytes.</p>
7.	<p><b>BIOSENSING NANOMATERIALS FOR BIOIMAGING AND BIOSENSING APPLICATIONS</b></p> <p><u>Gurpal Singh<sup>1</sup>, Ravi Pratap Barnwal<sup>2</sup></u>  <sup>1</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh,</i>  <sup>2</sup><i>Department of Biophysics, Panjab university, Chandigarh.</i></p> <p>Nanosensors that consolidate the upsides of nanomaterials and biosensing innovation have arisen as new diagnostic tools for infectious diseases because of the quick advancement of nanoscience and nanotechnology. Nanosensors are cutthroat in the field of infectious pathogen detection because of their rapidity, selectivity, robustness, and speed. However, because they still require specialized instrumentation for signal readout and multiple detection steps, the majority of available sensors do not fully meet the practical requirements. As a result, delicate, specific, precise, and easy-to-use demonstrative tests are desperately needed. Biofunctionalized engineered nanomaterials are proving to be promising when it</p>

	<p>comes to addressing these requirements for diagnosing the aforementioned issues in food, blood, and clinical samples. For the purposes of bioimaging and biosensing of infectious pathogens and cancer, I will concentrate on developments in fluorescent nanoparticles like CdTe, CdSe/ZnS, QDSNPs, graphene quantum dots (QDs), gold nanoparticles, and superparamagnetic nanoparticles. In addition, it will be demonstrated how cancer-specific aptamers and biohybrid graphene QDs inhibit Bcl-2 expression. Right now, the ordinary techniques for distinguishing the bacterial pathogen including E. coli depend on culturing the microorganisms on agar plates, trailed by standard biochemical identifications which are tedious, difficult, less touchy and require skilled labor. Subsequently, discuss how an AT mega 328P prototype biosensor based on aptamer conjugated CdTe-MPA QDs could be valuable for E. coli detection here. In order to make nanosensors with higher sensitivities accessible to a larger number of people worldwide, these cutting-edge technologies should be developed in the future.</p>
8.	<p><b>A COMPARATIVE STUDY ON SIVANARVEMBU: A SIDDHA DRUG OF CONTROVERSIAL ORIGIN</b></p> <p><u>Jai Malik</u>, Maninder Karan, Gurleen Kaur  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Over the past few years, there has been a huge surge in the use of herbal medicines, and it has become a subject of intensive research in its different aspects. However, widespread presence of folklore medicines and interpretation of description of the Drug, given in different languages, has led to confusion in ascertaining the true biological source of various medicinal plants. Moreover, the description of a plant in the ancient literature has an ample use of synonyms. These synonyms have also caused controversy in the identification of plants thereby causing ambiguity regarding the true source of the plant. Since herbal products are generally made by using the extracts of the plants known for a particular activity, the erroneous use of a controversial source sometimes may lead to an ineffective or sometimes even toxic preparations. The safe usage of the herbal medicine can be employed only when the botanical identity of plant can be verified. Thus, it is essential to ascertain the botanical provenance of the medicinal plants that are to be used for their biological potential. Sivanarvembu is one such Drug with controversial biological source in Siddha system of medicine. It has been used for its anti-inflammatory, hepatoprotective, antidiabetic and cytotoxic properties. Two different plants, <i>Justicia tranquebariensis</i> (Acanthaceae) and <i>Indigofera aspalathoides</i> (Fabaceae) are considered as Sivanarvembu in India leading to controversy regarding its true source. The present study gives a detailed, comparative pharmacognostic and phytochemical profile of the two plants for their proper identification.</p>
9.	<p><b>HARNESSING THE POTENTIAL OF LANTADENE SCAFFOLD AS NF-KB INHIBITOR: <i>IN SILICO</i> INVESTIGATIONS</b></p> <p><u>Monika</u>, Neelima Dhingra  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Natural products and their scaffolds encompasses an array of molecular entities as starting points for Drug designing and discovery. In the last two decades, phytochemically Driven Lantadenes and their modified analogues have gained significant attention due to tumor necrosis factor-alpha (TNF-<math>\alpha</math>) induced nuclear factor-kappa B inhibition and consequently their promising anticancer potential toward lung cancer. Further, in Drug discovery process, molecular docking has</p>

	<p>become an integral part of Drug design. Taking these advantages, present study includes binding interaction studies, pharmacokinetic and Drug likeness using V life MDS Bioproduct and ADMET lab tools. Grip docking approach was utilized to estimate binding interactions of all the optimized Lantadenes and their modified ester against nuclear factor-kappa B receptor (PDB ID: 1LE9). In addition, all the compounds were screened for pharmacokinetic profile and Drug likeness as an important consideration for the selection of compounds with desirable prosperities using ADMET lab tools. Ligand-receptor analysis revealed Lantadene showed negative D score ranging from -21.16 to -42.56 kcal/mol, found comparable to standard Drug Bortezomib. Furthermore, most of the analogues were found to have good ADMET profiles. Cumulative computational analyses provided 3<math>\beta</math>-(3-methoxybenzoyloxy)-22<math>\beta</math>-seneciyoxy-olean-12-en-28-oic acid as lead and can be considered as a potential candidate for detailed mechanistic studies against lung cancer.</p>
10.	<p><b>IDENTIFICATION AND EVALUATION OF STEROIDAL DERIVATIVES AS 5<math>\alpha</math>-REDUCTASE INHIBITORS: HOPE OF THERAPY FOR BENIGN PROSTATIC HYPERPLASIA</b></p> <p><u>Neelima Dhingra</u>  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>The advent of computational biology, and information technology infrastructures offering the opportunity to use artificial intelligence (AI) approaches in addressing the challenges and technical needs to discover Drug. Identification of new, essential, Druggable targets, analysis of vast amounts of molecules, prediction of outbreaks, enabling the researchers by discovering new treatments and to tackle the complex challenges of for prostatic disorders more efficiently and effectively than ever before. In the present study efforts have been made to identify potent few molecules amongst the generated library of the compounds followed by their validation by synthesis and biological evaluation.</p>
11.	<p><b>PROTECTIVE EFFECTS OF ZINGERONE ON CHRONIC RESTRAINT STRESS INDUCED DEPRESSIVE LIKE BEHAVIOURAL AND BIOCHEMICAL ALTERATIONS</b></p> <p><u>Sangeeta Pilkhwah Sah<sup>1</sup></u>, Kumud Upadhyaya<sup>2</sup>, Priya Kumari Sharma<sup>2</sup>  <sup>1</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh</i>  <sup>2</sup><i>Department of Pharmaceutical Sciences, Kumaun University, Bhimtal, Nainital, Uttarakhand.</i></p> <p>Zingerone is an active constituent of ginger with reported neuroprotective and antioxidant properties. The present study was aimed to explore the effects of plant origin Drug zingerone treatment on behavioural and biochemical endpoints of brain alterations induced by chronic restraint stress (CRS) in experimental rats. Female wistar rats were administered zingerone (25, 50, and 100 mg/kg p.o.) once daily for a period of 28 days while being exposed to chronic restraint stress (6 h/day). Our results indicated that the stressed animals depicted depression-like behaviour (reduced sucrose preference and increased immobility time), accompanied by increased lipid peroxidation (cortex) and decreased catalase (CAT) (hippocampus and cortex), increased superoxide dismutase (SOD) (hippocampus and cortex). Also, metabolic alterations were characterized by hyperglycaemia, and increased glycosylated haemoglobin in the CRS rats. However, no alterations were observed on learning and memory task in morris water maze and in the levels of reduced</p>

	<p>glutathione. Repeated zingerone administration significantly reversed depression-like behaviour elicited by chronic restraint stress in rats. Further, a significant antioxidant effect was exhibited by zingerone as shown by reduced lipid peroxidation and enhanced activity of antioxidant enzymes (SOD, CAT) in chronically stressed rats. The findings from the present study suggested that zingerone possesses protective actions against chronic stress induced depressive-like behavioural, biochemical alterations and metabolic alterations and that its underlying mechanism may be possibly related to its antioxidant properties. The results also signify its pharmacologic and possible nutritional importance.</p>
12.	<p><b>PREPARATION AND CHARACTERIZATION OF KETOPROFEN LOADED POLY- (LACTIC ACID) MICROSPHERES FOR PARENTERAL DELIVERY</b></p> <p><u>Shilpa Bhasin</u> <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Ketoprofen is an anti-inflammatory Drug used for long term treatment of arthritis, gout and post-operative pains. It has short elimination half-life (1.5-4hrs), thus necessitating its frequent administration. Parenterally, it is administered intramuscularly at a dose of 50-100mg every 4hrs for the chronic treatment of the above said diseases. Parenteral administration of Ketoprofen microspheres suspended in a suitable vehicle will form a depot at the site of injection, which acts as Drug reservoir releasing the Drug for a prolonged period of time leading to better patient compliance, reduced Drug dose, lesser side effects and better Drug utilization. Biodegradable poly- (Lactic Acid) microspheres of Ketoprofen for parenteral delivery were prepared by o/w emulsion solvent evaporation technique using various process variables to optimize the microsphere properties. Microsphere characterization by SEM, DSC, particle size, percent yield, Drug content, <i>in vitro</i> release and biological evaluation was studied. Spherical microspheres formed using poly (D, L-Lactic acid) (PDLLA) and poly (Lactic acid) (PLA) demonstrated prolonged release compared to the pure Drug. PLA microspheres released Drug slowly as compared to PDLLA microspheres due to crystalline form of the former. Incorporation of polycaprolactone in PDLLA microspheres modified the Drug release. Biological evaluation showed that subcutaneously administered poly- (Lactic acid) microspheres released the Drug consistently and produced less oedema compared to the control group. The administered microspheres exhibited anti-inflammatory activity for a period of about 4 days.</p>
<b>Faculty/Scientists from Colleges and Other Institutions</b>	
13.	<p><b>UNRAVELING TRENDS IN FDA-APPROVED ANTICANCER DRUGS: INSIGHTS INTO APPROVALS, TOXICITY, AND ROUTES OF ADMINISTRATION</b></p> <p><u>Heena Jindal</u>, Anupama Diwan <i>School of Pharmaceutical Sciences. Apeejay Stya University, Gurgaon, Haryana.</i></p> <p>The therapeutic landscape for cancer treatment has expanded significantly with the approval of numerous anticancer agents by the Food and Drug Administration (FDA). This study provides a comprehensive analysis of 273 FDA-approved anticancer Drugs, examining approval trends, toxicity profiles, and routes of administration. Data were collected from FDA records and cross-referenced with peer-reviewed literature, clinical trial repositories, and Drug databases to ensure accuracy. Between</p>

	<p>2010 and 2020, the highest number of Drug approvals have been observed with 126 new agents entering the market. The analysis revealed a predominance of intravenous (IV) formulations (139 Drugs), followed by oral Drugs (127 Drugs), underscoring the continued reliance on parenteral administration in oncology. Other routes of administration, including subcutaneous, intramuscular, and topical, were observed in smaller subsets. Toxicity analysis highlighted hepatotoxicity as a major concern, affecting 71.4% of approved agents, while 22.7% of the Drugs were associated with effects on lactation and breast milk. The findings provide key insights into the regulatory and clinical evolution of anticancer Drug approvals. This analysis is pivotal for healthcare professionals and policymakers, offering a data-Driven foundation for optimizing treatment protocols and guiding therapeutic innovations. Moreover, the toxicity trends call for enhanced safety monitoring and tailored treatment strategies to mitigate adverse effects in vulnerable patient populations. The study's results contribute to ongoing discussions about Drug development in oncology, particularly in understanding the balance between efficacy, toxicity, and the choice of administration routes.</p>
14.	<p><b>EFFICACY OF METHANOL EXTRACT OF THE HERBAL QUEEN: A LIFE-GIVING REMEDY FOR STREPTOZOCIN-INDUCED DIABETIC NEUROPATHY IN SWISS ALBINO MICE</b></p> <p><u>Shabeena Khan</u><sup>1</sup>, Abhishek Bhanot<sup>2</sup>, Uttam A. More<sup>3</sup>  <sup>1</sup>Shree Dhanvantary Pharmacy College, Kim, Surat, Gujarat, <sup>2</sup>A.S.B.A.S.J.S.M. College of Pharmacy, Bela Ropar Punjab, <sup>3</sup> Shree Dhanvantary Pharmacy College, Kim Surat, Gujarat.</p> <p>Diabetes-related neuropathy (DN) is a prevalent complication of diabetes characterized by progressive nerve damage, leading to symptoms such as pain, numbness, and impaired motor function. The pathophysiology of DN involves oxidative stress and inflammation, which contribute to neuronal injury. Herbal plants with notable antioxidant properties have garnered interest for their potential in managing diabetes and its complications. Among these, <i>Ocimum sanctum</i> (Holy Basil) and <i>Ocimum basilicum</i> (Basil) have demonstrated significant antihyperglycemic and neuroprotective effects in various studies. Despite their promising profiles, the specific impacts of these herbs on DN remain unexplored. The current study aimed to Evaluate the Efficacy of Methanol Extract of the Herbal Queen: A Life-Giving Remedy for Streptozocin-induced Diabetic Neuropathy in Swiss albino mice. Mice were assigned to three groups: control, diabetic, and test. Citrate buffer and Streptozocin. were administered and the effects were assessed through various in vitro and in vivo studies. The methanol extracts of <i>Ocimum sanctum</i> and <i>Ocimum basilicum</i> showed significant changes in weight variation, tail immersion test and blood glucose levels compared to the diabetic control. In brain tissue homogenate, measurement of oxidative stress by TBARS, GSH, and serum nitrite levels showed that the methanol extract of both plants produced significant changes compared to the diabetic control. The study concludes that methanol extracts of <i>Ocimum sanctum</i> and <i>Ocimum basilicum</i> have a significant effect on managing DN by improving oxidative stress markers and reducing hyperglycemia in diabetic mice. Keywords: Diabetic Neuropathy, <i>Ocimum sanctum</i>, <i>Ocimum basilicum</i>, Oxidative Stress, Streptozocin.</p>
<p><b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b></p>	

15.	<p><b>SYNTHESIS AND STUDY OF SOME COUMARIN-OXADIAZOLE CONJUGATES AS POTENTIAL CANDIDATES FOR THE TREATMENT OF COGNITIVE DECLINE</b></p> <p><u>Ajay Kumar</u>, Geetakshi Arora, Poonam Piplani <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Novel 4-((5-substituted phenyl-1,3,4-oxadiazole-2-yl)methoxy)-2H-chromen-2-one derivatives were designed, synthesized and evaluated against scopolamine induced deficit cholinergic transmission and oxidative stress serving as promising leads for treatment of cognitive dysfunction. A series of 8 compounds have been synthesised and evaluated against behavioural alterations okay using step down passive avoidance protocol at a dose of 2 mg/kg using reference standard rivastigmine. All the synthesised compounds were evaluated for their in vitro acetylcholinesterase (AChE) inhibition at five different concentrations using mice brain homogenate as the source of the enzyme. Biochemical estimation of markers of oxidative stress (lipid peroxidation, superoxide dismutase, glutathione, catalase) has also been carried out to assess the role of synthesised compounds on oxidative stress induced by scopolamine. Compound PP-389 showed better AChE inhibitory activity with percentage inhibition of <math>51.83 \pm 7.29</math> as compared to the standard (<math>48.00 \pm 3.28</math>). The resulting compound also displayed appreciable results in combating scopolamine induced oxidative stress, thus serving as promising lead for the amelioration of oxidative stress induced in cognitive decline. In molecular docking studies against active site of acetylcholinesterase (PDB ID: 4EY7), compound PP-389 established hydrogen bond and pi-pi interactions with the prominent amino acid residues. Thus, PP-389 compound could be a promising lead structure that can be used for further development of agents with potential for cognition improvement.</p>
16.	<p><b>ANALYTICAL METHOD DEVELOPMENT AND CHARACTERIZATION OF DEGRADATION PRODUCTS OF SERATRODAST BY UPLC-ESI-QTOF-MS</b></p> <p><u>Akshay Kumar</u>, Kanade Krushna Devrao, Alka Bali <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Chemical stability of pharmaceutical molecules is a matter of great concern as it affects the safety and efficacy of the Drug product. Stress testing is intended to identify the likely degradation products which further helps in determination of the intrinsic stability of the molecule and establishing degradation pathways, and to validate the stability indicating procedures. Seratrodast was subjected to forced degradation under conditions of hydrolytic, oxidative, photolytic and thermal stress, as suggested in the ICH guideline Q1A(R2). Seratrodast showed significant degradation under hydrolytic, photolytic and oxidative conditions. No degradation was seen under thermal stress. In total, four degradation products (I-IV) were formed under varied conditions, which could be separated by chromatography of respective degraded solutions on Phenomenex C-18 (100 mm x 4.6 mm; 2.6 <math>\mu</math>, Kinetex) column using isocratic elution method. The detection wavelength was selected at 267 nm. ESI-QTOF-MS studies were carried out to establish the complete fragmentation pathways of the Drug and degradation products, which was utilized to characterize the degradation products. The degradation pathway of the Drug leading to the generation of four degradation products (I-IV) was postulated.</p>

17.	<p><b>ANTIDIABETIC EFFECT OF <i>Pongamia pinnata</i> PIERRE IN STREPTOZOTOCIN-INDUCED DIABETIC RAT MODEL</b></p> <p><u>Anisha Sharma, Jayshri Swarnkar, Sangeeta Pilkhwal Sah</u>  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p><i>Pongamia pinnata</i> (L.) Pierre (Fabaceae) (<i>P. pinnata</i>), popularly known as “Karanja” (in Hindi) is traditionally used for many ailments due to the presence of diverse group of chemical constituents. In the present study, n-hexane, ethyl acetate and ethanolic leaf extracts of <i>Pongamia pinnata</i> were screened for phytochemicals using spectroscopic and chromatographic analysis. The extracts were evaluated for in vitro antioxidant effect followed by antidiabetic effect in streptozotocin-induced diabetic rats. The GC–MS investigation revealed the presence of total 3, 7 and 30 compounds in n-hexane, ethyl acetate and ethanolic extracts respectively which comprised 72.85 %, 14.18 % and 56.27 % of the total extract respectively. Cyclopentasiloxane, decamethyl- and cyclohexasiloxane, decamethyl- were common in all the three extracts. Animals developed diabetes one week after <i>Streptozotocin</i> administration. However, blood glucose decreased significantly after one week of treatment with ethanolic and ethyl acetate extracts, and two weeks with n-hexane extract and metformin. Ethanolic and ethyl acetate extracts produced more significant effect than the standard Drug metformin. All the extracts demonstrated in vitro antioxidant effect with ethanolic extract displaying the best. The results correlated with the findings of histopathological studies showing improved tissue (kidney and pancreas) architecture with all the three extracts. In nutshell the antidiabetic effect of <i>P. pinnata</i> leaf extracts could be attributed to antioxidant effect or to the effect of constituents on carbohydrate metabolism, which warrants further studies.</p>
18.	<p><b>TARGETING GLUTAMINE METABOLISM SUPPRESSES SMOOTH MUSCLE CELL PHENOTYPIC MODULATION AND NEOINTIMAL HYPERPLASIA</b></p> <p><u>Bhavneesh Kumar</u>  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Smooth muscle cell (SMCs) phenotypic modulation plays a pivotal role in the onset and progression of vascular diseases, including atherosclerosis and restenosis. During proliferation, SMCs utilize Glutamine to fulfil the energy, biosynthesis and redox needs. Although, glutamine metabolism (GM) is known to stimulate the proliferation of human cancer cells, endothelial cells and fibroblasts, its role and mechanism in SMC proliferation and neointimal hyperplasia remains elusive. This present study aims to explore the role and therapeutic potential of targeting GM during SMC proliferation and neointimal hyperplasia. To assess the role of GM on SMC proliferation, murine aortic SMCs were pre-treated with GM-IN-1 (selectively inhibits glutamine activity; medchem express; 10 µM) for 60 min. SMCs were stimulated with Platelet-Derived Growth Factor-BB (PDGF; 20 ng/ml) for 24 hours. Using Western blotting and immunofluorescence, we report that glutamine expression was significantly higher in PDGF-BB stimulated SMCs and in the neointima following carotid artery wire injury as compared to control. Deprivation of glutamine in the culture media blocked the proliferation and migration of SMCs. Pre-treatment of SMCs with GM inhibitor prevents SMC proliferation, migration phenotypic switching. GM inhibition was associated with reduced ERK and mTOR phosphorylation. Perivascular application of GM inhibitor attenuated injury induced neointimal hyperplasia. The results of the present study show that targeting glutamine</p>



	metabolism reduces SMC proliferation and can be a potential target to reduce neointimal hyperplasia.
19.	<p><b>PREPARATION AND OPTIMIZATION OF FAMOTIDINE-SORBIC ACID CO-CRYSTAL USING LIQUID-ASSISTED GRINDING TECHNIQUE</b></p> <p><u>Mansi Prashar</u>, Akshita Jindal, Renu Chadha, Neelima Dhingra <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Famotidine (FMT), a well-known anti-ulcer Drug recently explored for COVID-19 treatment, suffers from poor aqueous solubility and limited bioavailability (&lt;40%). To address these limitations, a novel 1:1 co-crystal of Famotidine and Sorbic Acid (FSOR) was prepared using the liquid-assisted grinding method and biologically evaluated. Distinct DSC thermograms and PXRD patterns confirmed the formation of a new crystalline phase. FT-IR spectroscopic analysis, combined with crystal structure determination, revealed a unique hydrogen-bonded network in the FSOR co-crystal, which crystallizes in the orthorhombic PNCB system. This new form of FMT exhibited a significant enhancement in solubility (9-fold) and dissolution rate (8-fold), along with a notable increase in peak plasma concentration (2-fold) and relative bioavailability (approx. 200%). Additionally, the co-crystal demonstrated improved anti-ulcer and antioxidant activities. This study highlights co-crystallization as a promising strategy for enhancing the bioavailability and therapeutic efficacy of Drugs with poor solubility, such as Famotidine.</p>
20.	<p><b>FORMULATION AND EVALUATION NANOSTRUCTURED LIPID CARRIERS (NLCS) OF RALOXIFENE HYDROCHLORIDE AND VITAMIN D FOR POSTMENOPAUSAL OSTEOPOROSIS</b></p> <p><u>Parveen Kumari</u><sup>1</sup>, Vandita Kakkar<sup>2</sup> <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Osteoporosis is a pathological condition distinguished by enhanced bone remodelling and reduced bone density, leading to compromised skeletal strength and an elevated susceptibility to fractures. This prevalent disorder affects a considerable proportion of postmenopausal women, reaching up to 62% of the whole female population. Currently, the use of diverse range of pharmacological agents employed for the treatment of osteoporosis, is limited owing to their shortcomings which involves decrease in calcium absorption post discontinuation, precipitation of unfavorable reactions, including stroke, cardiovascular disease, and breast cancer upon prolonged administration of estrogen. Herein, Raloxifene HCl (R-HCl) and Vitamin D (Vit D) loaded nanostructured lipid carriers (NLCs) were successfully prepared using micro emulsification technique followed by high-speed homogenization (HSH). NLCs had mean particle size of <math>\leq 300</math> nm and PDI 0.192 which indicated homogeneity of the prepared formulations. Zeta potential of optimized formulation was found to be -0.69 mV which ensured stability of nanoparticles. Total Drug content (TDC) and entrapment efficiency (EE) were found to be <math>85.76 \pm 0.24</math> % and <math>91.41 \pm 0.28</math> % respectively for R-HCL and <math>80.24 \pm 0.45</math> % and <math>79.56 \pm 0.42</math> % respectively for Vit D. PXRD, DSC and FTIR studies confirmed the formation of R-HCl and Vit D NLCs. FTIR and DSC showed their successful incorporation into NLCs. PXRD study confirmed amorphous nature of the developed NLCs. In conclusion, a successful</p>

	<p>formulation was prepared using the micro emulsification technique followed by HSH with raloxifene HCl and Vit D.</p>
21.	<p><b>ACCELERATING PROSTATIC RESEARCH USING COMPUTATIONAL TOOLS</b></p> <p><u>Priyanka Rana</u><sup>1</sup>, Shiwani Sharma<sup>2</sup>, Agneesh Pritam Das<sup>3</sup>, Subhash Mohan Aggarwal<sup>3</sup>, Tanzeer Kaur<sup>2</sup>, Neelima Dhingra<sup>1</sup></p> <p><sup>1</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh,</i>  <sup>2</sup><i>Department of Biophysics, Panjab University,</i>  <sup>3</sup><i>National institute of Cancer Prevention and Research, Noida.</i></p> <p>Benign prostatic hyperplasia (BPH) is a common condition in older males, characterized by non-cancerous prostate enlargement due to increased stromal and epithelial cells. This growth is driven by dihydrotestosterone (DHT), converted from testosterone by the enzyme 5-alpha reductase Type-II (5-AR2). The inhibition of 5-alpha reductase (5-AR) enzyme has been regarded as an important target to reduce the increased DHT levels and ultimately to control BPH. Current Drugs like finasteride and dutasteride, though effective, often cause undesirable side effects. The 3D crystallography structure 5-AR2, a member of the steroid 5-AR family belonging to the class of oxidoreductase has been resolved recently and opened the door to develop selective novel inhibitors of 5-AR Type-II isoform using molecular modeling techniques. Force-field (FF) and Gaussian-field (GF) 3D-QSAR models, based on 42 steroidal androstene inhibitors, showed strong predictive capabilities (<math>R^2 = 0.9367</math>, <math>Q^2 = 0.7233</math> for FF; <math>R^2 = 0.9459</math>, <math>Q^2 = 0.8595</math> for GF). Further protein-ligand interaction pattern analysis revealed the importance of amino acid residues GLU57, ARG114, TYR91 in the active site of 5-AR2 are crucial for lower energy complexes with good binding affinity. Identified hits were finally adjudged for their druggability by determining in-silico pharmacokinetic parameters. Further analysis, including RMSD and binding free energy calculations, demonstrated superior binding affinity for the identified ligand A-10 (<math>\Delta G_{bind} = -79.6 \pm 3.9</math> kcal/mol) compared to finasteride (<math>-69.13 \pm 4.69</math> kcal/mol). These findings provide valuable insights for developing novel 5-AR2 inhibitors for BPH treatment.</p>
22.	<p><b>ALTERED PHYSICAL AND SENSORIMOTOR DEVELOPMENTAL TRAJECTORY IN RAT OFFSPRING PRENATALLY EXPOSED TO VALPROIC ACID AS A MODEL OF AUTISM SPECTRUM DISORDER</b></p> <p><u>Saloni Rahi</u>, Sangeeta Pilkhwah Sah</p> <p><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p><i>Autism spectrum disorder (ASD)</i>, is a neurodevelopmental disorder that normally begins before the first 3 years of life. As per the CDC report 2023, 1 in 36 children had ASD, with boys having 3.8-fold higher incidence than girls. Research demonstrates that children with ASD experience early delays in sensorimotor development, communication, and social relation which predict subsequent cognitive and behavioural outcomes. Exposure to antiepileptic Drug valproic acid (VPA) during the gestation period is linked with developmental and physical malformations in the children. So far, the effect of VPA on early-developmental deficits and postnatal growth is not yet well discussed. In our study, we aimed to explore the influence of prenatal exposure to VPA in pregnant dams at two different doses (500 mg/kg and 600 mg/kg) on physical and sensorimotor development in rat offspring. Physical landmarks including body weight, tail malformations, pinnae unfold, and</p>

	<p>fur appearance were examined in the offspring in early postnatal days. Impairment in any of these landmarks was recognised as early developmental irregularities. While for sensorimotor landmarks, ten different developmental milestones including negative geotaxis, righting reflex, and grasping ability were examined. The findings of the study indicated a delayed physical and sensorimotor development in VPA exposed offspring as compared to normal offspring, with higher impacts seen in 600mg/kg than in 500mg/kg. Overall, the current work highlights a range of tests as a reliable way to assess the early developmental delay in the prenatal VPA model of autism and as a possible outcome measure for early intervention studies.</p>
23.	<p><b>SYNTHESIS AND PHARMACOLOGICAL EVALUATION OF SUBSTITUTED INDOLE DERIVATIVES AS COMBINED ANTI-DOPAMINERGIC AND ANTI-SEROTONERGIC AGENTS</b></p> <p><u>Tanvi Sharma</u>, Saswat Panda, Alka Bali  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>A series of aryl-substituted indole derivatives (ASP-8 to ASP-11) were synthesized as an effort to develop innovative atypical anti-psychotic compounds. The compounds were subjected to recrystallization and column chromatography to ensure their purity. Their chemical structures were authenticated using various spectral techniques, including Infrared spectroscopy, Nuclear Magnetic Resonance (Proton and Carbon-13), and Mass spectrometry. Subsequently, <i>in-silico</i> (docking) studies were conducted using dopaminergic D2 and serotonergic 5-HT2A receptors showing good binding affinity with the test compounds. The test compounds ASP-8 to ASP-11 exhibited strong similarity with Ketanserin, Ziprasidone, and Risperidone. However, their resemblance to clozapine was poor, except for ASP-10. The Log P value was investigated and the values ranged from 0.608 to 0.644 suggesting favorable BBB penetration. Additionally, the polar surface area as a determinant for Drug transport has been investigated, and all test compounds possess a value of 33.29 Å<sup>2</sup>, indicating good BBB permeation. The pharmacological evaluation of these compounds was conducted using clozapine as the standard Drug. The evaluation was conducted using albino mice (LACA strain) and the compounds were assessed for their ability to counteract apomorphine-induced mesh climbing behavior, apomorphine-induced stereotypy, and DOI induced head twitches. All the test compounds have demonstrated potential antipsychotic activity, exhibiting greater potency in their anti-dopaminergic profile compared to clozapine.</p>
<p><b>UG/PG STUDENTS OF PANJAB UNIVERSITY CAMPUS AND REGIONAL CENTRES</b></p>	
24.	<p><b>HARNESSING SIRNA: A REVOLUTIONARY APPROACH TO COMBAT COVID-19 AND OTHER VIRAL INFECTIONS</b></p> <p><u>Kanika Sharma</u>  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>In recent years, small interfering RNA (siRNA) has emerged as a groundbreaking tool in treating viral diseases, offering a precise method for silencing viral genes. This presentation introduces the concept of siRNA and its therapeutic potential. It provides an in-depth explanation of siRNA's mechanism of action, emphasizing its ability to disrupt viral replication and addressing the current challenges in delivering siRNA to infected cells. The presentation also examines the limitations of traditional antiviral therapies, particularly in the context of rapidly mutating pathogens, and explores the role of siRNA in combating COVID-19. It delves into the potential of siRNA in</p>

	<p>combating SARS-CoV-2 through therapeutic approaches and ongoing clinical trials, as well as its applications in other major viral diseases such as influenza, hepatitis, and HIV. Looking ahead, the potential of siRNA in preventing and treating future pandemics is discussed. It also explores technological advancements that could help overcome existing obstacles in siRNA development and deployment. Finally, a balanced view of the challenges and limitations of siRNA therapies is presented. In conclusion, while siRNA shows great promise in transforming our approach to viral diseases, realizing its full potential will require continued innovation and the overcoming of current obstacles.</p>
25.	<p><b>REVITALIZING THE TRADITIONAL USE OF BERBERINE: BRIDGING HERITAGE AND INNOVATION FOR ENHANCED HEALTH BENEFITS</b></p> <p>Amita Sarwal, Shivani Sharma, Tanya Sarwal, <u>Meenal Batra</u>  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Depression is a common mental illness affecting around 3.8% of the population, with higher rates in older adults and women. Traditional treatments for depression, including various classes of antidepressants, psychotherapy, and lifestyle changes, often have limitations such as side effects, slow onset of action, and inadequate response in some patients. These challenges have led to the exploration of alternative and complementary treatments, including natural compounds and phytoconstituents that may offer potential antidepressant effects. One such natural compound having potential antidepressant activity is berberine, an isoquinoline alkaloid derived from several plants. The MOA behind this action is by inhibition of MAO enzyme, reducing inflammation and oxidative stress in brain, exhibiting neuroprotective effect and also increasing the expression of BDNF. But the compound comes with a challenge of low bioavailability, which is mostly due to its low absorption, rapid metabolism and efflux via P- glycoprotein transporter. Therefore, phytosome technology can be used as a promising strategy to overcome the bioavailability issues associated with this phytoconstituent. Phytosomes are advanced delivery systems where the active phytoconstituent is complexed with phospholipids to form a lipid-compatible molecular complex. In this study, berberine phytosomes were prepared using the thin layer hydration method. The phytosomes were characterized by evaluating particle size, zeta potential, FTIR, DSC, and in-vitro Drug release. They're in-vivo antidepressant action was assessed using a Chronic Unpredictable Mild Stress (CUMS) model for depression. The effects of the phytosomes at various doses were compared to those of berberine through behavioral tests.</p>
26.	<p><b>INTEGRATION OF AYURVEDA IN MODERN PHARMACOLOGY: BRIDGING TRADITIONAL WISDOM WITH CONTEMPORARY SCIENCE</b></p> <p><u>Meet Yashraj Singh</u>  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Ayurveda, an ancient system of medicine originating in India over 5,000 years ago, offers a holistic approach to health by emphasizing the balance of mind, body, and spirit. This presentation explores the integration of Ayurvedic principles into modern pharmacology, highlighting how traditional wisdom can enhance contemporary medical practices. Recent scientific advancements have enabled the isolation and characterisation of bioactive compounds from Ayurvedic herbs. For instance, curcumin from <i>Curcuma longa</i> (turmeric) has demonstrated anti-inflammatory and antioxidant properties, leading to its incorporation into modern therapeutic regimens. Similarly, <i>Withania somnifera</i> (ashwagandha) is being studied for its adaptogenic</p>

	<p>effects, potentially aiding in stress management and neuroprotection. Integrating Ayurveda into modern pharmacology can enrich Drug discovery by providing novel compounds and therapeutic targets. The personalized approach of Ayurveda, which considers an individual's unique constitution (Prakriti), aligns with the emerging field of personalized medicine. This synergy can lead to more effective and tailored treatments, improving patient outcomes. However, challenges persist in standardising herbal formulations, ensuring quality control, and conducting rigorous clinical trials to validate efficacy and safety. Overcoming these barriers requires collaboration between traditional practitioners and modern scientists, along with supportive regulatory frameworks. This presentation underscores the potential benefits of merging Ayurvedic knowledge with modern pharmacological techniques. By bridging these two disciplines, we can develop holistic healthcare strategies that respect cultural heritage while embracing scientific innovation, ultimately contributing to global health advancements.</p>
27.	<p><b>EVALUATION OF DIABETIC WOUND HEALING POTENTIAL OF TOPICALLY APPLIED SILYMARIN</b></p> <p>Sharmila Sahoo, Kanwaljit Chopra, <u>Nishika Kapoor</u>  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Impaired wound healing is a critical complication in diabetic patients, resulting from prolonged inflammation, increased oxidative stress, and dysregulated cellular signaling. Despite various therapeutic attempts, the outcomes remain suboptimal due to high costs, extended treatment durations, and significant side effects. This study evaluates the wound healing potential of Silymarin, a natural compound with known anti-inflammatory and antioxidant properties, in Streptozotocin (STZ)-induced diabetic rats. The study's objectives include assessing Silymarin's effects on physiological parameters such as blood glucose, body weight, food and water intake, and urine excretion. Additionally, the study investigates wound contraction via digital photography, collagen synthesis through hydroxyproline and hexosamine assays, and oxidative stress markers like protein carboxylation, lipid peroxidation, and myeloperoxidase activity. Furthermore, the modulation of antioxidant enzymes (reduced glutathione, glutathione peroxi.</p>
28.	<p><b>FORMULATION AND EVALUATION OF TRIGONELLINE LOADED NANOSHOTS FOR THE TREATMENT OF GASTRIC ULCER</b></p> <p><u>Purvi Arora</u>, Jaspreet Kaur  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Gastric ulcers, affecting 5-10% of the global population, are among the most prevalent inflammatory diseases of the gastrointestinal tract. They result from an imbalance between aggressive factors, such as excess hydrochloric acid, pepsin, and Helicobacter pylori, and defensive factors, such as mucin, bicarbonate, antioxidants, and growth factors in the gastric mucosa. This study developed nanostructured lipid carriers (NLCs) of trigonelline (TRG) and vitamin E (VE) to address the limitations of TRG, including hygroscopicity, bitter taste, and low permeability, while enhancing its anti-ulcerogenic properties. TRG-VE-NLCs were successfully formulated using microemulsification and high-speed homogenization, with glyceryl monostearate as the solid lipid core. The optimized formulation showed a mean particle size of</p>

	<p>233±0.86 nm, zeta potential of -15 mV, and entrapment efficiencies of 73.51% for TRG and 84.27% for VE. Antioxidant capacity was confirmed through the DPPH method, and cell viability studies revealed improved protection and reduced cytotoxicity. In vivo studies using an acidified-ethanol gastric ulcer model demonstrated significant preventive and curative effects, comparable to traditional treatments like omeprazole. The nanoshot, termed TREshot, reduced inflammatory markers and mitigated mucosal damage. Future research will explore the development of alternative delivery systems, such as lyophilized and skin patches, for controlled and sustained Drug release. These formulations hold promise for improving patient compliance, especially in chronic conditions, by offering non-invasive, easy-to-administer options. The successful application of NLCs in this study lays the foundation for broader therapeutic use in conditions requiring enhanced Drug delivery and efficacy.</p>
29.	<p><b>SYNTHESIS AND STUDY OF SOME CHALCONES AS POTENTIAL CANDIDATES FOR THE TREATMENT OF COGNITIVE DECLINE</b></p> <p><u>Ramanpreet kaur</u>, Nalini Chaudhary, Poonam Piplani  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh</i></p> <p>Novel 4-(substituted-(3-(4-(prop-2-yn-1-yloxy)phenyl)acryloyl)phenyl benzoate derivatives were designed, synthesized and evaluated against scopolamine induced deficit cholinergic transmission and oxidative stress serving as promising leads for treatment of cognitive dysfunction. A series of 8 compounds have been synthesised and evaluated against behavioural alterations using step down passive avoidance protocol at a dose of 2 mg/kg using reference standard rivastigmine. All the synthesised compounds were evaluated for their in vitro acetylcholinesterase (AChE) inhibition at five different concentrations using mice brain homogenate as the source of the enzyme. Biochemical estimation of markers of oxidative stress (lipid peroxidation, superoxide dismutase, glutathione, catalase) has also been carried out to assess the role of synthesised compounds on oxidative stress induced by scopolamine. Compound PP-394 showed better AChE inhibitory activity with IC<sub>50</sub> of 9.53 µM as compared to the standard (9.75). The resulting compound also displayed appreciable results in combating scopolamine induced oxidative stress, thus serving as promising lead for the amelioration of oxidative stress induced in cognitive decline. In molecular docking studies against active site of acetylcholinesterase (PDB ID: 4EY7), compound PP-394 established hydrogen bond and pie-pie interactions with the prominent amino acid residues. Thus, PP-394 compound could be a promising lead structure that can be used for further development of agents with potential for cognition improvement.</p>
30.	<p><b>THE LIVING DRUG NEXCAR19: INDIA'S FIRST INDIGENOUS CAR-T THERAPY</b></p> <p><u>Shruti Goyal</u>  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Cancer, the world's second leading cause of mortality, has plagued humanity for centuries. Traditional treatments – surgery, chemotherapy, and radiation therapy – remain cornerstone approaches, but targeted therapies, immunotherapy, and immune checkpoint inhibitors have revolutionized cancer management. This presentation focuses on Chimeric Antigen Receptor-T (CAR-T) cell therapy, a groundbreaking treatment for hematological malignancies, where T lymphocytes are genetically modified to express a fusion protein combining a ligand-specific recognition domain</p>

and the T cell receptor's activating signaling domain. We will explore the evolution, mechanism of action, modifications, manufacturing process, and precise functioning of CAR-T cell therapy, including side effects such as Cytokine Release Syndrome (CRS) and Immune Effector Cell-Associated Neurotoxicity Syndrome (ICANS), and its potential in treating solid cancers. Notably, we highlight India's pioneering contribution through NexCAR-19 (*Talicaftagene autoleucl*), the country's first indigenous, Made-in-India CAR-T therapy, resulting from a collaborative academia-industry partnership between Prof. Rahul Purwar's team at IIT Bombay's BSBE Department, Tata Memorial Centre, and Immuno ACT. As the world's most affordable CAR-T therapy, NexCAR-19 positions India prominently on the global map of advanced cell and gene therapy, offering a cost-effective solution priced at 1/10th of global counterparts, thereby increasing accessibility for cancer patients.

**UG/PG STUDENTS FROM COLLEGES AND OTHER INSTITUTIONS**

**31.  $\epsilon$ -POLYLYSINE CROSSLINKED OXIDISED SODIUM ALGINATE COMPOSITE FILMS FOR POTENTIAL ANTIBACTERIAL WOUND DRESSING OR PACKAGING FILM APPLICATION**

Arun Gautam, Varun Kumar, Gurinder Sigh  
*GHG Khalsa College of Pharmacy Ludhiana, Punjab.*

The superior biodegradability, biocompatibility, edibility, and prospective applications of naturally occurring polymers have led to a recent increase in their use in antimicrobial food packaging. The performance requirements of a dressing may change while a wound heals since wound healing is a dynamic process. Most modern wound care therapies aim to provide a warm, moist environment because it is widely recognized that this promotes speedy healing. Natural polysaccharides are a better option overall because they are non-toxic, more readily available, and less expensive than synthetic polymers. The primary goal of this research is to develop and characterize oxidized sodium alginate (OSA)-  $\epsilon$ -polylysine ( $\epsilon$ PL) composite films for wound Dressings. OSA was used due to its better biodegradability and biocompatibility and  $\epsilon$ PL for antimicrobial activity. Solvent casting method was used to fabricate OSA- $\epsilon$ PL films. The concentration of  $\epsilon$ PL was varied from 5 to 10% w/v and evaluated the developed films in terms of solubility, moisture content, film expansion, opacity, FTIR, SEM, XRD, and in vitro antibacterial activity. The composite (OSA- $\epsilon$ PL) films were evaluated against OSA films formed using calcium chloride as crosslinker. The present study demonstrated that the prepared films possess better suitability for wound Dressings as they showed excellent results in various aspects like film expansion, solubility, opacity and antimicrobial activity.

**32. REVEALING FUSED BENZIMIDAZOBENZODIAZEPINE AS LOX INHIBITORS WITH ADDED CYTOTOXIC EFFECTS: SYNTHESIS AND EVALUATION**

Riya Rani, Gaganpreet Kaur, Minni  
*Department of Pharmaceutical Sciences and Drug Research, Punjabi University, Patiala.*

This research, titled “Revealing Fused Benzimidazobenzodiazepine as LOX Inhibitors with added Cytotoxic Effects: Synthesis and Evaluation,” focuses on the design and synthesis of novel fused benzimidazobenzodiazepine hybrids. By integrating benzimidazole and benzodiazepine structural units, twelve compounds were synthesized with the aim of targeting lipoxigenase (LOX) enzymes to explore

their potential anti-inflammatory and cytotoxic properties. The synthesized compounds underwent a lipoxygenase screening UV assay to assess their inhibitory effects by quantifying hydroperoxide production. Subsequent molecular docking studies were performed to predict binding interactions and affinities with the LOX active site, providing insights into their mechanisms of action. Compounds exhibiting significant LOX inhibition and favorable docking results were selected for further evaluation. Additionally, cytotoxicity assays using the MTT method were conducted on various cancer cell lines to identify potential anticancer properties. This integrated approach highlights the therapeutic potential of these novel compounds, particularly in targeting LOX dysregulation prevalent in cancers like lung cancer, thereby offering an innovative strategy for developing effective anti-inflammatory and anticancer agents.



ABSTRACTS OF  
POSTER  
PRESENTATIONS

**Pharmaceutical Sciences – Poster Presentation****Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)**

<b>S.No.</b>	<b>Name of Participant</b>	<b>Affiliating Institutions</b>	<b>Title of Abstract</b>
1.	Mr. Bakr Ahmed Hameed	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Dually acting atorvastatin: Advancing ocular delivery using solid lipid nanoparticle for age-related macular degeneration.
2.	Mr. Bharti Sunil Shivprasad	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Topical administration of tamoxifen using lipid-based nano-carrier loaded gel in psoriasis treatment: In-vitro and in-vivo insights.
3.	Ms. Divya	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Penduline and memory: Advancing daruharidra's role in cognitive health through nanotechnology.
4.	Ms. Dolly Chauhan	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Neuroprotective effect of perillyl alcohol in experimental sporadic alzheimer's disease.
5.	Ms. Maneesha Rana	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	In-vivo evaluation of efficacy and safety of RGD-functionalized solid lipid nanoparticles co-encapsulating docetaxel and curcumin for targeted breast cancer therapy.
6.	Ms. Namarta Thakur	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Preparation and evaluation of dual drug loaded liposomes containing curcumin and 5-fluorouracil for the treatment of breast cancer.
7.	Ms. Navjot Sharma	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Optimized solid lipid nanoparticles for enhanced topical delivery of resveratrol and oxyresveratrol.
8.	Mrs. Priyanka Puri	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	To study the impact of gender variability on chronic olanzapine induced weight gain and effect on cognition in balb/c mice.
9.	Ms. Sima Kujur	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Electrospun 2d biotherapeutic composite nanofibers: Physicochemical characterization and evaluation for chronic wound healing.

10.	Ms. Simrandeep Kaur	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Ultimate skin care with solid lipid nanoparticles: Innovative cosmeceutical moisturizers.
11.	Ms. Srishti Naryal	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Enhanced efficacy and stability of retinol in nanostructured lipid carriers for improved topical delivery and depigmentation.

**Research Scholars from Colleges and other Institutions (JRF, SRF, Project Fellow and Post Docs)**

S. No.	Name of Participant	Affiliating Institutions	Title of Abstract
12.	Mrs. Anshu Kadiyan	Department of Pharmacology, Kurukshetra University, India.	Gastro protective potential of citrus <i>Limetta risso</i> fruit juice in ethanol induced gastric ulcer mice model.
13.	Mr. Suraj Sharma	Department of Pharmacology, Neuropharmacology Division, ISF College of Pharmacy, Moga, Punjab, India.	Protective effects of cerebrolysin against chemotherapy (carmustine) induced cognitive impairment in albino mice.
14.	Ms. Harveen Kour	Department of Pharmacology, Rayat Bahara University, Mohali (Punjab), India.	Combination of berberine and gemfibrozil abrogates oxidative insult, inflammation and nephrotoxic parameters in kidney associated with cadmium induced intoxication in rat.
15.	Ms. Nikita Thakur	School of Pharmacy, Chitkara University, Baddi, Himachal Pradesh.	Properties of glimepiride through eutectic mixture formation.

**UG/PG Students of Panjab University Campus and Regional Centres**

S. No.	Name of Participant	Affiliating Institutions	Title of Abstract
16.	Ms. Aakanksha Kumari	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Neurocosmetics: A new frontier in skincare.
17.	Ms. Bhawna		
18.	Mr. Onkar Singh		
19.	Mr. Prabal		

20.	Mr. Rohit Kumar		
21.	Mr. Muzamil qayoom lone	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Neuropharmacological investigations on NF- $\kappa$ B pathway in experimental paradigm of huntington's disease.
22.	Mr. Abhishek Saini	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Berberis-loaded nanophytoformulation: A novel strategy for enhanced topical delivery and skin health.
23.	Mr. Ankit Yadav	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Role of artificial intelligence in pharmaceutical field.
24.	Priya Gupta		
25.	Rigzin Angmo		
26.	Tashu Khanna		
27.	Adarsh Trivedi		
28.	Mr. Ayush Gupta	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Indigenous herbs in COVID: Present status and future challenges.
29.	Takbeer Alam		
30.	Ms. Ayushi Kushwah	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Role of histamine in cancer: Insights and implications.
31.	Mr. Chetan Goyal	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Role of herbal formulation for the management of day-to-day mild stress.
32.	Mr. Davinder Pal Singh	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Mechanistic function of pyruvate kinase in vascular smooth muscle cell proliferation, migration and phenotypic switching.
33.	Mr. Divyanshu Singla	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Revolutionising personal healthcares through genomic kits which are produced indigenous.

34.	Ms. Heena	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Targeting parkinson's disease with biotic therapies.
35.	Mr. Indar Jatav	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Comparative evaluation of lettuce varieties in 3-NP induced rat model of huntington's disease.
36.	Ms. Jasleen Kaur	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Revolutionizing personalised healthcare through genomic kits in India.
37.	Mr. Jasroop Matharu		
38.	Mr. Kanav Baluni		
39.	Ms. Kashish Pal		
40.	Ms. Jassimran Kaur	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Formulation development and evaluation of phospholipid based nanostructured carriers of ascorbic acid for topical use.
41.	Ms. Jyoti Krishna Nayak	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Innovative hydroxyurea oral suspension: Akums' solution for sickle cell disease management.
42.	Priyanka		
43.	Keshav Sharma		
44.	Tejwinder Kaur		
45.	Jasmeen Kaur		
46.	Ms. Komal Gulati	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Transforming India's api landscape: Reducing foreign dependency.
47.	Ms. Komal Tyagi	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	<i>Lactuca sativa</i> Linn: A comprehensive study on its pharmacognostic properties and memory enhancing potential.
48.	Ms. Kritika Khanna	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Robotic exoskeleton for rehabilitation.
49.	Raghav Bhardwaj		
50.	Rajveer Kaur		
51.	Shruti Kumari		
52.	Mr. Manas Prabhu		

53.	Mr. Harsh Sharma	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	From India to the world: Qureai's impact on AI-driven healthcare.
54.	Mr. Kartik Sharma		
55.	Mr. Archit Sood		
56.	Mr. Mohammad Shafique Ansari	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	The novel approach for treating HIV-1 through CCR5 co-receptor: A case study.
57.	Ms. Nitika Chaudhary	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Cryonics; will the dead return?
58.	Ms. Niharika	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Genomic sculptors: CRISPR-Cas9's breakthrough in triple-negative breast cancer.
59.	Anish Singh		
60.	Sadhiya		
61.	Kaushiki Roy		
62.	Inderjeet Thakur		
63.	Mr. Pankaj Khajuria	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Nano-biosensors: Revolutionizing early diagnosis.
64.	Simrandeep Kaur		
65.	Sanjana Kumari		
66.	Ms. Prachi Pranamya	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Exploring cosmeceutical /dermaceutical benefits of patented berberine nanophytoformulation.
67.	Ms. Pratishtha Lambodra	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Introducing novel oxazole substituted tetra hydro quinazoline derivatives as potential cyclooxygenase-2 inhibitors.
68.	Mr. Rahul	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	HPTLC analysis of ursolic acid in <i>Ocimum basilicum</i> .
69.	Ms. Ramneet Kaur	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Formulation development and evaluation of hydroxychloroquine loaded ethosomes for the management of discoid lupus erythematosus.

70.	Ms. Rishita Sharma	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	CRISPR-CAS9: Unleashing the power of genetics.
71.	Kavya Jha		
72.	Kritika Longia		
73.	Ms. Ritika	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Catalyzing the future of benign prostate hyperplasia research
74.	Mr. Rohit Kundlas	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Bilosomal system for boosting the oral bioavailability
75.	Mr. Saksham Garg	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Unveiling the hidden dangers: The role of nitrosamines in cancer risk.
76.	Ms. Shabana Sharif	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Development of N-(Pyrimidin-2-yl) alkyl/arylamide derivatives as quorum sensing inhibitors.
77.	Ms. Somali Patra	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Synthesis and study of indanone derivatives as promising therapeutic agents in neurodegenerative disorders.
78.	Ms. Srirati Chakraborty	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Neuroprotective effect of polyphenols and phenolic derivatives in management of Chronic unpredictable mild stress (CUMS) induced depression.
79.	Ms. Sukhmani Sharma	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Maitri: A digital tool to track postpartum depression.
80.	Kunal Jain		
81.	Chinmayee Ratho		
82.	KomalPreet Kaur		
83.	Ms. Swasti Gayatri Mohapatra	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Development and evaluation of probiotics loaded Emulgel systems.

84.	Ms. Upma Sharma	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	In silico screening of aryl substituted indole derivatives as potential atypical antipsychotics.
85.	Ms. Vibha Sharma	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Alpha-amylase inhibitory activity of <i>Withania coagulans</i> .
86.	Mr. Vishwash Bhardwaj	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Modifications of ibuprofen derivative with enhanced biological effect as anti-inflammatory and gastroprotective agent.

**UG/PG Students from Colleges and Other Institutions**

S. No.	Name of Participant	Affiliating Institutions	Title of Abstract
87.	Mr. Aman Shakya	University Institute of Pharma Sciences, Chandigarh University, Mohali, Punjab.	Bioinformatics in medicinal chemistry: Data mining and analogue for drug discovery.
88.	Ms. Ananya Priyadarshni	University Institute of Pharma Sciences, Chandigarh University, Mohali, Punjab.	New frontiers in parkinson's disease treatment.
89.	Kajal Thakur		
90.	Ritika Sharma		
91.	Ms. Anjali Sharma	GHG Khalsa College of Pharmacy, Gurusar Sudhar, Ludhiana, Punjab.	Enhancing the therapeutic efficacy of curcumin and diclofenac in wound healing using polymer films based on sodium alginate, carbopol, PEG, and HPMC.
92.	Ms. Anu Rani	Department of Pharmaceutical Science, Kurukshetra University, Kurukshetra, Haryana.	Exploring the potential of nanomedicine and microfluidics for gene therapy across the physicochemical and cellular barriers.
93.	Mr. Arun	Pharmaceutical sciences Guru Jambheshwar University of Science and Technology, Hisar, Haryana.	Prevalence, types, pathophysiology and management of epilepsy.
94.	Mr. Bhanu Verma	University School of Pharmaceutical Sciences, Rayat Bahra University, Kharar, Punjab.	Utilization of millets and millet-based products for health and socio-economic upliftment: Viksit Bharat vision



95.	Ms. Chetna Kashyap	University School of Pharmaceutical Sciences, Rayat Bahra University, Kharar, Punjab.	Socio-economic upliftment of farmers through farming of indigenous plant drugs & development of their products thereafter: A viksit Bharat strategy.
96.	Mr. Devwart Khatri	Pharmaceutical sciences Guru Jambheshwar University of Science and Technology, Hisar, Haryana.	Nano formulations in health care.
97.	Ms. Dimpy	Department of Pharmaceutical Science, Kurukshetra University, Kurukshetra, Haryana.	Role of indigenous knowledge in tackling antimicrobial resistance.
98.	Ms. Isha	School of Pharmaceutical Sciences, Shoolini University of Biotechnology and Management Sciences, Solan, Himachal.	Development and evaluation of novel formulation of chebulinic acid for colon specific drug delivery.
99.	Ms. Kirti Kumari	Pharmaceutical sciences guru Jambheshwar university of science and technology, Hisar Haryana.	A comprehensive review on diabetes induced vascular dementia.
100.	Ms. Lakshika Singh	School of Pharmaceutical Sciences, Shoolini University of Biotechnology and Management Sciences, Solan, Himachal.	Development of elastic niosomal gel for topical delivery of piroxicam.
101.	Ms. Manisha	Department of Pharmaceutical Science, Kurukshetra University, Kurukshetra, Haryana.	Microneedling and plasma therapy: A revolutionary approach to facial rejuvenation.
102.	Ms. Nikita Devi	Pharmaceutical sciences Guru Jambheshwar University of Science and technology, Hisar, Haryana.	Electrospinning - The technique and applications.
103.	Mr. Nitin	Pharmaceutical sciences Guru Jambheshwar University of Science	Green chemistry.

		and technology, Hisar, Haryana.	
104.	Mr. Rajat Sheokand	Pharmaceutical sciences Guru Jambheshwar University, Hisar, Haryana.	Biological significance of quinolines derivatives
105.	Mr. Ravinder Kumar	Pharmaceutical sciences Guru Jambheshwar University, Hisar, Haryana.	Green chemistry in drug development.
106.	Ms. Ritu	Pharmaceutical sciences Guru Jambheshwar University of Science and technology, Hisar, Haryana.	Thiazole.
107.	Ms. Shagun	GHG Khalsa college of pharmacy Gurusar Sadhar, Ludhiana, Punjab.	To investigate the effect of crosslinking strategies and to develop systematically optimized sodium alginate and $\epsilon$ -polylysine based hydrogel films with superior physical and mechanical performance.
108.	Ms. Shalini Thakur	G.H.G Khalsa College of Pharmacy Gurusar Sadhar Ludhiana Punjab	Evaluation of anxiolytic and locomotor activity of ethanolic extract of <i>Prunus persica</i> leaves in wistar rats.
109.	Mr. Vikas Sain	Pharmaceutical sciences Guru Jambheshwar University of Science and technology, Hisar, Haryana.	Artificial intelligence in pharmaceutical research @ viksit Bharat mission 2047.
110.	Mr. Vinay Verma	Pharmaceutical sciences Guru Jambheshwar University of Science and Technology, Hisar, Haryana.	A comprehensive review on parkinson's disease.

**Abstract file****Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)****1. DUALY ACTING ATORVASTATIN: ADVANCING OCULAR DELIVERY USING SOLID LIPID NANOPARTICLE FOR AGE-RELATED MACULAR DEGENERATION**

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<sup>2</sup>*Singapore Eye Research Institute.*

Atorvastatin, a lipid-lowering agent, has shown potential in treating age-related macular degeneration (AMD) due to its anti-inflammatory and antioxidant properties. However, its low solubility and bioavailability limit its therapeutic efficacy. This study developed atorvastatin-loaded solid lipid nanoparticles (ATO-SLNs, patent application no: FA/714/DEL/2024) to enhance ocular delivery for AMD. The optimized ATO-SLNs formulation, using central composite design (CCD), had an average particle size of 295.2 nm±26.10 nm, a polydispersity index (PDI) of 0.292±0.0161, and a zeta potential of -9.47 mV± -1.71 mV, ensuring stability. Encapsulation efficiency was 72.7%± 0.85, with a drug loading of 145.4%. In-vitro release studies demonstrated sustained, diffusion-controlled release over 72 hours and no significant degradation in simulated tear fluid up to 2 hours. Ex-vivo permeation studies in goat and pig models revealed higher permeation coefficients compared to atorvastatin suspensions (ATO-SUS). Three-tier toxicity studies (cell viability using statens seruminstitut rabbit cornea cell lines, in-vivo, and biocompatibility/ocular tolerance) establish safety of ATO-SLNs. Later demonstrated significantly higher C<sub>max</sub>, AUC, relative bioavailability, and half-life than ATO-SUS. IVIVC analysis following F-statistical calculation for validating the model showed a significant correlation for both ATO-SLNs and ATO-SUS. In a high-fat diet-fed mouse model, ATO-SLNs reduced drusen-like deposits in the posterior region and improved retinal microvasculature, highlighting its potential for AMD treatment. Atorvastatin exhibited reduced cytokine levels (IL-6 and TNF- $\alpha$ ) in corneal cells and drusen that can accumulate under the retina at the macula site.

**2. TOPICAL ADMINISTRATION OF TAMOXIFEN USING LIPID BASED NANO-CARRIER LOADED GEL IN PSORIASIS TREATMENT: IN-VITRO AND IN-VIVO INSIGHTS**

Sunil Bharti, Gursharanpreet Kaur, Gajanand Sharma, Amita Sarwal, O.P. Katare  
*University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.*

In the 1980s, tamoxifen citrate (TAM), a synthetic non-steroidal anti-oestrogen, came in light to have anti-psoriatic action in addition to its primary application in cancer. However, there are several challenges to oral TAM delivery, including decreased efficacy at the targeted site, and poor bioavailability because of hepatic metabolism. Therefore, this work aims to develop a novel carrier system to enhance the efficacy and safety of TAM. After thorough efforts in formulation development, including analytical techniques, component selection, and characterization i.e., microscopic examination TEM revealed the spherical and multilamellar nature of vesicles and CLSM studies showed that formulation was evenly distributed throughout skin layers. In vitro characterizations like, Vesicle size (381.7nm), PDI (0.254), Zeta Potential (10.1mV), and in-vitro release studies, skin permeation &

	<p>retention studies. The superior efficacy of developed formulation was assessed by tail psoriatic model. The stability data obtained as per the ICH guidelines indicated the stability and assay performed at different time intervals were found within permissible limit. In conclusion, developed stable TAM-loaded hybrid liposomes (HL) enable effective drug delivery across the stratum corneum and epidermis having strong potential in treating psoriasis.</p>
3.	<p><b>PENDULINE AND MEMORY: ADVANCING DARUHARIDRA'S ROLE IN COGNITIVE HEALTH THROUGH NANOTECHNOLOGY</b></p> <p><u>Divya</u>, Kaustav Dey, Bakr Ahmed, Indu Pal Kaur, Maninder Karan <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>With a focus on its potential as a memory-enhancing agent, this study aims to advance the clinical importance of promising quaternary alkaloids of Daruharidra (<i>Berberis</i> spp., Berberidaceae), an admired traditional Indian medicinal plant with a wide spectrum of therapeutic characteristics. Despite the historical significance, Daruharidra as well as its major alkaloidal constituents including berberine and penduline are not available in contemporary clinical settings owing to the high dose, unstable nature and poor biopharmaceutical properties. We picked up a USFDA approved molecule, penduline, of this plant, to address the inherent poor biopharmaceutical challenges posed by it for clinical usage. These limitations were bypassed through encapsulation of penduline in a novel delivery system prepared using hot homogenization technique (patent granted) and evaluated for its memory enhancing potential. The nanophytoformulation demonstrated all desired characteristics of optimum particle size, zeta potential, homogeneous formulation, enhanced entrapment efficiency, drug loading and many more. The in-vitro experiments demonstrated a perfect controlled release system and analytical evaluation confirmed the system stability. The memory enhancing efficacy evaluated in mice using a scopolamine-induced model showed significant improvement. The histopathological evaluation demonstrated remarkable mitigation of apoptosis, and neuronal hyperplasia. The successful formulation of nanosystem showed faster action at lesser dose by enhancing efficacy and making it suitable for use in clinical setting. Daruharidra based nanosystem developed by us is expected to emerge as a versatile and potent remedy for memory related challenges and associated disorders.</p>
4.	<p><b>NEUROPROTECTIVE EFFECT OF PERILLYL ALCOHOL IN EXPERIMENTAL SPORADIC ALZHEIMER'S DISEASE</b></p> <p><u>Dolly Chauhan</u><sup>1</sup>, Rahul Deshmukh<sup>2</sup> <sup>1</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i> <sup>2</sup> <i>Central University, Bathinda.</i></p> <p>Alzheimer's disease is a slow-progressing neurological disease that causes cognitive and memory loss as people get older. The two hallmarks of Alzheimer's disease are extracellular <math>\beta</math>-amyloid plaques and intracellular build up of neurofibrillary tangles. The different pathological mechanisms implicated in the pathogenesis of AD include progressive deterioration of memory, cognition, neuroinflammation, mitochondrial dysfunction, decrease in cerebral glucose utilization, A<math>\beta</math> plaque accumulation, neurofibrillary tangles inside neurons, increased glutamate and oxidative stress. The present study was designed to investigate the effect of Perillyl alcohol on intracerebroventricular (i.c.v.) streptozotocin induced experimental sporadic dementia of Alzheimer's type. Infusion of streptozotocin impaired learning and</p>

	<p>memory, increased oxidative– nitritive stress and induced cholinergic hypofunction in rats.: Treatment with Perillyl alcohol (25, 50 and 100 mg/kg p.o.) for 14 days from 14 to 28 days following first i.c.v. streptozotocin infusion significantly improved learning and memory in Morris water maze and object recognition test paradigms. Further, Perillyl significantly reduced the oxidative–nitritive stress, as evidenced by decrease in malondialdehyde (MDA) and nitrite levels, and restored the reduced glutathione (GSH) levels. Significant increase in acetylcholinesterase activity was observed in the present model indicating cholinergic hypofunction and increase in neuronal cell damage. Treatment with Perillyl alcohol also reduced significantly the increase in acetylcholinesterase activity indicating restorative capacity of Perillyl alcohol with respect to cholinergic functions and preventing the neuronal damage. The observed beneficial effects of Perillyl alcohol in spatial memory processing may be due to its ability to restore cholinergic functions, and its antioxidant mechanisms. However, more studies required to understand this.</p>
5.	<p><b>IN-VIVO EVALUATION OF EFFICACY AND SAFETY OF RGD-FUNCTIONALIZED SOLID LIPID NANOPARTICLES CO-ENCAPSULATING DOCETAXEL AND CURCUMIN FOR TARGETED BREAST CANCER THERAPY</b></p> <p><u>Maneesha Rana</u><sup>1</sup>, Narender Kumar<sup>1</sup>, Joga Singh<sup>1</sup>, Indu Pal Kaur<sup>1</sup>, Alka Bhatia<sup>2</sup>  <sup>1</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh,</i>  <sup>2</sup><i>Experimental Medicine and Biotechnology PGIMER Chandigarh.</i></p> <p>Docetaxel (DTX) is a widely used chemotherapeutic agent for breast cancer, but its therapeutic potential is hindered by low solubility, rapid metabolism, and systemic toxicity. Curcumin (Cmn), a natural phytochemical with anti-cancer properties, can potentiate the effects of DTX and inhibit drug resistance by targeting P-glycoprotein (Pgp) efflux, yet its clinical application is limited by poor stability and bioavailability. To overcome these challenges, we developed DCLN, a solid lipid nanoparticle (SLN) formulation co-encapsulating DTX and Cmn, synthesized via high-pressure homogenization using generally recognized as safe (GRAS) ingredients. This optimized system exhibits a sustained release of DTX over 72 hours, enhanced bioavailability, and significantly lower organ accumulation than standard DTX formulations. Additionally, the nanoparticles were functionalized with RGD peptides for targeted delivery, allowing for the DCLN system to demonstrate superior tumor regression as well as increased mean residence time and reduced off-target effects in rat models. This formulation not only improves the therapeutic profile and stability of DTX and Cmn but also minimizes side effects, supporting its potential as a targeted, effective.</p>
6.	<p><b>PREPARATION AND EVALUATION OF DUAL DRUG LOADED LIPOSOMES CONTAINING CURCUMIN AND 5-FLUOROURACIL FOR THE TREATMENT OF BREAST CANCER</b></p> <p><u>Namarta Thakur</u>  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Breast cancer is a leading cause of cancer-related deaths among women worldwide. This study aims to develop and evaluate a dual drug-loaded liposomal formulation containing 5-Fluorouracil (5-FU) and Curcumin for breast cancer treatment. Characterization of pure drugs revealed 5-FU's highest solubility in methanol and Curcumin's poor solubility in most solvents except methanol and ethanol. The dual</p>

	<p>drug-loaded liposomes were prepared using the thin-film hydration method with LIPOID S 100, showing favorable vesicle shape, stability, and minimal aggregation. The formulation, named DDLL, demonstrated high encapsulation efficiency and stability. Analytical methods, including UV spectroscopy and HPLC, confirmed drug purity and ensured precise quantification. UV spectroscopy showed peaks at 265 nm for 5-FU and 424 nm for Curcumin. The liposomes were incorporated into a transdermal film via solvent casting, aiming to enhance bioavailability, avoid first-pass metabolism, and provide site-specific delivery. This co-delivery system offers a synergistic therapeutic approach, potentially improving efficacy and reducing side effects. The study highlights the importance of meticulous drug characterization, formulation optimization, and method validation. Future research should focus on in vivo evaluations to assess pharmacokinetics, biodistribution, and therapeutic efficacy, paving the way for improved breast cancer treatment strategies.</p>
7.	<p><b>OPTIMIZED SOLID LIPID NANOPARTICLES FOR ENHANCED TOPICAL DELIVERY OF RESVERATROL AND OXYRESVERATROL</b></p> <p><u>Navjot Sharma</u>, Divya Nagla, Indu Pal Kaur  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Resveratrol (RSV) and oxyresveratrol (OXY) are natural polyphenols known for their antioxidant, anti-inflammatory, and anticancer properties. Despite their potential, their therapeutic applications are hindered by low aqueous solubility, chemical instability, and poor bioavailability, necessitating an optimized drug delivery system. In this study, solid lipid nanoparticles (SLNs) were developed using high shear homogenisation as an effective delivery platform for RSV and OXY. The formulations were optimized by selecting lipids with high solubility, using glyceryl citrate as a surfactant, and varying co-solvent concentrations. Particle size reduction was achieved through controlled stirring speeds, producing stable SLNs with particle sizes of <math>515.8 \pm 20.5</math> nm for RSV (F-R6*) and <math>410.5 \pm 15.1</math> nm for OXY (F-O5*). The SLNs demonstrated high entrapment efficiency (<math>96.11 \pm 0.68\%</math> for RSV and <math>98.88 \pm 0.78\%</math> for OXY) and were suitable for topical delivery. Polydispersity index (PDI) values indicated good uniformity, and field emission scanning electron microscopy (FESEM) confirmed spherical, stable nanoparticles. Differential scanning calorimetry (DSC) and X-ray diffraction (PXRD) analyses revealed a shift from crystalline to amorphous states, improving drug solubility. In vitro release studies showed controlled drug release over 72 hours for RSV and 24 hours for OXY, following the Higuchi diffusion model. In conclusion, these optimized SLN formulations effectively overcome the limitations of RSV and OXY, enhancing their solubility, enhancing entrapment efficiency for topical use.</p>
8.	<p><b>TO STUDY THE IMPACT OF GENDER VARIABILITY ON CHRONIC OLANZAPINE INDUCED WEIGHT GAIN AND EFFECT ON COGNITION IN BALB/C MICE</b></p> <p><u>Priyanka Puri</u><sup>1</sup>, Dr Sangeeta Pilkhwal Sah<sup>2</sup>  <sup>1</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh,</i>  <sup>2</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p><i>Atypical antipsychotics (AAPs), such as olanzapine, are known to induce severe metabolic alterations, including obesity, diabetes mellitus, insulin resistance, dyslipidaemia, and cardiovascular complications. These effects are linked to disruptions in hypothalamic appetite regulation, energy sensing, insulin/leptin</i></p>

	<p>signalling, inflammatory responses, and reward mechanisms. This study aimed to assess gender differences in olanzapine-induced metabolic changes and cognitive effects in BALB/c mice. Male and female mice (18–23 g) were treated with olanzapine (6 mg/kg, p.o.) or normal saline for ten weeks. Weekly measurements included feed and water intake, body temperature, waist circumference, and body weight were done. Locomotion, Novel Object Recognition (NOR), and Morris Water Maze (MWM) tests were performed at weeks 1, 6, and 10 to assess cognition. Serum glucose and lipid profiles were evaluated biochemically. After 10 weeks, olanzapine significantly increased feed and water intake, body weight, and waist circumference while decreasing body temperature and locomotor activity. <i>Olanzapine</i>-treated mice showed impaired glucose homeostasis, with elevated serum glucose levels and area under the curve in the oral glucose tolerance test. However, cognitive performance improved, as shown by higher discrimination and recognition indices in NOR, decreased escape latency in MWM, and increased entries into the target quadrant. These findings demonstrate that chronic olanzapine induces metabolic syndrome but also enhances cognition in both male and female mice, highlighting the need for further research to explore this paradoxical effect.</p>
9.	<p><b>ELECTROSPUN 2D BIOTHERAPEUTIC COMPOSITE NANOFIBERS: PHYSICOCHEMICAL CHARACTERIZATION AND EVALUATION FOR CHRONIC WOUND HEALING</b></p> <p><u>Sima Kujur</u><sup>1</sup>, Dr Parneet Kaur Deol<sup>2</sup>, Dr Indu Pal Kaur<sup>3</sup>  <sup>1</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh,</i>  <sup>2</sup><i>GHG Khalsa College of Pharmacy, Ludhiana, Punjab., University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Chronic diabetic wounds, a global concern, often lead to amputation due to limited treatment options and high costs, affecting ~8.2 million people according to medical beneficiaries report, 2018. Existing treatment typically address one of the proposed causes of impaired healing -infections, inflammation or oxidative stress. Objective: Design of 2D-nanofiber (NF) embedding fish oil (FO) and probiotic (P) for comprehensive wound tissue regeneration. Methods: FO + P loaded nanofiber (FO+P@NF) were prepared via emulsion electrospinning and evaluated in full excision diabetic infect wound model in rats. Results and Conclusions: Developed NF were evaluated for particle size (FE-SEM; 467 ± 118 nm), FTIR and DSC data demonstrate that FO and P were encapsulated in NF; tensile strength of NF was suitable at 14.467 MPa to maintain structural integrity and durability. In vitro anti-bacterial activity, biofilm inhibitory activity and biofilm dispersal activity were performed on mixed biofilm of <i>E. coli</i>, <i>MRSA</i> and <i>PA</i>. Pre-clinical studies showed significantly better wound contraction and biomarker levels (TNF-<math>\alpha</math>, IL-6, TGF-<math>\beta</math>, <math>\alpha</math>-SMA and MMP-8) in comparison to marketed colloidal silver hydrogel (Silverex® Heal) in wound healing study. Study establishes FO+P@NF as a promising alternative option for the management of chronic wound.</p>
10.	<p><b>ULTIMATE SKIN CARE WITH SOLID LIPID NANOPARTICLES: INNOVATIVE COSMECEUTICAL MOISTURIZERS</b></p>

Simrandeep Kaur<sup>1</sup>, Garima Sharma<sup>1</sup>, Jaspreet Singh Gulati<sup>2</sup>, Indu Pal Kaur<sup>1</sup>  
<sup>1</sup>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.  
<sup>2</sup>Hitech Formulations Pvt Ltd.

Sun blocking effect is defined as the ability to protect the skin against ultraviolet-induced damage, indicated in terms of sun protection factor (SPF). This protection can be physical or chemical. Chemical sun protecting agents can permeate the skin leading to toxic side effects. Solid lipid nanoparticles (SLNs), also known as lipid carriers have been widely investigated across the world and have evolved as promising nano-sized drug carriers. In this study, different placebo SLN formulations demonstrate sun protection. Five different SLN formulations (F1–F5) with varying lipid content were developed using three industry amenable techniques viz. high-speed stirring (HSH), high pressure homogenisation (HPH) and microemulsification method (MEM). A correlation between morphology (HR TEM), particle size-polydispersity index (DLS), sun protection factor (SPF) and occlusive effect (OE) were established. Results indicated promising SPF (6.0–24.0) and hydrating effects (OE 6.0–71.0) of spherical, mono disperse lipidic nanoparticles with lipid content of  $\geq 4\%$ . SLNs were found to offer hydration effects comparable to Vaseline® petroleum jelly (OE 71.0 and 82.0, respectively). Hence, SLNs per se can be regarded as: (i) safe alternative to current toxic chemical sunscreen agents, or (ii) carriers for latter, employed at low concentration to provide similar effects, and (iii) as suitable moisturisers.

11. **ENHANCED EFFICACY AND STABILITY OF RETINOL IN NANOSTRUCTURED LIPID CARRIERS FOR IMPROVED TOPICAL DELIVERY AND DEPIGMENTATION**

Srishti Naryal, Garima Sharma, Indu Pal Kaur  
University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.

The global retinol (RET) market is set to expand, driven by its ability to prevent melanogenesis, collagen degradation and lipid peroxidation. However, poor solubility, instability (photodegradation and oxidation), limited dermal permeability, and potential irritation restrict topical applications of RET. This study addresses these challenges by developing a safe and stable retinol loaded nanostructured lipid carrier (RET-NLC) system using a high-shear method. The RET-NLCs were further incorporated into a cream base for ease of application. RET-NLCs achieved a uniform spherical particle size (403.4 nm), high drug loading, high entrapment efficiency (~96%). NLCs demonstrated sustained zero-order release up to 96 hours, contrasting with the marketed cream, which released 100% RET within 24 hours. *In vitro* and *in vivo* studies demonstrated enhanced efficacy, with RET-NLCs showing approximately 150% greater permeation and 840% increased retention in dermal layers compared to conventional creams. Cellular uptake studies and *in vivo* permeation studies confirmed extended skin localization. Rate of absorption/permeation of RET was increased 4 folds post encapsulation when compared with conventional cream. Depigmentation studies revealed RET-NLCs reduced melanin content by 125% more than free RET. The RET-NLCs also exhibited high stability, with less than 6.2% degradation over one year, compared to 50–70% in free RET formulations. These results underscore potential of RET-NLCs for enhanced efficacy, stability, and safety, presenting a promising therapeutic strategy for pigmentation disorders and skin aging treatments.



12.	<p><b>PROPERTIES OF GLIMEPIRIDE THROUGH EUTECTIC MIXTURE FORMATION</b></p> <p><u>Nikita Thakur</u><sup>1</sup>, Shareen Gill<sup>2</sup>, Mansi Prashar<sup>3</sup>, Neelima Dhingra<sup>3</sup>, Manish Kumar<sup>4</sup>, Poonam Arora<sup>4</sup></p> <p><sup>1</sup><i>Chitkara University School of Pharmacy, Chitkara University, Himachal Pradesh,</i> <sup>2</sup><i>I.K. Gujral Punjab Technical University, Jalandhar, Punjab,</i> <sup>3</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh,</i> <sup>4</sup><i>Chitkara College of Pharmacy, Chitkara University, Patiala, Punjab</i></p> <p>Glimepiride (GL) is a sulfonylurea and an oral hypoglycaemic agent of BCS class II (low solubility and high permeability). Because of low aqueous solubility, they do not easily dissolve in water. This can pose challenges in drug formulation and delivery because drugs need to dissolve in the gastrointestinal fluids to be effectively absorbed into the bloodstream. The present work is intended to improve the solubility of this drug by the formation of binary eutectic mixtures. Eutectic mixtures are multicomponent solid forms that possess a lesser melting point than the individual components at a fixed composition. Eutectics are shown to have high solubility and faster dissolution because of their high free energy, greater molecular mobility, and weaker intermolecular interaction. Gallic acid (GA) is used as a conformer for the synthesis of glimepiride their nature was established by using i.e. DSC, PXRD, and SEM. As projected, the in vitro data very well corroborated with in vivo results and the drug release was found to be maximum when an equimolar concentration of gallic acid was used as conformer, making gallic acid an ideal candidate for the cocrystal formulation. The research work presented complete preliminary data on improved physicochemical properties of glimepiride. Solvent-drop grinding of glimepiride with selected co-formers led to the formation of eutectic formulations and the solubility is increased by 6.8 folds as compared to pure GA. The most significant improvement in physicochemical parameters was attained in the GL-GA binary mixture which is confirmed by pharmacokinetic and pharmacodynamic profiles of all the prepared.</p>
13.	<p><b>GASTRO PROTECTIVE POTENTIAL OF CITRUS LIMETTA RISSO FRUIT JUICE IN ETHANOL INDUCED GASTRIC ULCER MICE MODEL</b></p> <p><u>Anshu kadiyan</u><sup>1</sup>, Parbhjeet Kaur Bamrah<sup>1</sup>, Dr.Tanuj Hooda<sup>2</sup></p> <p><sup>1</sup><i>Department of Pharmaceutical Science, Kurukshetra University, Kurukshetra, Haryana.,</i> <sup>2</sup><i>Department of pharmacology, Maharishi Markandeshwar University, Ambala, India.</i></p> <p>Peptic ulcer is a disease of GIT that results of chronically inequity of endogenous gastro protective factors and destructive factors. The primary cause of the erosion of mucosal layer may be factors like smoking, poor diet, excessive intake of alcohol, NSAIDs and H. pylori infection. Phytochemical screening of <i>Citrus Limetta risso</i> confirms the presence of alkaloids, glycosides, saponins, flavonoids, anthraquinones, phenolics, tannins, and terpenes. According to literature cited by various authors alkaloids, flavonoids, and D-limonene present in <i>Citrus Limetta risso</i> have the potential for antiulcer activity. Methods: Present study aimed at investigating the gastro protective effects of <i>Citrus limetta</i> against ethanol-induced gastric ulcers in mice using famotidine as a control drug. Ethanol induced gastric ulcer model in mice was used for evaluation; ulcer index was calculated by scoring the ulcers. Biochemical estimation of stomach tissues was completed by SOD, GSH, LPO,</p>

	<p>catalase methods. Results: The results of findings demonstrated that the mice group pre-treated with <i>C. limetta</i> juice significantly lower the GUI and raised the ulcer inhibition rate of gastric ulcers. Conclusion: Mechanism behind the <i>C. limetta</i> juice may be neutralization reaction with gastric acid, further studies required so that it could be used as alternate to currently used antiulcer drugs.</p>
14.	<p><b>PROTECTIVE EFFECTS OF CEREBROLYSIN AGAINST CHEMOTHERAPY (CARMUSTINE) INDUCED COGNITIVE IMPAIRMENT IN ALBINO MICE</b></p> <p><u>Suraj Sharma</u>, Shamsheer Singh, Khadga Raj  <sup>1</sup><i>Department of Pharmacology, Neuropharmacology Division, ISF College of Pharmacy, Moga, Punjab, India.</i></p> <p>Chemotherapy-induced cognitive impairment (CICI) comprises different neurological problems, including difficulty in learning new things, concentrating and making decisions that affect daily life activities. The purpose of the present study is to examine the effects of widely used anticancer medication (Carmustine) on cognitive function using mice model and investigation of the neuroprotective effects of Cerebrolysin (CBN). Cerebrolysin (CBN) is a mixture of several neurotrophic factors and active peptides with anti-inflammatory, antioxidant, and neuroprotective actions. Our study aimed to establish a mice model of Carmustine (BCNU)-induced cognitive deficits and determine the protective effects of CBN. BCNU (10 mg/kg, i.v.) was administered to mice for 28 days, and behavioral parameters were measured on a weekly basis. CBN (44 and 88 mg/kg, i.p.) was administered daily from day 1 to 28 to BCNU treatment mice. All animals were sacrificed on day 29 and brain hippocampus tissues were used for biochemical, neuroinflammatory, neurotransmitters analysis. BCNU administration animals showed impaired cognition and memory, confirmed from behavioral analysis. Further, BCNU increased oxidative stress, inflammatory cytokines release and altered neurotransmitters concentration as compared to the control group (<math>p &lt; 0.01</math>). However, mice treated with CBN (44 and 88 mg/kg, i.p.) significantly and dose-dependently improved cognitive functions, reduced oxidative stress markers, inflammatory cytokines and restored neurotransmitters concentration as compared to BCNU administered mice (<math>p &lt; 0.05</math>). The finding of current study suggested that CBN could be the promising compound to reverse cognitive impairment associated with use of chemotherapy.</p>
15.	<p><b>COMBINATION OF BERBERINE AND GEMFIBROZIL ABROGATES OXIDATIVE INSULT, INFLAMMATION AND NEPHROTOXIC PARAMETERS IN KIDNEY ASSOCIATED WITH CADMIUM INDUCED INTOXICATION IN RATS</b></p> <p><u>Harveen Kour</u>, Ramica Sharma, Raibarinder Singh, Suraj Sharma  <sup>1</sup><i>Department of Pharmacology, Rayat Bahara University, Mohali, Punjab, India.</i></p> <p>Cadmium (Cd) a nephro-toxicant is widely distributed throughout ecosystem and being an industrial contaminant, it poses a serious adverse effect on health. Berberine (BBR) is known for its numerous health benefits and characterized by high safety in both human and animals. Gemfibrozil (GEM) a fibrate medication is extensively used in the treatment of hyperlipidemia. It has been shown that BBR and GEM improve kidney functions in animal model of nephrotoxicity. The present study was undertaken to delineate the combination of BBR and GEM can prevent Cd-induced nephrotoxic and other deleterious effects. A nephrotoxic dose of Cd was</p>

administered to diseased, BBR, GEM and combination group for 7 days to female wistar rats. The effect of BBR, GEM and combination group was determined on Cd-induced alterations in various serum, urine parameters, oxidative stress parameters and inflammatory marker. Cd nephrotoxicity was recorded by increased serum creatinine (SCr), blood urea nitrogen (BUN), urea, Tumor necrosis factor alpha (TNF- $\alpha$ ) and glucose levels. Cd decreased the urine output, potassium levels, creatinine, urea and increased the sodium and glucose levels which were assessed in urine. Treatment with BBR and GEM significantly reduced SCr, BUN, urea, TNF- $\alpha$  and glucose levels. BBR and GEM upsurge urine output, potassium levels, creatinine, urea and diminution of sodium and glucose levels were observed in urine. Combination of BBR and GEM mitigates Cd-induced nephrotoxic and other inimical effects due to its intrinsic biochemical/ antioxidant properties.

**UG/PG STUDENTS OF PANJAB UNIVERSITY CAMPUS AND REGIONAL CENTRES**

**16. NEUROCOSMETIC: A NEW FRONTIER IN SKINCARE**

Aakanksha Kumari, Prabal, Rohit Kumar, Bhawna Nagpal, Onkar Singh  
*University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.*

As we are aware, the concept of ‘emotions’ is a complex and multifaceted one. Emotions are not a single, unitary phenomenon but rather a multidimensional construct, this concept is now actively being employed in neuro-infused cosmetics. Recent researches have developed innovative products, namely “NEUROCOSMETICS” that hold the power to revolutionize the cosmetic world. Neurocosmetics are non-absorbing, non-toxic, bioactive topical product that contain ingredients designed to work at a neurological level. They primarily focus on skin-brain connection and how skincare products can influence the nervous system. They work by modulating neurotransmitters and enhancing sensory perception, thereby, improving skin health. They target nerve clusters sensitive to heat, cold, pain, itching, and/or pressure, hence, affecting brain’s responses to topical treatments. Many cosmetic companies have started to formulate neurocosmetics products that exhibit their activity on the cutaneous nervous system by affecting the skin’s neuromediators through different mechanisms of action. They help in overcoming problems like skin aging, environmental damage, wrinkles, pigmentation, etc. Various neurocosmetic functional ingredient employed are menthol, biomimetic peptides, several plant extracts, and more. The purpose of this review is to provide an overview of the recent key breakthrough in the cosmetology and how will it grow far beyond in the near future. In conclusion, this methodology has combined various neurological measurements with deep learning methods to recognize consumer’s emotional responses to cosmetics. Aakanksha Kumari<sup>1</sup>, Prabal<sup>1</sup>, Rohit Kumar<sup>1</sup>, Bhawna Nagpal<sup>1</sup>, Onkar Singh<sup>1</sup>

**17. BERBERIS-LOADED NANOPHYTOFORMULATION: A NOVEL STRATEGY FOR ENHANCED TOPICAL DELIVERY AND SKIN HEALTH**

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	<p>This study is an effort to advance the clinical significance of a prized indigenous herb <i>Berberis</i>, with specific emphasis on its dermaceutical potential and safety. The application of <i>Berberis</i> in modern clinical settings has been constrained by challenges related to low solubility, poor bioavailability and stability. To overcome these restraints, we have developed a sophisticated nano-colloidal system enriched with <i>Berberis</i> extract. The study began with the preparation of an optimized extract with an enhanced solubility profile. Subsequently, nanophytoformulation was prepared via the heat and pressure homogenization technique. The developed nano-formulation showed precise attributes, including optimal nanoscale particle size (237.6 nm), elevated drug content, and superior entrapment efficiency (91.9 % ± 0.35%). The augmented drug loading, solubility, stability, and bioavailability with optimum sustained release has the potential to substantially reduce required dosages, subsequently amplifying the safety profile of <i>Berberis</i> on account of high doses. The MTT assay indicated robust cell viability. Melanin inhibition assay underscored the formulation's promising depigmentation potential, suggesting its superior effectiveness in treating hyperpigmentation disorders of the skin. The photoageing evaluation showed its capacity to mitigate detrimental effects of UV exposure. The in-vivo acute dermal toxicity studies (OECD TG402) showed no adverse effect, affirming its suitability for topical applications and highlighting its safety advantage over the marketed products. The ex-vivo permeation studies further reinforced nanophytoformulation's enhanced dermal delivery and retention capabilities. These results collectively indicate that <i>Berberis</i> based novel nanophytoformulation offers a more effective, safe, and innovative approach to skin health and dermatological treatments over existing market offerings.</p>
18.	<p><b>ROLE OF ARTIFICIAL INTELLIGENCE IN PHARMACEUTICAL FIELD</b></p> <p><u>Ankit yadav</u>, Priya Gupta, Rigzin Angmo, Tashu Khanna, Adarsh Trivedi  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>The role of Artificial Intelligence (AI) in pharmacy is rapidly evolving, transforming various aspects of drug development, patient care, and operational efficiency. AI technologies, such as machine learning and deep learning, are increasingly used in drug discovery to identify promising compounds, predict drug interactions, and optimize clinical trials. By processing large datasets and recognizing patterns that humans may miss, AI accelerates the drug development timeline and enhances precision medicine. In addition to research and development, AI is improving pharmacy operations by automating routine tasks, managing inventory, and supporting decision-making in personalized treatment plans. However, despite its potential, the integration of AI in pharmacy raises concerns regarding ethical considerations, data privacy, and the potential for job displacement. This presentation explores the diverse applications of AI in pharmacy, highlights its benefits in enhancing efficiency and accuracy, and addresses the challenges that need to be managed as this technology continues to grow. Keywords: Artificial Intelligence, Pharmacy, Drug Discovery, Precision Medicine, Automation, Ethical Issues.</p>
19.	<p><b>INDIGENOUS HERBS IN COVID: PRESENT STATUS AND FUTURE CHALLENGES</b></p>

	<p><u>Ayush Gupta</u>, Takbeer Alam <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>A novel coronavirus-induced pneumonia, which was later called coronavirus disease 2019 (COVID-19), rapidly increased to an epidemic scale and affected whole human population globally. The spreading of SARS-CoV-2 infection varies and different from other SARS-CoV infections possibly due to structural differences in S proteins. In India, the first case of COVID-19 was an imported case from Wuhan, China on January 30, 2020 traced in Kerala. Though it spreads very rapidly, the case fatality rate is below 1.50%, which is markedly less than in other countries, despite the dense population and minimal health infrastructure in rural areas. This may be due to the routine use of many immunomodulator medicinal plants and traditional AYUSH formulations by the Indian people. Present study is an effort to apprise the AYUSH recommended formulations and their ingredients, routinely used medicinal plants and formulations by Indian population as well as other promising Indian medicinal plants, which have been tested against COVID-19. Keywords: COVID-19, AYUSH Medicine.</p>
20.	<p><b>ROLE OF HISTAMINE IN CANCER: INSIGHTS AND IMPLICATIONS.</b></p> <p><u>Ayushi Kushwah</u><sup>1</sup>, Ankit Bajpai<sup>2</sup>, Ranjit Singh<sup>3</sup>, Ranju Bansal<sup>4</sup> <sup>1</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh,</i> <sup>2</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh,</i> <sup>3</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh,</i> <sup>4</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Cancer is the second leading cause of death globally and its incidence and mortality are rapidly increasing worldwide. The identification by genomics-based approach of the human histamine receptors by several research groups has helped refine our understanding of the role of histamine in cancer. Histamine [2-(4-imidazolyl)-ethylamine] is an endogenous biogenic amine widely distributed throughout the body, and it is involved in numerous physio-pathological conditions, in the control of gastric acid secretions, neurotransmission, allergic disorders, and proliferation of cells. There are 4 main classes of histamine receptors: H1R, H2R, H3R and H4R with varying locations and functions. Recently, understanding the role of histamine in cancer biology; has revealed the pivotal role of histamine receptors especially H1 and H4 receptor in the development and progression of many types of cancer due to its immunomodulatory properties. Histamine can be released to the extracellular medium and through a paracrine or autocrine regulation, it may regulate diverse biological responses related to tumor growth. In the tumor micro environment the concentration of histamine in the tissue, and the activation of histamine receptors may determine the biological responses in diverse neoplasm. These events include angiogenesis, cell proliferation, invasion, migration, differentiation, apoptosis, and also the modulation of the immune response, indicating that histamine may be a crucial mediator in cancer formation and dissemination.</p>
21.	<p><b>ROLE OF HERBAL FORMULATION FOR THE MANAGEMENT OF DAY-TO-DAY MILD STRESS</b></p> <p><u>Chetan Goyal</u>, Mini Dahiya, Garima Sharma, Anil Kumar <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p>

	<p>Stress, a prevalent condition in today's fast-growing world, has significant effect on both mental and physical health. Stress prevalence has surged globally, with millions affected by mental health disorders like anxiety and depression. The COVID-19 pandemic significantly worsened the situation, amplifying stress levels due to isolation, uncertainty, and economic instability. Conventional treatment options, while effective, often come with undesirable side effects or dependency risks, paving the way for newer treatment strategies. Moreover, herbal/traditional drugs are well known for their efficacy and widely utilized in traditional medicine systems, offering a promising approach due to their natural origins and multifaceted mechanisms of action. The present study has been designed to explore the impact of various herbal drug combination to cause synergism or potentiation against stressful situation in experimental animals. Herbal drugs (Drug A to C) would be given in a fixed dose in for a period of 15 days to explore their anti-stress potential against mild chronic unpredictable stress with the help of various behaviour, biochemical and cellular parameters. Formulation of the drug combination (Drug A to C) would be helpful in treating various stressful situation in a daily life. Present work would show case the results as well as findings of our present study on experimental animals. Keywords: Chronic unpredictable mild stress, Herbal drugs, Stress.</p>
22.	<p><b>MECHANISTIC FUNCTION OF PYRUVATE KINASE IN VASCULAR SMOOTH MUSCLE CELL PROLIFERATION, MIGRATION AND PHENOTYPIC SWITCHING</b></p> <p>Manish Jain, Ankan Sarkar, Bhavneesh Sharma, <u>Davinder Pal Singh</u> <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Abnormal vascular smooth muscle cell (VSMC) proliferation is a hallmark feature of atherosclerosis and restenosis. Increased glycolysis is involved in the proliferation and migration of vascular smooth muscle cells (SMCs) and plays a pivotal role in vascular proliferative disorders. Pyruvate kinase (PK), a key rate-limiting enzyme in glycolysis, is a ubiquitously expressed intracellular protein and orchestrates proliferation and migration of cancer cells. Aim- In this study, we examined the effects of PK inhibitor (PKi), via a specific inhibitor, on Platelet-Derived Growth Factor-BB (PDGF-BB) induced SMC proliferation. Methods: PK expression was detected by immunofluorescence. Murine aortic SMCs were pretreated with PKi and stimulated with PDGF-BB. Cell viability was determined through MTT assay. Mitochondrial ROS levels (MitoSox Red staining), Apoptosis (TUNEL), SMC proliferation (BrdU incorporation), migration (scratch assay) and phenotype switching (immunostaining of contractile SMC markers) were also assessed. Results: Using Western blotting and immunofluorescence, we found that PK expression was increased in VSMCs during PDGF-BB stimulation. Moreover, PK translocation to the mitochondria was also increased in PDGF-BB stimulated SMCs as compared to unstimulated control. PKi effectively inhibited PDGF-BB induced SMC proliferation and migration. PK inhibition also favored contractile SMC phenotype. Reactive oxygen species (ROS) and SMC proliferation are interlinked. In addition, PKi promoted SMC apoptosis by increasing mitochondrial ROS levels. Summary- Our results suggest that PK regulates VSMC proliferation, migration, and phenotypic switching, which might provide a novel therapeutic approach for the treatment of atherosclerosis and restenosis.</p>
23.	<p><b>REVOLUTIONISING PERSONAL HEALTHCARES THROUGH GENOMIC KITS WHICH ARE PRODUCED INDIGENOUS</b></p>

	<p><u>Kashish Pal</u>, Jasroop Matharu, Kanav Baluni, Divyanshu Singla, Jasleen Kaur <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Mapmygenome, a pioneering Indian genomics company, has transformed the landscape of personalised healthcare by offering a range of genomic kits to empower individuals with insights into their genetic makeup. Its innovative DNA-based tests enable the early detection of genetic predispositions to various diseases, lifestyle traits, and drug responses, thereby promoting proactive healthcare decisions. Our poster will provide an overview of Mapmygenome’s genomic kits, including their technology, utility, and broader impact on India’s healthcare system. Notable products like Genomepatri™—a comprehensive personal genomics test—analyze genetic variants associated with conditions such as diabetes, cardiovascular disease, and cancer, offering actionable health and wellness recommendations. Additionally, specialized kits like Gynaecmap™ focus on women’s health, while Medicamap™ offers insights into pharmacogenomics, assisting doctors in prescribing the most effective drugs based on an individual’s genetic profile. The poster will discuss how Mapmygenome’s offerings align with the growing trend toward precision medicine and the integration of genomics into routine healthcare. It will also explore prospects, including the expansion of services in collaboration with healthcare providers and advancements in genomic data interpretation. By fostering greater genetic literacy, genomic kits are poised to lead India’s genomics revolution, bridging the gap between personalized medicine and affordable healthcare for the masses.</p>
24.	<p><b>TARGETING PARKINSON’S DISEASE WITH BIOTIC THERAPIES</b></p> <p><u>Heena</u>, Priyanka Rana, Mansi Prashar, Monika Chauhan, Amita Sarwal, Neelima Dhingra <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>The gut-brain axis refers to the two-way communication between the gut and brain, involving hormonal, immune, endocrine, and neural pathways. Disruption of the gut’s microbial balance can negatively affect these communication pathways, contributing to neurological problems and cognitive impairments. In Parkinson’s disease, gut dysbiosis may worsen symptoms by increasing intestinal permeability, promoting inflammation, and producing harmful metabolites. These processes contribute to the neuroinflammation and accumulation of alpha-synuclein, responsible for disease progression. Integrating prebiotics, probiotics, and postbiotics with traditional treatments provides a holistic approach to enhancing brain health, offering additional benefits like improved digestion, a stronger immune system, and reduced side effects. Present study offers a comprehensive review of clinical trials exploring the impact of biotic therapies in the management of Parkinson’s disease.</p>
25.	<p><b>COMPARATIVE EVALUATION OF LETTUCE VARIETIES IN 3-NP INDUCED RAT MODEL OF HUNTINGTON’S DISEASE</b></p> <p><u>Indar Jatav</u>, Supreet, Maninder Karan, Jai Malik <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Huntington’s disease (HD) is a fatal genetic autosomal dominant neuro-disorder causing progressive neuronal damage. <i>Lactuca sativa</i> (LS) Linn. (<i>Asteraceae</i>), an important component of Mediterranean diet and it is a leafy vegetable that is</p>

	<p>consumed fresh as a salad and is also used in the preparation of soups and vegetable curries because of its taste and high nutritional value. Besides its culinary uses, LS also has a great medicinal value and has been used traditionally in the treatment insomnia, neurosis, dry coughs, rheumatic pain and anxiety. In this study, we compare the protective effects of the ethanol extracts of three different <i>lettuce varieties</i>, viz. Grand rapid, <i>Lollo rosso</i> and Iceberg against 3-NP induced neurotoxicity in rodents. Rats were divided into control group, 3-NP treated group, and test groups receiving extracts of different varieties of lettuce at 100 and 200 mg/kg. The protective effect of lettuce varieties was assessed using behavioural paradigms namely, narrow beam walk, rotarod, morris water maze and actophotometer. Effect on various biochemical parameters viz lipid peroxidation, nitrite, superoxide dismutase, catalase and reduced glutathione was also evaluated. The results of both behavioural and biochemical studies showed that all the three varieties were effective in mitigating the 3-np induced neurotoxicity. Amongst the three tested varieties, extract of grand rapid exhibited maximum protection.</p>
26.	<p><b>REVOLUTIONIZING PERSONALISED HEALTHCARE THROUGH GENOMIC KITS IN INDIA</b></p> <p><u>Jasleen Kaur</u><sup>1</sup>, Kanav Baluni<sup>1</sup>, Jasroop Matharu<sup>1</sup>, Kashish Pal<sup>1</sup>, Divyanshu Singla<sup>1</sup>  <sup>1</sup> <i>University Institute of Pharmaceutical Sciences, Panjab University</i></p> <p>Mapmygenome, a pioneering Indian genomics company that has transformed the landscape of personalized healthcare by offering a range of genomic kits aimed at empowering individuals with insights into their genetic makeup. Through its innovative DNA-based tests, it enables the early detection of genetic predispositions to various diseases, lifestyle traits, and drug responses, thereby promoting proactive healthcare decisions. Our poster will provide an overview of Mapmygenome's genomic kits, including their technology, utility, and the broader impact on India's healthcare system. Notable products like Genomepatri™—a comprehensive personal genomics test—analyze genetic variants associated with conditions such as diabetes, cardiovascular disease, and cancer, offering an actionable health and wellness recommendations. Additionally, specialized kits like Gynaecmap™ focus on women's health, while Medicamap™ offers insights into pharmacogenomics, assisting doctors in prescribing the most effective drugs based on an individual's genetic profile. The poster will discuss how Mapmygenome's offerings align with the growing trend toward precision medicine and the integration of genomics into routine healthcare. It will also explore future prospects, including the expansion of services in collaboration with healthcare providers and advancements in genomic data interpretation. By fostering greater genetic literacy, genomic kits are poised to lead India's genomics revolution, bridging the gap between personalized medicine and affordable healthcare for the masses.</p>
27.	<p><b>FORMULATION DEVELOPMENT AND EVALUATION OF PHOSPHOLIPID BASED NANOSTRUCTURED CARRIERS OF ASCORBIC ACID FOR TOPICAL USE</b></p> <p><u>Jassimran Kaur</u><sup>1</sup>, Shailja Kumari<sup>2</sup>, Gajanand Sharma<sup>2</sup>, O.P. Katare<sup>2</sup>  <sup>1</sup> <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh,</i>  <sup>2</sup> <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Ascorbic acid is the most abundant and potent antioxidant in the epidermal layer crucial for collagen biosynthesis, particularly type I and III which are vital for maintaining skin structure and integrity. This study focuses on the formulation and</p>



	<p>evaluation of a phospholipid-based nanostructured carrier for ascorbic acid to enhance its topical delivery. The final formulation comprised 14% w/w organic phase with 3% w/w lipid and 10% w/w PBS 7.4, resulting in vesicles with a size of 254 nm with narrow PDI of 0.368 and a zeta potential of -0.267 mV. In vitro release data indicated a zero-order release profile, while skin permeation studies demonstrated a 253% increase in flux compared to a marketed solution and skin retention found to be 342. Dermatokinetic studies confirmed superior drug transfer to the epidermis and dermis. The skin permeation studies demonstrated a 253% increase in flux compared to a marketed solution and skin retention was found to be 342µg/cm<sup>2</sup> which is 2.53 times of marketed formulation. Dermatokinetic studies confirmed superior drug transfer to the epidermis and dermis. Stability studies conducted under ICH guidelines indicated acceptable drug retention over three months. These findings suggested that the developed formulation significantly improved the stability, safety and efficacy of ascorbic acid for topical applications.</p>
28.	<p><b>INNOVATIVE HYDROXYUREA ORAL SUSPENSION: AKUMS' SOLUTION FOR SICKLE CELL DISEASE MANAGEMENT</b></p> <p>Priyanka, Keshav Sharma, <u>Jyoti Krishna Nayak</u>, Tejwinder Kaur, Jasmeen Kaur <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Sickle cell disease (SCD) is a genetic condition causing abnormal haemoglobin production, which leads to serious complications like Vaso-occlusive crises and organ damage. Hydroxyurea has long been a proven treatment for reducing these crises and minimizing the need for transfusions. Akums Drugs and Pharmaceuticals have taken a significant step forward by developing a patented oral suspension of hydroxyurea (100mg/ml). This liquid formulation, designed for paediatric and elderly patients, remains stable at room temperature, even after the container is opened, making it more convenient and effective for long-term use. The suspension improves patient compliance and demonstrates enhanced clinical benefits. Hydroxyurea also demonstrated ability to enhance foetal hemoglobin (HbF) levels by 18.46%. This increase in HbF is linked to a significant reduction in complications like transcranial Doppler velocity and albuminuria. With its innovative design and therapeutic benefits, Akums' drug offers a new hope for the effective long-term management of SCD, reducing both immediate symptoms and preventing organ damage.</p>
29.	<p><b>TRANSFORMING INDIA'S API LANDSCAPE: REDUCING FOREIGN DEPENDENCY</b></p> <p><u>Ms. Komal Gulati</u> <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>The Indian pharmaceutical industry, a rapidly growing sector, faces significant challenges in research and development (R&amp;D), particularly in its dependency on foreign sources for active pharmaceutical ingredients (APIs) and key intermediates. Ambiguities in the regulatory framework further complicate the approval processes. Advancements in genetic engineering and microbial strain research, betterment of downstream and upstream processes can enhance fermentation-based API production, potentially improving efficacy against antibiotic-resistant pathogens. Bridging the gap between industry and academia is crucial for innovation. Objective: This review aims to propose solutions to reduce this dependency while prioritizing environmental sustainability. Method: For the selection of significant information for the study, the materials were assembled from literature search using</p>

	<p>several databases such as Google Scholar, PubMed, Springer, and Science Direct database. Result: A large scale set up of <i>API</i> manufacturers in the country is the positive outcome of the market growth along with reducing the dependency on foreign countries. Moving on to greener methods (GREEN CHEMISTRY) for <i>API</i> manufacturing would help in controlling the pollution as it is more eco-friendly approach. Conclusion: The <i>API</i> industry needs to restructure its production process in order to mobilize operations in the event of unprecedented circumstances. The COVID-19 virus is the perfect litmus test for pharma companies to assess their standings and address challenges of the future. It is time we revive our domestic <i>API</i> industry, which has been deeply affected.</p>
30.	<p><b><i>Lactuca sativa</i> LINN: A COMPREHENSIVE STUDY ON ITS PHARMACOGNOSTIC PROPERTIES AND MEMORY ENHANCING POTENTIAL</b></p> <p><u>Komal Tyagi</u>, Jagpreet Kaur, Maninder Karan, Jai Malik  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Lettuce (<i>Lactuca sativa</i> L, Asteraceae) is a leafy vegetable that is most widely consumed as salad greens worldwide. Originating in the Mediterranean region, lettuce has been cultivated since ancient times and holds significant cultural and nutritional value. <i>Lactuca sativa</i> is available in various forms, including butterhead, romaine, and iceberg, each with distinct characteristics. Rich in vitamins A, C, and K, as well as folate and dietary fiber, lettuce is celebrated for its health benefits, contributing for overall well-being. Beyond its nutritional properties, recent studies have begun to explore the phytochemical composition of <i>Lactuca sativa</i>, revealing the presence of antioxidants and other bioactive compounds that may offer potential health benefits, including neuroprotective effects. This interest in the medicinal properties of lettuce has sparked research into its role in enhancing cognitive function and memory. As per the research the studies focuses on the pharmacognostic evaluation of <i>Lactuca sativa</i>, investigating its morphological, microscopic, and phytochemical characteristics to establish a comprehensive profile. Various extraction methods were employed to isolate bioactive compounds, followed by qualitative and quantitative analyses to identify key phytochemicals, including flavonoids, phenolics, and alkaloids. Additionally, the memory-enhancing potential of <i>Lactuca sativa</i> was evaluated using established behavioral models in rodents, such as the Morris water maze, Novel Object Recognition (NOR), Actophotometer and etc. Results indicated that administration of <i>Lactuca sativa</i> extracts significantly improved cognitive function and memory retention, suggesting neuroprotective effects. The findings support the traditional use of <i>Lactuca sativa</i> as a cognitive enhancer and highlight its potential for further exploration in neuropharmacology.</p>
31.	<p><b>ROBOTIC EXOSKELETON FOR REHABILITATION</b></p> <p><u>Kritika Khanna</u><sup>1</sup>, Raghav Bhardwaj<sup>1</sup>, Rajveer Kaur<sup>2</sup>, Shruti Kumari<sup>1</sup>  <sup>1</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh,</i>  <sup>2</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Robotic exoskeleton is an emerging transformative technology for restoring mobility in individuals who have suffered from stroke, paralysis and other neuromuscular disorders. They provide an external support to the weakened or paralyzed limbs and enable them to regain their function. This poster explores an integration between robotics, artificial intelligence and neuro-rehabilitation to regain the functional movement of limbs and hence improving the quality of life for the patients. This idea</p>

	allows the patients to regain independence, live their lives normally and contribute to the development of the nation.
32.	<p><b>FROM INDIA TO THE WORLD: QURE.AI'S IMPACT ON AI-DRIVEN HEALTHCARE</b></p> <p>Archit Sood, Harsh Sharma, Kartik Sharma, <u>Manas Prabhu</u> <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Artificial Intelligence (AI) has been a driving factor in the modernisation of medical diagnosis, treatment and patient care by enhancing the precision and efficiency of both medications and medical devices. AI driven tool such as Machine Learning (ML) and Deep Learning (DL) have accelerated processes like disease detection, drug discovery and the development of personalised treatment. One such example of a Made in India AI-Powered health-tech company is Qure.AI which has made significant advances in AI-based Medical Imaging. The company's algorithms are designed to assist radiologists by detecting abnormalities in X-rays, CT-Scans and MRIs leading to faster diagnoses and improved patient outcomes especially in areas with limited skilled healthcare resources. Their technology is particularly impactful in identifying conditions such as tuberculosis and head injuries. The incorporation of artificial intelligence into India's healthcare system holds significant potential. With a population exceeding 1.4 billion, the nation encounters various challenges concerning healthcare accessibility and affordability. AI can play a crucial role in overcoming these obstacles by streamlining routine medical procedures, forecasting disease outbreaks, and facilitating remote patient monitoring. As the healthcare infrastructure in India expands, embracing AI could help close the urban-rural gap, lower healthcare expenses, and enhance the overall quality of care, leading to a healthier future driven by innovation.</p>
33.	<p><b>THE NOVEL APPROACH FOR TREATING HIV-1 THROUGH CCR5 CO-RECEPTOR: A CASE STUDY</b></p> <p><u>Mohammad Shafique Ansari</u>, Anil Kumar <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>RNA interference (RNAi)-mediated knockdown of gene expression offers a novel treatment strategy for human immunodeficiency virus (HIV) infection. A novel immunoliposome method was developed targeting the lymphocyte function-associated antigen-1 (LFA-1) integrin expressed on all leukocytes, and it was evaluated for systemic delivery of siRNA in a humanized mouse model. In vivo, administration of anti-CCR5 resulted in leukocyte-specific gene silencing in the humanized mice. It showed enhanced resistance to infection as assessed by the reduction in plasma viral load and disease-associated CD4 T-cell loss. By using this approach, a 53-year-old male was successfully cured from HIV-1 by following CCR5<math>\Delta</math>32/<math>\Delta</math>32 allogeneic hematopoietic stem cell transplantation. This study explores the virological and immunological responses observed in the patient, highlighting the mechanisms underlying the potential cure for HIV-1. The findings indicate that the transplantation not only eliminated detectable viral loads but also led to sustained immune reconstitution, suggesting a functional cure. The research underscores the importance of CCR5 as a therapeutic target and provides insights into the feasibility of similar approaches for broader HIV-1 treatment strategies. The</p>

	<p>implications of this case extend to future research directions aimed at developing effective curative therapies for HIV-1, emphasizing the need for further exploration of gene editing and stem cell transplantation techniques. The results of the present study would be shown in the form of poster.</p>
34.	<p><b>GENOMIC SCULPTORS: CRISPR-CAS9'S BREAKTHROUGH IN TRIPLE-NEGATIVE BREAST CANCER</b></p> <p><u>Niharika</u>, Anish Singh, Sadhiya, Kaushiki Roy, Inderjeet Thakur <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Utilizing the surgical precision of a master craftsman and the adaptability of a shapeshifter, the groundbreaking CRISPR-Cas9 gene-editing technology emerges as a formidable force in the battle against Triple Negative Breast Cancer (TNBC) tumors. Known for its aggressive nature and resistance to traditional therapies, TNBC has long been a daunting challenge in the field of oncology. However, this pioneering study unveils a revolutionary approach beyond conventional treatments, introducing finesse and effectiveness previously unseen in cancer therapy. By precisely targeting and modifying specific genes within TNBC cells, CRISPR-Cas9 can potentially disrupt tumor growth and spread at a molecular level, making it a game-changer in oncology. This approach not only holds the promise of halting the progression of TNBC but also paves the way for a new era of highly personalized, gene-targeted therapies, offering hope to countless individuals battling this resilient form of cancer.</p>
35.	<p><b>NANO-BIOSENSORS: REVOLUTIONIZING EARLY DIAGNOSIS</b></p> <p><u>Pankaj Khajuria</u>, Simrandeep Kaur, Sanjana Kumari <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Novel biosensors, particularly Nano-biosensors, are revolutionizing the landscape of disease diagnostics by enabling ultra-sensitive, rapid detection of biomarkers critical for early diagnosis. In India, where a large portion of the population lacks access to advanced medical infrastructure, these innovative biosensors can play a pivotal role. The need for early diagnosis is urgent, especially for diseases like cancer, tuberculosis, diabetes, and infectious conditions that impose a heavy burden on public health. Traditional diagnostic methods are often slow, costly, and inaccessible in rural and underserved areas. Nano-biosensors, developed using advanced nanotechnology and biorecognition elements, offer a low-cost, portable alternative that can be deployed in point-of-care settings, ensuring timely intervention and reducing mortality rates. The future market for biosensors is set to expand significantly, driven by their application in personalized medicine, environmental monitoring, and food safety. These technologies could bridge the healthcare gap, providing affordable, rapid testing without the need for sophisticated laboratory infrastructure. By integrating nanotechnology with biosensing, these devices offer high specificity and sensitivity at a fraction of the cost, improve access to diagnosis. As the technology advances, nano-biosensors are poised to become essential tools for improving public health, reducing healthcare disparities, and enhancing disease management.</p>
36.	<p><b>EXPLORING COSMECEUTICAL /DERMACEUTICAL BENEFITS OF PATENTED BERBENINE NANOPHYTOFORMULATION</b></p>

	<p><u>Prachi Pranamya</u>, Shikha Goswami, Bakr Ahmed, Srishti Naryal, Indu Pal Kaur, Maninder Karan <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Indian Barberry (<i>Berberis aristata</i> and related species, Berberidaceae) is a valued indigenous medicinal plant of Ayurveda, traditionally used for its wide range of therapeutic properties, primarily due to the major alkaloid berberine. In addition to its health benefits, it also has dermatological and cosmetic benefits and has been used for conditions like eczema, psoriasis, acne, etc. However, Barberry, berberine and its other alkaloids suffer from poor stability and permeability and thus are not a part of the mainstream dermatologicals. To address this challenge, many patents and reports are available on novel drug delivery systems of berberine but no work has been done on berbenine. A novel nanophytoformulation was developed with perfect characteristic score for which we have been granted a patent. To explore further clinical prospects of alkaloid berbenine, it was evaluated for cosmetic/dermatological benefits. The <i>in vitro</i>, <i>ex vivo</i> and <i>in vivo</i> tests for cosmetic and dermatological aspects together with its toxicity evaluation demonstrated successful berbenine nanosystem. MTT assay suggested higher cell uptake; <i>in vivo</i> studies confirmed beneficial anti-aging effects and no noticeable toxic (acute dermal toxicity, OECD Guideline (TG402) effects thus making it suitable for topical application. The <i>ex vivo</i> permeation studies showed desired dermal delivery. The study underscores benefits of the developed product compared to commercially available products, with expected high demand and wide range of applications.</p>
37.	<p><b>INTRODUCING NOVEL OXAZOLE SUBSTITUTED TETRA HYDRO QUINAZOLINE DERIVATIVES AS POTENTIAL CYCLOOXYGENASE-2 INHIBITORS</b></p> <p><u>Pratishtha Lambodra</u>, Sayonika Goswami, Alka Bali <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>It is important to develop novel active small-molecule anti-inflammatory drugs with an improved safety profile. To this end, a series of substituted oxazole derivatives (ASG-1 to ASG-7) have been synthesized. The test compounds underwent authentication, and their purity was determined through a range of spectral and chromatographic techniques. The comparative analysis of test compounds (ASG-2 to ASG-7) indicates minimal similarity to Rofecoxib (39.6-74.1%) and moderate similarity to Celecoxib (16.2-71.41%). However, a significant degree of similarity is observed with nimesulide (42.7-95.5%). <i>In silico</i> (docking) studies have indicated a favorable binding of the test compounds to the COX-2 receptor. The binding affinity of these test compounds within the active site of the cyclooxygenase-2 enzyme was assessed using PyRx. Among the substituted oxazole derivatives, compound ASG-7 exhibited the best dock score of -11. The <i>in vivo</i> studies conducted on the target compounds ASG-4, ASG-6, and ASG-7 demonstrated significant anti-inflammatory activity with notably lower ulcerogenic potential compared to nimesulide. The test compounds exhibited the most favorable anti-inflammatory profile across all administered dose levels (5 mg/kg p.o., 25 mg/kg p.o., 75 mg/kg p.o.). This exciting discovery holds great potential for advancing treatment options in the field of anti-inflammatory medications.</p>
38.	<p><b>HPTLC ANALYSIS OF URSOLIC ACID IN <i>Ocimum basilicum</i></b></p>

	<p><u>Rahul, Neha, Ashwani Kumar</u> <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p><i>Ocimum basilicum</i>, also known as holy basil belongs to the Lamiaceae (mint) family. The genus has many species that have been used since ancient times to treat a variety of disorders and diseases. The genus <i>Ocimum</i> contains about 30 species, with varying morphological and chemical variations, found in tropical and subtropical regions of Africa, Asia, Central and South America., <i>O. basilicum</i> is one of the species which grows in India and plays a vital role due to its various medicinal properties. In the present study we have developed a simple and quick HPTLC method to evaluate the quality of various dried parts of <i>Ocimum basilicum</i> using Ursolic acid which is one the biologically active marker constituents present in the drug. The method involves extraction of powdered plant material with methanol, applying the filtered extract on precoated silica gel G plates. The solvent system used was Toluene: ethyl acetate (8:2). The plates were derivatized with anisaldehyde sulphuric acid reagent, heated at 110° C for 5 minutes and scanned at 540 nm on Camag HPTLC Scanner. The method was validated as per ICH guidelines. Ursolic acid was quantified in the samples using HPTLC method. The method is easy, simple, accurate and time efficient. The Ursolic acid content in leaf, stem and flower part was found to be 14.32 mg, 21.43 mg and 22.17 mg/g respectively.</p>
39.	<p><b>FORMULATION DEVELOPMENT AND EVALUATION OF HYDROXYCHLOROQUINE LOADED ETHOSOMES FOR THE MANAGEMENT OF DISCOID LUPUS ERYTHEMATOUS</b></p> <p><u>Ramneet Kaur, Diksha, Anil Thakur, O.P.Katara</u> <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Hydroxychloroquine is an antimalarial drug which is now approved by the US FDA for treatment of discoid lupus erythematosus. The conventional topical dosage forms were unable to produce desired effects due to low efficacy and safety, so the ethosomal system were developed in this project work which improved the skin permeation potential and dermato-kinetic properties. The Formulation composed of 14% w/w of organic phase, 3% w/w of lipid phase, 10 % w/w of propylene glycol and PBS 7.4 used as the aqueous phase in quantity sufficient. The developed formulation was found to be nanometric in size (123.9 nm), with PDI (0.34) and improved zeta-potential (-2.71 mv). Dermto-kinetic studies on Wistar rat skin proclaimed higher amount of drug in epidermis and dermis when compared with conventional formulation. The stability studies were performed at the storage temperature as per ICH guidelines which were within the permissible limits. Thus, it can be concluded that HCQ entrapped in developed ethosomal systems has all the possibilities to prove its clinical worth in real life situations.</p>
40.	<p><b>CRISPR-CAS9: UNLEASHING THE POWER OF GENETICS</b></p> <p><u>Rishita Sharma<sup>1</sup>, Kavya Jha<sup>1</sup>, Kritika Longia<sup>1</sup></u> <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Clustered Regularly Interspaced Short Palindromic Repeats is a revolutionary gene editing technology that enables scientists to correct errors in the genome and turn on or off genes in cells and organisms quickly, cheaply, precisely, and with relative ease. A custom-designed single guide-RNA (sgRNA), a Cas9 endonuclease, and PAM sequences in the target region are the necessary requirements that result in the modification or permanent alteration of the genomic target sequence by creating a</p>

	<p>double-strand break upon the sgRNA-Cas9 complex and target binding. CRISPR-Cas9 has diverse medical applications, including gene modification in human cells, cancer research, gene therapies, and diagnostic purposes. It can potentially correct disease-causing mutations, disrupt cancer progression, and enable rapid detection of viral infections and genetic mutations. CRISPR-Cas9 technology has revolutionised genome editing but raises significant bioethical concerns, including safety risks from off-target effects, ethical dilemmas surrounding germline editing, and designer babies. India has made significant advancements in CRISPR-Cas9 research, particularly through the Indian Institutes of Science and various startups. IISc researchers have engineered improved Cas9 variants with enhanced specificity and expanded PAM requirements, developed disease-resistant rice varieties, and explored gene therapy strategies to correct genetic disorders. Notable startups in India are focusing on CRISPR therapies for genetic diseases, offering customised gene editing services, targeted cancer cell therapies, and, providing tailored gene editing solutions. Together, these efforts highlight India's growing role in advancing CRISPR technology across agriculture, healthcare, and biotechnology.</p>
41.	<p><b>CATALYZING THE FUTURE OF BENIGN PROSTATE HYPERPLASIA RESEARCH</b></p> <p><u>Ritika</u>, Ramandeep Singh, Priyanka Rana, Neelima Dhingra  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Benign prostatic hyperplasia (BPH) is a common urological condition characterized by the enlargement of the prostate gland, often leading to urinary complications. Targeting 5<math>\alpha</math>-reductase, an enzyme responsible for converting testosterone into the prostate-enlarging dihydrotestosterone (DHT), has emerged as a promising therapeutic strategy. In this study, molecular docking was employed to explore the potential of Arylpiperazine derivatives as inhibitors of 5<math>\alpha</math>-reductase, utilizing the advanced Schrodinger Maestro (v12.3) software suite. Naftopidil, a known 5<math>\alpha</math>-reductase inhibitor, was included for comparison to assess the performance of these derivatives. The study highlights the importance of drug designing as an efficient approach to discovering new therapeutic uses for existing drugs, potentially reducing development time and cost. The results of this computational analysis pave the way for further experimental validation and the development of effective treatments for BPH.</p>
42.	<p><b>BILOSOMAL SYSTEM FOR BOOSTING THE ORAL BIOAVAILABILITY</b></p> <p><u>Rohit Kundlas</u>, Mansi Prashar, Amita Sarwal, Neelima Dhingra  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>The development of new drug molecules is often hindered by poor solubility and bioavailability, which limits their effectiveness and prevents many from reaching the market. Despite advances in drug discovery, only a few candidates make it through the costly and lengthy development process, largely due to issues like lack of efficacy, safety concerns, and unfavourable pharmacokinetics. High molecular weight and increased lipophilicity further contribute to poor water solubility, affecting around 40% of marketed drugs and up to 70% of those in development. These challenges significantly reduce oral drug absorption and bioavailability, making it difficult for drugs to be effective. To address these limitations, various formulation strategies have been explored, including SNEDDS, liposomes, crystal modification, and bilosomes. Among these, bilosomal technology stands out, offering enhanced stability in the gastrointestinal tract and improved oral delivery.</p>

	<p>This paper highlights the potential of bilosomes as a promising solution for overcoming solubility and bioavailability challenges in drug development.</p>
43.	<p><b>UNVEILING THE HIDDEN DANGERS: THE ROLE OF NITROSAMINES IN CANCER RISK</b></p> <p><u>Saksham Garg</u>, Pravesh Bhardwaj, Ashok Kumar Yadav <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Nitrosamines are a diverse group of genotoxic chemical carcinogens found in our environment and food, as well as produced endogenously in the human body. Studies show that N-nitroso compounds can trigger cancer in various animal models, impacting over forty species, including higher primates and potentially humans. Nitrates, commonly present in food, can be converted into nitrites by microorganisms, serving as nitrosating agents. Understanding the mechanisms and implications of nitrosamine formation is essential for evaluating cancer risks from dietary and environmental sources. In this article, we will explore these critical issues in greater depth.</p>
44.	<p><b>DEVELOPMENT OF N-(PYRIMIDIN-2-YL) ALKYL/ARYLAMIDE DERIVATIVES AS QUORUM SENSING INHIBITORS</b></p> <p><u>Shabana Sharif</u>, Nikki, Ashok Kumar Yadav <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>The rise of bacterial resistance to antimicrobial agents presents a significant challenge to the efficacy of bacterial illness treatment. Biofilm formation, facilitated by quorum sensing (QS), is a key factor contributing to antimicrobial resistance. Inhibiting QS suppresses the QS signalling pathway and disrupting cell-to-cell communication. This research focuses for the development of N-(pyrimidin-2-yl) alkyl/arylamide derivatives as quorum sensing inhibitors. N-(pyrimidin-2-yl) alkyl/arylamide derivatives were designed, synthesized, characterized and evaluated for their QS inhibitory activity. Among the synthesized compounds (3a-j), compounds 3b, 3d, and 3h displayed the highest QS inhibitory activity, with inhibition zones of <math>17.66 \pm 6.17</math>, <math>14.00 \pm 6.24</math>, and <math>17.33 \pm 0.66</math> mm, respectively. Furthermore, molecular docking studies revealed binding affinities ranging from -8.4 to -6.3 kcal/mol, indicating strong interactions with the target proteins. Molecular dynamic simulations confirmed the stability of the protein-ligand complexes for compounds 3b and 3h. In-silico methods were also utilized to predict the physicochemical properties of these molecules. These findings emphasize the potential of N-(pyrimidin-2-yl) alkyl/arylamide derivatives as QS inhibitors, presenting a novel perspective for the development of alternative antimicrobial therapies.</p>
45.	<p><b>SYNTHESIS AND STUDY OF INDANONE DERIVATIVES AS PROMISING THERAPEUTIC AGENTS IN NEURODEGENERATIVE DISORDERS</b></p> <p><u>Somali Patra</u><sup>1</sup>, Chanchal Kumar<sup>1</sup>, Ankit Bajpai<sup>2</sup>, Dr. Ranjit Singh<sup>3</sup>, Dr. Ranju Bansal<sup>4</sup> <sup>1</sup>M. Pharm, <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh</i>, <sup>2</sup>Research Scholar, <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh</i>, <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh</i>, <sup>3</sup>Young Scientist, <i>University Institute of</i></p>



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Neurodegenerative diseases, such as Alzheimer's and Parkinson's diseases are major global health challenges necessitating the search for new therapeutic agents. Several studies have revealed that indanone, a benzocyclopentanone, existing in two isomeric forms 1-indanone and 2-indanone has emerged as a significant scaffold in neurodegenerative diseases. Neurodegeneration, the primary cause of progressive impairment in the structural or functional activities of nerve cells, leads to pathological conditions such as Alzheimer's disease (AD) Parkinson's Disease (PD) and other neurological disorders. Parkinson's disease (PD) primarily impacts the motor system, governing both voluntary and involuntary movements. The condition results from decreased dopamine levels in the brain and is typified by the hallmark symptoms of hypokinesia, rigidity, and tremor. Indanones exhibit a high affinity for crucial enzymes including monoamine oxidases (MAO-A/ MAO-B) and acetylcholinesterase (AChE) involved in the recycling and degradation of neurotransmitters associated with neurodegenerative conditions. This research work focuses on designing, synthesis, and evaluation of the pharmacological effects of various indanone oxime ether derivatives as potent MAO-B inhibitors for the targeted treatment of Parkinson's disease. The findings suggest that the oxime ether group shows promise as a potential substituent for creating powerful neuroprotective drugs based on indanone. It is also indicated that further exploration of these analogues could lead to the development of key compounds in this field.

46. **MANAGEMENT OF CHRONIC UNPREDICTABLE MILD STRESS (CUMS) INDUCED DEPRESSION**

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*Depression*, a chronic mental disorder, affects about 15 to 20% of people in the world. The effects of recent conventional medication for depression using SSRIs, tricyclic antidepressants (TCAs), and monoamine oxidase inhibitors manifest after several days and rarely more than 12 weeks. Active ingredients in medicinal plants neutralize various stressors, help to return monoamine receptor and neurotransmitter levels to normal and raise the level of monoamine neurotransmitters in certain parts of the cortical regions of brain, ameliorating depression related symptoms with mood stabilizing effects. The present study was designed to investigate the effect of such polyphenols on unpredictable chronic stress induced behavioural and biochemical alterations in mice. Animals (BALB/c or LACA mice) will be subjected daily to mild stress conditions for 15 days. Compounds will be administered orally 30 min before each day test session. Various behavioural (body weight, actophotometer, FST, mirror chamber, EPM) tests will be performed, followed by biochemical tests (oxidative stress and mitochondrial enzyme complex activity and neuroinflammatory markers) will be assessed in the discreet areas of the brain. *Polyphenolic* compounds modulate brain monoaminergic and GABAergic transmission pathways and help to improve learning and memory ability in experimental models. Moreover, it inhibits the MAO enzymes, thus increasing monoaminergic activity. It has also shown a

	<p>reduction in the levels of NO, cortisol, IFN-<math>\gamma</math>, and BDNF in depressive disorder leading to favourable effect on HPA axis activity and cortisol levels in depressed patients. Results of the present study would be shown in the form of poster.</p>
47.	<p><b>MAITRI: A DIGITAL TOOL TO “TRACK” POSTPARTUM DEPRESSION</b></p> <p><u>Sukhmani Sharma</u>, Kunal Jain, Chinmayee Ratho, KomalPreet Kaur <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Postpartum depression (PPD) is a medical and psychological condition that commonly affects women following childbirth. Over 10 million women face Postpartum depression annually in India. If undetected or untreated, it may develop into major chronic depression later on in life also compromising the new born child’s well-being. PPD manifests as intense sadness, anxiety, worry, feeling incompetent to take care of the baby, difficulty bonding with the new-born, feeling of hopelessness, loneliness, irritability along with negative impact on sleep and diet. This comprehensive review highlights the unmet needs and gaps in the current health care system regarding awareness, diagnosis and detection of PPD along with the concern of lack of management. We propose a brain child of our own – an interactive application “<i>Maitri</i>” with the aim of revolutionizing PPD management. It’ll help “TRACK” (Therapy, Response, Assessment, Care/Collaboration, and Knowledge) Postpartum mental health.</p>
48.	<p><b>DEVELOPMENT AND EVALUATION OF PROBIOTICS LOADED EMULGEL SYSTEMS</b></p> <p>Rishav sood<sup>1</sup>, Indu pal kaur<sup>2</sup>, <u>Swasti gayatri mohapatra</u><sup>1</sup> <sup>1</sup><i>University Institute of Pharmaceutical Sciences, Panjab University Chandigarh,</i><sup>2</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Diabetes is linked to the serious complication of delayed wound healing. The current focus is on exploring the potential of probiotics as an alternative or supplementary therapy for managing skin infections through various mechanisms, such as producing antimicrobial agents, preventing pathogen adhesion, and enhancing immune responses. This study aims to develop an emulgel system targeting skin infections caused by <i>Propionibacterium acnes</i>, utilizing probiotics wound healing properties in diabetic wounds. The objective is to create an affordable, stable, and patient-friendly formulation containing whole-cell probiotics, suitable for all skin types and conditions. The formulation is designed to maintain <i>Bacillus coagulans</i> in a dormant state by ensuring low water activity (&lt; 0.77 aw) and includes appropriate humectants, surfactants, and sunflower oil in a carbopol-PEG gel base. This low water activity eliminates the need for external preservatives, making the formulation self-preserving. Thus, it provided a safe alternative approach for the treatment of diabetic wound with the direct modification of skin flora to restore its robustness. Furthermore, the components and equipments used in the study are cheap and widely available which makes it an industrially viable option.</p>
49.	<p><b>IN SILICO SCREENING OF ARYL SUBSTITUTED INDOLE DERIVATIVES AS POTENTIAL ATYPICAL ANTIPSYCHOTICS</b></p> <p><u>Upma Sharma</u>, Saswat Panda, Alka Bali <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p>

	<p>In the pursuit of developing a series of innovative atypical antipsychotic compounds, we have engineered a set of indole-based molecules as a component of our research endeavor. The novel antipsychotic compounds (ASP-8 to ASP-11) were designed based on their physicochemical similarity studies to standard drugs and in silico (docking studies) with respect to 5-HT<sub>2A</sub> and D<sub>2</sub> receptors. The test compounds ASP-8 to ASP-11 exhibited strong similarity with Ketanserin, Ziprasidone, and Risperidone. However, their resemblance to clozapine was poor, except for ASP-10. The Log P value was investigated and the value ranged from 0.608 to 0.644 suggesting favorable BBB penetration. Additionally, the polar surface area as a determinant for drug transport has been investigated, and all test compounds possess a value of 33.29 Å<sup>2</sup>, indicating good BBB permeation. A 2D QSAR model has been developed to correlate ED<sub>50</sub> values with LogP, ovality, and TPSA. The model exhibited a strong predictive ability, as indicated by a high cross-validated r<sup>2</sup> (q<sup>2</sup> = 0.923) obtained using the Leave-One-Out (LOO) method. All the test compounds have demonstrated potential antipsychotic activity, exhibiting greater potency in their anti-dopaminergic profile compared to clozapine. This exciting discovery holds great potential for advancing treatment options in the field of antipsychotic medications.</p>
50.	<p><b>ALPHA-AMYLASE INHIBITORY ACTIVITY OF WITHANIA COAGULANS</b></p> <p><u>Vibha Sharma</u>, Navdeep Kaur, Ashwani Kumar  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Diabetes is a chronic metabolic disorder affecting 537 million people worldwide. In India 101 million people are suffering from diabetes. There is long tradition of use of medicinal plant for the prevention and treatment of diabetes. Therefore, it was considered worthwhile to evaluate antidiabetic potential of <i>Withania coagulans</i>. <i>Withania coagulans</i>, commonly known as Indian Rennet or Paneer dodi, is a medicinal plant that holds significant importance in traditional medicine systems such as Ayurveda and Unani. Native to arid regions of India, Pakistan, and Afghanistan, this plant belongs to the Solanaceae family. Water extract of the drug was prepared using moderately course powder and boiled for 30 minutes. The extract was filtered and the <math>\alpha</math>-amylase inhibition assay was performed using the 3,5-dinitrosalicylic acid (DNSA) method. A positive control sample was prepared using Acarbose. <i>Withania coagulans</i> showed 75% inhibition. In conclusion, <i>Withania coagulans</i> emerges as a promising natural source for antidiabetic therapy, supported by its significant <math>\alpha</math>-amylase inhibitory activity comparable to the standard drug Acarbose. These <math>\alpha</math>-amylase inhibitors are also called as starch blockers as they prevent or slow the absorption of starch into the body mainly by blocking the hydrolysis of 1,4-glycosidic linkages of starch and other oligosaccharides into maltose, and other simple sugars. The results justify the use of water extract of the drug for the prevention and management of type 2 diabetes.</p>
51.	<p><b>MODIFICATIONS OF IBUPROFEN DERIVATIVE WITH ENHANCED BIOLOGICAL EFFECT AS ANTI-INFLAMMATORY AND GASTROPROTECTIVE AGENT</b></p> <p><u>Vishwash Bhardwaj</u>, Neeraj Mehta, Neelima Dhingra  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p>

	<p>This study includes synthesis, characterization and biological evaluation of new non-steroidal anti-inflammatory agents (NSAIDs) to achieve better activity and low gastric side effects. The major side effects associated with all currently available NSAIDs are gastrointestinal tract (GIT) haemorrhage and ulceration, due to inhibition of COX-1, Structural modification of ibuprofen might improve their specificity for COX-2 enzyme selectivity. A series of Ibuprofen derivatives have been synthesized and evaluated as potential NSAIDs, in order to reduce the ulcerogenic effect of ibuprofen, its carboxylic group has been converted into ester. The structures of synthesized compounds were confirmed by IR spectra and <sup>1</sup>H NMR spectra. Additionally docking study was carried out using auto dock to find out the binding interactions &amp; binding orientation of these novel derivatives of ibuprofen into their binding site of COX enzyme (PDB ID 5F1A). The synthesized compounds have showed good anti-inflammatory effect as compared to the parent drug. Anti-ulcer activity was also carried out as one of the key toxicological studies and indicated the gastroprotective nature of these derivatives.</p>
52.	<p><b>NEUROPHARMACOLOGICAL INVESTIGATIONS ON NF-KB PATHWAY IN EXPERIMENTAL PARADIGM OF HUNTINGTON'S DISEASE.</b></p> <p><u>Muzamil Qayoom Lone</u><sup>1</sup>, Sangeeta Pilkhwal Sah<sup>2</sup>  <sup>1</sup><i>University Institute of Pharmaceutical Sciences Panjab University,</i> <sup>2</sup> <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Huntington's disease (HD) is a neurodegenerative disorder characterized by motor, cognitive, and psychiatric disturbances. Nuclear factor kappa B (NF-κB) pathway plays a pivotal role in HD pathogenesis, regulating inflammation, oxidative stress, and neuronal death. This study investigated neuropharmacological modulation of NF-κB pathway against Quinolinic acid induced Huntington disease in animal model. This study examined the effects of NF-κB inhibitors (ellagic acid and vanillic acid) on NF-κB activation, inflammatory cytokines (IL-1β, IL-6, TNF-α), oxidative stress markers (ROS, MDA), and neuronal survival. NF-κB activation exacerbated neurodegeneration and motor dysfunction after Quinolinic acid administration. Results showed that pharmacological modulation of NF-κB pathway by ellagic acid and vanillic acid improved motor and cognitive function in animals. Further, NF-κB inhibitors reduced inflammatory cytokine expression and oxidative stress which was further supported by histopathological studies. Our findings demonstrate the critical role of NF-κB pathway in HD and suggest that targeting this pathway by ellagic acid and vanillic acid may offer an adjuvant therapeutic strategy for disease modification.</p>

53.	<p><b>Cryonics; Will the Dead Return?</b></p> <p><u>Nitika Chaudhary</u><sup>1</sup>, Sangeeta Pilkhwah Sah<sup>1</sup>  <sup>1</sup><i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Today technology plays a vital role in every aspect of life. Cryogenics is one of them, which is the scientific study of the production and effects at ultra temperature. A further innovation that falls under the category of cryogenics is cryonics, which involves freezing a deceased person in the hope of resurrecting them in the future. Cryonics is a method that combines science, technology, and human desire to preserve human bodies and brains at -196°C for possible future resuscitation. It can be used for life extension, tailored therapy, and future revival. Though there are challenges associated with it like, preservation at these temperatures would preserve perhaps a portion of the structures' attractive qualities, which most of us would like to preserve, and ultra-low temperatures could halt some metabolic processes. However, life can be restored through the use of cryonics as few case studies support this concept, and majority of future efforts will be in the field of cryonics.</p>
<b>UG/PG STUDENTS FROM COLLEGES AND OTHER INSTITUTIONS</b>	
54.	<p><b>BIOINFORMATICS IN MEDICINAL CHEMISTRY: DATA MINING AND ANALOGUE FOR DRUG DISCOVERY</b></p> <p><u>Aman Shakya</u>  <i>University Institute of Pharma Sciences Chandigarh University, Mohali, Punjab.</i></p> <p>Bioinformatics valuable tool in medicinal chemistry, data mining and analogue for drug discovery. bioinformatics and its relevance to medicinal chemistry various data types such as genomics, proteomic and chemical data base. Specific data mining method Analogue are designed and optimised using bioinformatics tools synergistic approach challenge and future direction.</p>
55.	<p><b>NEW FRONTIERS IN PARKINSON'S DISEASE TREATMENT</b></p> <p>Ritika Sharma, <u>Ananya Priyadarshni</u>, Kajal Thakur  <i>University Institute of Pharma Sciences Chandigarh University, Mohali, Punjab.</i></p> <p>Parkinson's disease is a chronic and progressive neurological disorder that affects the motor function of the individual and is volatile with motor and non-motor symptoms. New directions of PD treatment are oriented to focus on understanding the disease's multifactorial nature, addressing not only symptomatic relief but also underlying disease mechanisms. Emerging studies focus on gut brain axis indicating that gut microbes can affect neuroinflammation and <math>\alpha</math>-synuclein deposition. Stem cell therapies exhibit potential by replacing lost dopaminergic neurons, thereby halting disease progression. In parallel, newer and contemporaneous methods of drug delivery such as nanoparticle and intranasal administration could improve drug absorptivity and niche delivery to the brain tissue. Advancements in the past decade have involved modified management approaches for symptomatic treatment. Evolving surgical interventions like Deep Brain Stimulation (DBS) offer new frontiers, particularly for patients unresponsive to medication. Furthermore, AI-driven technologies conduce to the discovery of novel targets, which encompass drug</p>

	<p>discovery and repurposing, biomarker identification, personalized medicine, optimization of DBS for PD treatment, as well as decreasing ROS and Neuroinflammation by identifying novel pathways involved in the pathophysiology. Collectively these advances offer new hope for modifying disease progression and improving patient outcomes, marking the inception of a promising era for PD treatment.</p>
56.	<p><b>ENHANCING THE THERAPEUTIC EFFICACY OF CURCUMIN AND DICLOFENAC IN WOUND HEALING USING POLYMER FILMS BASED ON SODIUM ALGINATE, CARBOPOL, PEG, AND HPMC</b></p> <p><u>Anjali sharma</u><sup>1</sup>, Anu jindal<sup>2</sup>  <sup>1</sup><i>GHG Khalsa College of Pharmacy Gurusar Sudhar Ludhiana</i>, <sup>2</sup><i>GHG Khalsa College of Pharmacy Gurusar Sudhar Ludhiana</i>.</p> <p>Curcumin, the active compound in <i>Curcuma longa</i> L., better known as turmeric, offers significant therapeutic benefits for treating a range of ailments. When the skin is damaged, whether by acute or chronic wounds, the body activates a series of processes to heal tissue and restore the skin's barrier. Curcumin plays a key role in this, with its strong antibacterial and antifungal properties, largely thanks to its antioxidant and wound healing capabilities. However, its medicinal use is limited by its poor oral bioavailability, rapid metabolism, and low solubility in water. To overcome these challenges, developing effective drug delivery systems for curcumin is essential to enhance its therapeutic potential. This study highlights recent advancements in curcumin-based delivery systems, particularly for wound healing applications, focusing on the development of hydrogels, films, wafers, and sponges. Curcumin's potent antibacterial and antioxidant activities make it a valuable tool in treating wounds. In particular, specially designed films were loaded with diclofenac, an anti-inflammatory drug, along with curcumin, to improve encapsulation and allow controlled release of these compounds, which typically have low bioavailability. These curcumin and diclofenac-loaded films demonstrated excellent antibacterial effects against Gram-positive bacteria strains. Both in vitro and in vivo research supports the potential of these polymer films as innovative transdermal wound dressings, combining diclofenac's ability to reduce inflammation and pain with curcumin's capacity to promote faster wound healing. Keywords: wound healing, curcumin, hydrogels, diclofenac, films.</p>
57.	<p><b>EXPLORING THE POTENTIAL OF NANOMEDICINE AND MICROFLUIDICS FOR GENE THERAPY ACROSS THE PHYSICOCHEMICAL AND CELLULAR BARRIERS</b></p> <p><u>Anu Rani</u>  <i>Department of Pharmaceutical Science, Kurukshetra University, Kurukshetra, Haryana.</i></p> <p>The integration of nanomedicine and microfluidics offers significant potential for overcoming physiological and cellular barriers in gene therapy. Nanomedicine employs engineered nanoparticles to facilitate the delivery of genetic material, enhancing stability and targeting while minimizing off-target effects. Concurrently, microfluidics enable precise control over fluid dynamics, allowing for the fabrication of advanced delivery systems that can mimic physiological conditions. This study investigates the combined application of these technologies to enhance the transport</p>

	<p>of therapeutic genes across biological barriers, such as the blood-brain barrier and cellular membranes. Moreover, it highlights the development of multifunctional nanocarriers designed for improved cellular uptake and endosomal escape, as well as the use of microfluidic platforms for real-time analysis of gene delivery efficiency. This study indicates that this interdisciplinary approach not only improves the efficacy of gene therapies but also provides insights into the interactions between therapeutic agents and biological environments. Conclusively, this review discusses the potential of nanomedicine and microfluidics in advancing gene therapy applications, addressing critical challenges in the treatment of genetic diseases and tumors. Key Words: Nanomedicine, Microfluidics, Gene therapy, Nanocarriers.</p>
58.	<p><b>PREVALENCE, TYPES, PATHOPHYSIOLOGY AND MANAGEMENT OF EPILEPSY</b></p> <p><u>Arun</u>, Dinesh Dhingra  <i>Department of Pharmaceutical sciences, Guru Jambheshwar ,University of Science and Technology, Hisar Haryana.</i></p> <p>Epilepsy is a common neurological disorder characterized by recurrent seizures. The excessive, hypersynchronous firing of neurons in the brain causes seizures. Epilepsy affects an estimated five million individuals worldwide each year. Epilepsy is projected to affect 49 out of every 1,00,000 persons each year in high-income nations. This rate can be as high as 139 per 100000 in low- and middle-income nations. This is most likely attributable to an increased risk of endemic diseases like malaria; a greater frequency of road traffic accidents; birth-related injuries; and differences in medical infrastructure, preventative health programmes, and access to care. Epilepsy affects more than 10-12 million people in India. Seizure types are primarily categorized into three groups- Focal onset, Generalized onset and Unknown onset. Focal epilepsy may include unifocal or multifocal seizures affecting one hemisphere. Generalized-onset seizures engage bilateral or bihemispheric cortical networks. Generalized-onset seizures can be further classified into motor or non-motor onset. Motor seizures include tonic-clonic, clonic, tonic, myoclonic and atonic. Non-motor seizures are also named as absence seizures. Increase in excitatory or glutamatergic neurotransmission and decrease in inhibitory or GABAergic neurotransmission may cause epileptic seizures. Unknown- onset refers to when the onset is unknown but other manifestations are known. Sodium channel inhibitors such as phenytoin, valproate, and carbamazepine; GABA activators such as benzodiazepines and barbiturates; calcium channel inhibitors such as ethosuximide and valproate; and GABA transaminase inhibitors such as vigabatrin are clinically employed antiepileptic drugs.</p>
59.	<p><b>UTILIZATION OF MILLETS AND MILLET BASED PRODUCTS FOR HEALTH AND SOCIO-ECONOMIC UPLIFTMENT: VIKSIT BHARAT VISION</b></p> <p><u>Bhanu Verma</u>, Jitender Singh  <i>University School of Pharmaceutical Sciences, Rayat Bahra University, Kharar, Punjab.</i></p> <p>Milletts are a nutritious and sustainable food source that can address food security and improve human nutrition. India contributes 80% of millet production in Asia and 20% worldwide. Milletts are hardy crops that can grow well in arid and semi-arid</p>

	<p>regions with minimal water and inputs, making them an ideal crop for farmers in rain-fed areas. The cultivation of millets can uplift rural economies by providing farmers with a sustainable income source. Millets have the potential to become future of farming systems due to their eco-friendly nature and ability to thrive in poor soil and climatic conditions. The use of millets can also address the issue of gluten allergy, as they are gluten-free rich in fiber, protein, vitamin and mineral and can be used as an alternative to wheat and rice. Millets can be processed into various products, such as flour and breakfast cereals, which can create new opportunities for farmers and small-scale entrepreneurs. To promote millet consumption, there is a need to create greater awareness among consumers about the nutritional benefits of millets and how to incorporate them into their diets. Governments, NGOs, and health organizations can work together to promote millets through public campaigns, school feeding programs, and health initiatives. In conclusion, millets offer a dual advantage: they promote better health while also providing economic opportunities, particularly in rural areas. By embracing millets and millet-based products, we can move towards a more sustainable and healthier future.</p>
60.	<p><b>SOCIO-ECONOMIC UPLIFTMENT OF FARMERS THROUGH FARMING OF INDIGENOUS PLANT DRUGS &amp; DEVELOPMENT OF THEIR PRODUCTS THEREAFTER: A VIKSIT BHARAT STRATEGY</b></p> <p><u>Chetna Kashyap</u>, Jitender Singh  <i>University School of Pharmaceutical Sciences, Rayat Bahra University, Kharar, Punjab.</i></p> <p>India is one of the 17th mega biodiversity centers of the world and has moved from an agricultural-based country to being self-reliant in agricultural production and emerging into one of the most industrialized countries in the world. India covers an area of 32,87,263 sq. km out of which 1.78 million sq. km (2021) is used as agricultural land and is unquestionably the largest livelihood provider as it contributes a significant figure to GDP. But so far, only 6,71,000 hectares (2022-23) have been cultivated with indigenous plant (IP) cultivation with production of 6,80,000 MT. According to WHO, 80% of the human population uses plant or plant-based medicines for living or healthcare purposes, throughout the globe. Approx. 40,000 to 70,000 medicinal plant species have been used worldwide as traditional medicine. The world trade in Medicinal and Aromatic Plants (MAP) and related products is more than US\$ 100 billion with an annual growth rate of 15 %. Moreover, about 25% of modern medicines are derived or obtained from plants, either directly or indirectly. It just shows how promising the herbal products market is, projected to be a \$5 trillion industry by 2050. Still, India has only 7% of this market but hasn't even begun to scratch the surface of its biodiversity, mainly because of the unawareness among farmers about the financial possibilities in the cultivation of MAP. Awareness, training, and Government support can encourage IP cultivation to increase the production and productivity of MAP and MAP-based products.</p>
61.	<p><b>NANO FORMULATIONS IN HEALTH CARE</b></p> <p><u>Devwart Khatri</u>  <i>Department of Pharmaceutical sciences, Guru Jambheshwar University of Science and Technology, Hisar Haryana.</i></p> <p>Nano formulations in healthcare refer to the use of nanotechnology to create medications and treatment methods on a very small scale. These formulations involve engineering drug particles or delivery systems at the nanoscale, typically</p>



	<p>ranging from 1 to 100 nanometers. This enables targeted drug delivery, increased drug solubility, enhanced bioavailability, and reduced side effects. Nano formulations are being explored for various applications including cancer treatment, imaging, diagnostics, and targeted therapy delivery. They hold promise for revolutionizing drug delivery and improving patient outcomes in numerous medical fields.</p>
62.	<p><b>ROLE OF INDIGENOUS KNOWLEDGE IN TACKLING ANTIMICROBIAL RESISTANCE</b></p> <p><u>Dimpy</u>  <i>Department of Pharmaceutical Science, Kurukshetra University, Kurukshetra, Haryana.</i></p> <p>Antimicrobial resistance is a significant worldwide public health issue, particularly in underdeveloped nations. The overuse of antibiotics has resulted in the emergence of antimicrobial resistance, which poses a significant danger to world health. Antimicrobial resistance (AMR) arises when microorganisms, including bacteria, acquire resistance to an antimicrobial agent. The causes contributing to the development of resistance include insufficient understanding and awareness of antibiotics, with poor education about antibiotic utilisation among prescribers. Improper practices, including inadequate antibiotic therapy, reuse of leftover pharmaceuticals, inappropriate use of antibiotics for viral infections, self-medication, and missed doses, have been documented. The indiscriminate use of antibiotics often leads to the development of adverse effects and treatment resistance in disease. Method: India is the foremost producer of medicinal herbs. Plants produce secondary metabolites and phytochemicals, which provide significant medicinal potential. In recent decades, research has intensified to identify medicinal plants that might be utilised synergistically with synthetic medications to mitigate negative effects. Furthermore, medicinal plants may significantly contribute to combating the development of antibiotic resistance by their direct antimicrobial properties (such as antibacterial, antiviral, antifungal, and antiparasitic effects) and indirectly by reducing resistance to antibiotics. This perspective highlights that discoveries of novel plant-derived antimicrobials, as dependable sources of antibiotics, have gathered the interest of the scientific community. Conclusion: Priority should be given to natural or herbal medicinal plants and the therapeutic knowledge of indigenous peoples, as these can serve as remedial treatments to mitigate antimicrobial resistance (AMR). Keywords: Antimicrobial, phytochemicals, awareness, medicinal plant.</p>
63.	<p><b>DEVELOPMENT AND EVALUATION OF NOVEL FORMULATION OF CHEBULINIC ACID FOR COLON SPECIFIC DRUG DELIVERY.</b></p> <p>Priyanka Vishwas, <u>Isha</u>, Raveen Chauhan, Bigul Yogeshver Bhardwaj, Poonam Negi  <i>School of Pharmaceutical Sciences, Shoolini University of Biotechnology and Management Sciences, Solan, Himachal.</i></p> <p>Pharmacologically active substances such as ellagic acid and chebulinic acid are found in <i>Terminalia chebula</i>, which is utilized extensively in traditional medical systems including Ayurveda, Unani, and homeopathy. Chebulinic acid has great promise for the treatment of gastrointestinal problems because of its antisecretory, antioxidative, and anti-inflammatory effects, which are known to have anti-ulcer</p>

	<p>qualities. However, its hydrophobicity and poor water solubility restrict its usage in medications. By creating alginate microspheres for the targeted therapy of ulcerative colitis, this study sought to increase the effectiveness of chebulinic acid. Guar gum, a natural polymer, was used to compress the tailored microspheres into matrix-forming tablets for medication distribution that was particular to the colon. The successful trapping of chebulinic acid within the microspheres was validated by Fourier Transform Infrared Spectroscopy, X-ray diffraction, differential scanning calorimetry, and particle size analysis. Additional assessments included in vivo testing utilizing an animal model of ulcerative colitis and in vitro release kinetics, which were based on the Peppas model. The spherical shape of the microspheres was verified by scanning electron microscopy, and in the ulcerative colitis model, the chebulinic acid-loaded matrix tablets produced better therapeutic results than the pure substance. This study shows that chebulinic acid-loaded microspheres, administered in matrix tablets made of guar gum, have the potential to be a successful treatment for colonic diseases, especially ulcerative colitis. Keywords: Chebulinic acid, ulcerative colitis, microspheres, matrix tablet, sodium alginate, guar gum.</p>
64.	<p><b>A COMPREHENSIVE REVIEW ON DIABETES INDUCED VASCULAR DEMENTIA</b></p> <p><u>Kirti Kumari</u>  <i>Department of Pharmaceutical Sciences, Guru Jambheshwar University of Science and Technology, Hisar Haryana.</i></p> <p>Vascular dementia is the second most common form of dementia, resulting from impaired cerebral blood flow to the brain, often due to stroke or other vascular issues. Risk factors include hypertension, diabetes, hyperlipidaemia, smoking, and heart disease. Vascular dementia often exacerbated by conditions such as diabetes. The streptozotocin (STZ) model has emerged as a crucial tool for studying vascular dementia mechanisms and potential therapeutic interventions. This study investigates the neurobiological effects of intracerebral STZ administration, which induces a diabetic state and mimics vascular cognitive impairment in rodent models. We observed that STZ treatment led to significant oxidative stress, inflammation, and disruption of the blood-brain barrier, resulting in cognitive deficits characterized by impaired learning and memory. Behavioural assessments demonstrated marked declines in performance on spatial navigation tasks. Diagnosis involves a comprehensive clinical assessment, including neuropsychological testing and neuroimaging techniques such as MRI or CT scans, these findings underscore the complex interplay between metabolic dysregulation and neurovascular integrity in the pathogenesis of vascular dementia. Furthermore, potential therapeutic strategies, including antioxidant treatments and anti-inflammatory agents, were explored, showing promise in alleviating cognitive decline. This research highlights the STZ model as a valuable platform for advancing our understanding of vascular dementia and developing targeted therapies.</p>
65.	<p><b>DEVELOPMENT OF ELASTIC NIOSOMAL GEL FOR TOPICAL DELIVERY OF PIROXICAM</b></p> <p>Anshu Sharma, <u>Lakshika</u>, Hemlata Kaurav, Deepak N Kapoor  <i>School of Pharmaceutical Sciences, Shoolini University of Biotechnology and Management Sciences, Solan, Himachal.</i></p>

	<p>The present study aimed to prepare and evaluate elastic niosomal gel of piroxicam. Elastic niosomes are capable to entrap both lipophilic and hydrophilic drugs and can penetrate across the skin more efficiently in comparison to conventional formulations and niosomes. Piroxicam loaded elastic niosomes were prepared by thin film hydration and ether injection method using span 60, cholesterol, ethanol, drug (piroxicam), and buffer. The formulations were characterized for entrapment efficiency (%EE), particle size, and microscopy. Based on the results of particle size, zeta potential, PDI and %EE, the selected elastic niosomal formulations were observed for vesicle formation by transmission electron microscope (TEM). Piroxicam entrapped elastic niosomal gel was prepared and evaluated for pH, viscosity and ex-vivo permeation studies. Finally, in-vivo studies were performed by carrageenan induced paw edema method to compare the anti-inflammatory activity of the formulated piroxicam entrapped elastic niosomal gel and marketed anti-inflammatory (piroxicam) gel formulation. The piroxicam entrapped elastic niosomal gel sufficiently reduced the edema and revealed prolonged therapeutic action vis-a-vis marketed anti-inflammatory (piroxicam) gel formulation.</p>
66.	<p><b>MICRONEEDLING AND PLASMA THERAPY: A REVOLUTIONARY APPROACH TO FACIAL REJUVENATION</b></p> <p><u>Manisha</u>  <i>Department of Pharmaceutical Science, Kurukshetra University, Kurukshetra, Haryana.</i></p> <p>Microneedling and Plasma therapy works by combining two high-end treatments to revolutionize the way to refresh a face, as well as improve your skin condition. A revolutionary face rejuvenating method, microneedling and plasma treatment combines the best of both cutting-edge treatments to help you look younger while improving your skin health. Microneedling is a minimally invasive treatment that uses tiny needles to create micro-injuries, which trick the body into setting up its own regenerative healing mechanisms, including producing more collagen and elastin in skin. This method helps topically administered Plasma therapy, oftentimes created from the patient's blood itself has growth factors and proteins that support tissues to regenerate faster and helps in healing. The plasma is then applied to the freshly microneedled skin so that it can penetrate deeper and help rejuvenate your complexion. Clinical studies have shown that when used alone microneedling and plasma treatment can significantly improve skin tone, reduce fine lines and enhance the quality of your complexion. Technology plays its role in all different fields, and similarly microneedling combined with plasma treatment is another innovation to renew the skin. It is good for those people who are now less willing for surgical approaches. This presentation is instrumental in demonstrating how this treatment algorithm can be used to alter facial aesthetics, and increase patient satisfaction in cosmetic dermatology.</p>
67.	<p><b>ELECTROSPINNING - THE TECHNIQUE AND APPLICATIONS</b></p> <p><u>Nikita Devi</u><sup>1</sup>, <u>Munish Ahuja</u><sup>2</sup>  <sup>1</sup><i>Department of Pharmaceutical Sciences, Guru Jambheshwar University of Science and Technology, Hisar Haryana,</i> <sup>2</sup><i>Department of Pharmaceutical Sciences, Guru Jambheshwar University of Science and Technology, Hisar Haryana.</i></p> <p>Electrospinning is a versatile and cost-effective technique for producing nanofibers with high porosity and a large surface area, offering wide-ranging applications in</p>

	<p>fields such as tissue engineering, drug delivery, wound dressings, and membrane technologies. Electrospinning is a fibre production method characterized by an electrohydrodynamic process in which electric potential controls a jet of extruded polymer, hence permitting the synthesis of continuous fibres in the micro and nanoscale. Over 200 polymers have been electrospun to date, and the list continues to grow. This study gives an in-depth look at the principles, materials, and methods of electrospinning, detailing the process where high-voltage electric fields are applied to polymer solutions or melts to form fibers with diameters ranging from nanometers to micrometers. Key innovations include the development of porous, hollow, aligned, and core-shell nanofibers tailored for specific applications. The ability to fine-tune fiber dimensions and morphology through parameter control has expanded electrospinning's potential, especially with the incorporation of functional fillers. Applications span biomedical devices, filtration systems, energy storage, and sensors. Finally, the highlights are the future outlook for electrospinning, focusing on upscaling production, sustainable manufacturing, and addressing current technological challenges. This abstract summarizes the core aspects of electrospinning and touches on the future perspectives that could appeal to the audience of researchers in your field.</p>
68.	<p><b>GREEN CHEMISTRY</b></p> <p><u>Nitin</u>  <i>Department of Pharmaceutical Sciences, Guru Jambheshwar University of Science and Technology, Hisar Haryana.</i></p> <p>Green Chemistry, an innovative and sustainable approach to chemical design and production, has emerged as a pivotal discipline in response to environmental concerns. This abstract provides an overview of the key principles and applications of Green Chemistry, highlighting its pivotal role in mitigating the environmental impact of traditional chemical processes. The 12 principles of Green Chemistry, emphasizing waste reduction, the use of renewable resources, and the development of energy-efficient methodologies, serve as a foundation for eco-friendly practices. Green Chemistry not only seeks to minimize the generation of hazardous by-products but also strives to improve the efficiency and safety of chemical processes. The abstract explores the broader implications of Green Chemistry in fostering a circular economy, where the concept of waste is minimized through the recycling and reuse of materials. Additionally, the abstract touches upon the economic benefits and industrial relevance of adopting Green Chemistry practices, underscoring its potential to drive innovation and create sustainable solutions for global challenges. In conclusion, the abstract underscores the significance of Green Chemistry as a transformative and imperative approach for achieving a harmonious balance between chemical advancements, economic prosperity, and environmental preservation. The adoption of Green Chemistry principles holds promise for a more sustainable and resilient future, aligning industrial practices with the overarching goal of environmental stewardship.</p>
69.	<p><b>BIOLOGICAL SIGNIFICANCE OF QUINOLINES DERIVATIVES</b></p> <p><u>Rajat Sheokand</u>  <i>Department of Pharmaceutical Sciences, Guru Jambheshwar University of Science and Technology, Hisar Haryana.</i></p> <p>Quinolines and their derivatives constitute a versatile class of organic compounds with a myriad of pharmacological activities, ranging from anti-malarial and anti-</p>

	<p>inflammatory to anti-cancer properties. This abstract provides a succinct overview of the chemical structure, synthesis, and diverse pharmacological applications of quinolines and their derivatives. The core structure of quinolines, characterized by a benzene ring fused to a pyridine ring, serves as a scaffold for the synthesis of various derivatives. The synthesis methods often involve modifications to the substituents on the quinoline ring, leading to compounds with enhanced bioactivity and altered pharmacokinetic profiles. Quinolines have garnered significant attention in medicinal chemistry due to their anti-malarial properties, exemplified by chloroquine and its derivatives. Moreover, the anti-inflammatory effects of certain quinoline derivatives have been explored in conditions like rheumatoid arthritis. Additionally, quinoline-based compounds exhibit promising anti-cancer activities, making them subjects of intense research for potential oncological therapeutics. This abstract highlights the versatility and medicinal significance of quinolines and their derivatives, underscoring their potential as valuable candidates for drug development across various therapeutic domains. The exploration of novel synthetic strategies and continued investigations into their pharmacological mechanisms further contribute to the evolving landscape of quinoline-based pharmaceuticals.</p>
70.	<p><b>GREEN CHEMISTRY IN DRUG DEVELOPMENT</b></p> <p><u>Ravinder Kumar</u>  <i>Department of Pharmaceutical Sciences, Guru Jambheshwar University of Science and Technology, Hisar Haryana.</i></p> <p>The pharmaceutical industry has historically relied on resource-intensive, frequently environmentally hazardous, high-waste, and hazardous by-product procedures. The future of drug development is being increasingly shaped by green chemistry, a method that focusses on sustainability and lowering the environmental impact of chemical processes. In order to minimise waste and lessen harmful environmental impacts, this study emphasises sustainable approaches to medication production and the significance of green chemistry in the pharmaceutical industry. In order to improve process efficiency and atom economy and guarantee that a larger percentage of raw materials are transformed into the intended final products, important tactics include the application of flow chemistry and catalysis. A key role is played by the utilisation of renewable feedstocks, such as materials obtained from biomass and solvent selection frameworks that prioritise ecologically friendly options. Given the amount of solvent waste produced by the pharmaceutical sector, attention to solvent selection and waste minimisation is crucial. Businesses can significantly lessen their environmental effect by recycling solvents, employing greener solvents, and utilising them in less quantities throughout production processes. Designing medications that harmlessly break down in the environment after usage is yet another essential component of sustainability. The use of green chemistry concepts to pharmaceutical synthesis provides a route towards safer, more effective, and cleaner drug development, which in turn helps to save money and conserve the environment. These procedures will become increasingly important as they develop in order to both meet the rising worldwide demand for medications and manage environmental issues.</p>
71.	<p><b>THIAZOLE</b></p> <p><u>Ritu</u>  <i>Department of Pharmaceutical Sciences, Guru Jambheshwar University of Science and Technology, Hisar Haryana.</i></p>

	<p>Thiazole is a heterocyclic compound composed of a five-membered ring containing three carbon atoms, one nitrogen atom, and one sulphur atom. Its chemical structure is represented as C<sub>3</sub>H<sub>3</sub>NS. Thiazole and its derivatives exhibit a wide range of biological activities and have diverse applications in medicinal chemistry, agrochemicals, materials science, and organic synthesis. Thiazole derivatives are synthesized by modifying the thiazole ring structure, often by substituting different functional groups at various positions around the ring. These modifications can alter the compound's physicochemical properties, such as polarity, solubility, and reactivity, as well as its biological activity.</p>
72.	<p><b>TO INVESTIGATE THE EFFECT OF CROSSLINKING STRATEGIES AND TO DEVELOP SYSTEMATICALLY OPTIMIZED SODIUM ALGINATE AND <math>\epsilon</math>-POLYLYSINE BASED HYDROGEL FILMS WITH SUPERIOR PHYSICAL AND MECHANICAL PERFORMANCE</b></p> <p><u>Shagun</u>, Jasleen Kaur Kooner, Parneet Kaur Deol  <i>GHG Khalsa College of Pharmacy Gurusar Sadhar, Ludhiana, Punjab.</i></p> <p>Sodium alginate and <math>\epsilon</math>-polylysine can spontaneously undergo physical crosslinking or can be crosslinked chemically using crosslinkers under favorable condition. The hydrogels thus formed have superior biocompatibility, biomedical safety, and ease of manufacturing but limited biodegradation range and mechanical properties. In the present study, the crosslinking methods (physical and chemical) were evaluated for cross linking and compared for its effect on various physical and mechanical properties of films. Later, best performing film was selected and critical material attributes and critical process attributes were shortlisted via risk assessment studies. Systematic optimisation using Response Surface Optimisation technique was performed to identify best set of factors which yield physically and mechanically superior films. FTIR results revealed that both physical and chemical crosslinking retained the antibacterial activity of <math>\epsilon</math>- polylysine, confirming that cross linking will be favorable for potential application as packaging films or wound dressing material. Chemically cross-linked films were denser and rigid vs physically cross-linked films. Former were subjected to systematic optimisation using Box-Behenken Design. 2D Contour plots and 3D response surface plots reported that crosslinking temperature has negative influence on all the four tested responses (increase % moisture content and % aqueous solubility; decrease WVTR and folding endurance). Further, with increase in <math>\epsilon</math>-PL contribution in polymer mixture, denser and rigid films were fabricated. On the other hand, crosslinker concentration need to be optimal for facilitating fabrication of composite films of required properties.</p>
73.	<p><b>EVALUATION OF ANXIOLYTIC AND LOCOMOTOR ACTIVITY OF ETHANOLIC EXTRACT OF PRUNUS PERSICA LEAVES IN WISTAR RATS</b></p> <p><u>Shalini Thakur</u><sup>1</sup>, Arshdeep Kaur<sup>1</sup>, Jaswinder Kaur<sup>1</sup>, Gurinder Singh<sup>1</sup>  <sup>1</sup><i>G.H.G Khalsa College of Pharmacy Gurusar Sadhar Ludhiana Punjab</i></p> <p>The aim and objective of the present research were to evaluate the anxiolytic and locomotor activity and to investigate several oxidative stress markers of ethanolic extract of Prunus persica leaves. Wistar rats were divided into four groups, with group I receiving no treatment, group II receiving diazepam, and group III and IV administered EEPP (200 and 400 mg/kg, p.o. respectively). The treatment was continued for 8 days. On the 8th day, after 45 mins of treatment, rats were evaluated for anxiolytic activity and locomotor activity, and their brains were homogenized for biochemical parameters assessment. EEPP administration significantly increased</p>

	<p>cumulative time spent and number of entries in open arms and lighted side (<math>P &lt; 0.05</math>) compared to the control group at both tested doses in the elevated plus maze model and light-dark apparatus. In locomotor activity evaluation, treatment with EEPP, at both the tested doses, significantly (<math>P &lt; 0.05</math>) increased the number of mobility counts as compared to the control group. In the neuroprotective assay, treatment with EEPP significantly (<math>P &lt; 0.05</math>) decreased the lipid peroxidation levels while, a significant (<math>P &lt; 0.05</math>) increase in GSH, SOD, and catalase levels was recorded versus the control group. Further, levels of LPO and Catalase recorded in brain homogenates on EEPP treatment, at 400 mg/Kg dose, were comparable to that obtained on treatment with the standard drug, diazepam. Taken altogether, the present study demonstrates that the EEPP leaves have an anxiolytic effect. The drug might act on GABAA receptors to give anxiolytic activity.</p>
74.	<p><b>ARTIFICIAL INTELLIGENCE IN PHARMACEUTICAL RESEARCH @ VIKSIT BHARAT MISSION 2047</b></p> <p><u>Vikas Sain</u>, Kavita Bahmani  <i>Department of Pharmaceutical Sciences, Guru Jambheshwar University of Science and Technology, Hisar Haryana.</i></p> <p>Artificial intelligence emerges as game changer approach in the field of pharmaceutical research. Artificial intelligence helps us in different steps during drug discovery and development like Target identification, Virtual screening, Molecular design, In-silico modeling. Artificial intelligence can be beneficial during clinical trial i.e., Patient recruitment, Data analysis, Predictive modeling. Artificial intelligence can analyze patient specific data to develop personalized treatments plan for patients. Using artificial intelligence we can achieve process optimization, predictive maintenance and supply chain management. The government's vision was to transform Bharat into a developed nation by 2047 i.e., 100th year of independence. The vision of Viksit Bharat 2047 can't be fruitful by not considering pharmaceutical industries. India's pharmaceutical industries was 3rd largest industry in the world, providing generic medicine which was most affordable for global health needs. Cost effective production can be achieved by skilled manpower and ease of availability of patient in India for clinical trails can attract investors to India. India's potential in pharmaceutical research sector requires continued support and investment which can be fulfilled under Viksit Bharat mission 2047. Keywords: Artificial intelligence, pharmaceutical research, Global health, Generic medicine, Viksit Bharat 2047.</p>
75.	<p><b>A COMPREHENSIVE REVIEW ON PARKINSON'S DISEASE</b></p> <p><u>Vinay Verma</u>, Dinesh Dhingra  <i>Department of Pharmaceutical Sciences, Guru Jambheshwar University of Science and Technology, Hisar Haryana.</i></p> <p>Parkinson's disease (PD) is a progressive neurological condition with motor symptoms include tremors, stiffness, bradykinesia, and postural instability. Additionally, non-motor symptoms including cognitive impairment, autonomic dysfunction, and psychiatric manifestations significantly impact patients' quality of life. Despite extensive research, the exact etiology of PD remains elusive, with a complex interplay of genetic, environmental, and cellular factors implicated in its pathogenesis. The primary neuropathological hallmark of PD is the loss of dopaminergic neurons in the substantia nigra pars compacta, accompanied by the formation of intracellular protein aggregates known as Lewy bodies, composed primarily of alpha-synuclein. Parkinson's disease affects approximately 1% of the</p>

<p>global population over the age 60 whereas men are more susceptible than women. Advancements in neuroimaging techniques, such as positron emission tomography (PET) and magnetic resonance imaging (MRI), have contributed to the early diagnosis and monitoring of PD progression. Moreover, novel therapeutic strategies including dopamine replacement therapy, deep brain stimulation, and disease-modifying interventions such as gene therapy, stem cell therapy, immunotherapy and medications like MAO-B inhibitors, dopamine inhibitors that hold promise for improving symptomatic control and potentially altering disease progression. Despite treatments alleviating symptoms, there's no cure, making its progression challenging to manage effectively. Thus, this review targets to spread awareness about the breakthrough treatment approaches for PD.</p>
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# Physical Sciences

- Physics
- Nanoscience & Nanotechnology
- Medical Physics

## **CO-ORDINATORS**

*Sectional President*

**Dr. Jadab Sharma**

**8197651653**

*Sectional Secretary*

**Dr. Akash Katoch**

**945931073**

**CHASCON 2024**  
**NATIONAL CONFERENCE ON**  
***“Indigenous Technologies for Viksit Bharat”***  
**SECTION: PHYSICAL SCIENCES**

**Program (Thursday, November 07, 2024)**  
**Venue: Department of Physics, Panjab University, Sector-14, Chandigarh**

<b>Sectional Coordinator</b> <b>Dr. Jadab Sharma</b> <b>8197651653</b>		<b>Sectional Secretary</b> <b>Dr. Akash Katoch</b> <b>9459631073</b>	
<b>Time</b>	<b>Program</b>		
<b>09:30-10:00</b>	Inauguration of Sectional Program <i>Venue:</i> Auditorium, Department of Physics, Panjab University, Chandigarh		
<b>10:00-11:00</b>	<b>Session Chair:</b> Prof. Surya Kant Tripathi <b>Speaker:</b> Dr. Ujjal K. Gautam Associate Professor, Department of Chemical Science, IISER, Mohali. <i>“The Unique Sillen Aurivillius Phases As ‘Self-Activating’ Catalysts for Energy Harvesting Applications”</i> <i>Venue:</i> Auditorium, Department of Physics, Panjab University, Chandigarh		
<b>11:00-11:30</b>	Tea Break		
<b>11:30-12:30</b>	<b>Session Chair:</b> Prof. Satya Prakash <b>Speaker:</b> Prof. Abir De Sarkar Professor, Department of Quantum Material and Device Unit, Institute of Nano Science and Technology, Mohali. <i>“Computational Perspectives on Energy Conversion and Futuristic Electronics in Selected Functional 2D Materials”</i> <i>Venue:</i> Auditorium, Department of Physics, Panjab University, Chandigarh		
<b>12:30-01:30</b>	Oral Presentation <i>Venue:</i> Auditorium, Department of Physics, Panjab University, Chandigarh		
<b>1:30-2:30</b>	Lunch		
<b>2:30-3:45</b>	Oral Presentation <i>Venue:</i> Auditorium, Department of Physics, Panjab University, Chandigarh		
<b>3:45-4:00</b>	Tea break		
<b>4:00-5:00</b>	Poster Presentation <i>Venue:</i> Department of Physics, Panjab University, Chandigarh		

## KEY SPEAKERS

S.No.	Name of Participant	Affiliating Institution	Title of Abstract
1.	Dr. Ujjal K Gautam	Associate Professor, Department of Chemical Sciences, IISER, Mohali.	<i>The Unique Sillen Aurivillius Phases As 'Self-Activating' Catalysts for Energy Harvesting Applications</i>
2.	Dr. Abir De Sarkar	Professor (Scientist-G / Senior Professor H) & Dean (Faculty), INST, Mohali.	<i>Computational Perspectives on Energy Conversion and Futuristic Electronics in Selected Functional 2D Materials</i>

# THE UNIQUE SILLEN AURIVILLIUS PHASES AS 'SELF-ACTIVATING' CATALYSTS FOR ENERGY HARVESTING APPLICATIONS



Dr. Ujjal K Gautam

Associate Professor, Department of  
Chemical Sciences, IISER, Mohali.

## ABSTRACT

The layered Sillen-Aurivillius (SA) oxyhalides consist of layers of fluorite [Bi<sub>2</sub>O<sub>2</sub>], perovskite [A<sub>n-1</sub>B<sub>n</sub>O<sub>3n+1</sub>], and halide [X] (A: Sr<sup>2+</sup>, Bi<sup>3+</sup>, etc.; B: Nb<sup>5+</sup>, Ta<sup>5+</sup>, etc.; *n* = 1,2,3, etc.). Their many advantages include, besides immense structural flexibility, a high photostability and a narrow band gap (~2.5 eV). Using these materials, in this talk, I will counter two common notions: (i) that all photocatalysts degrade upon use by taking two reactions: H<sub>2</sub>O<sub>2</sub> photo-production and rhodamine-B (RhB) photo-degradation; (ii) that the RhB-degradation lacks any commercial prospects even after 54 years of research by showing that SA phases convert RhB to Rhodamine-110 (Rh110), a highly expensive and important fluorophore and while doing so, it continues to improve its activity for ~300 h due to a leaching induced 'self-activation' process. The commercial production of Rh110 is challenging due to the formation of various side-products originating from the presence of the two labile amino side groups, leading to purification difficulties, low yield, and high costs. We have been able to produce Rh110 from RhB using Bi<sub>4</sub>Ta<sub>0</sub>8Br as a photocatalyst. The catalyst is not just stable over 30 catalytic cycles but also gets activated continuously in successive cycles to produce a reaction yield up to 88%. Similarly, we have used them for the conversion of O<sub>2</sub> from air to H<sub>2</sub>O<sub>2</sub> with a high production rate of ~3 mmol/h/g (17.5% photon conversion). Here too, the catalyst gets consistently activated continuously to increase the H<sub>2</sub>O<sub>2</sub> yield by >200% to 6.5 mmol/h/g, unlike other catalysts for H<sub>2</sub>O<sub>2</sub> production.

- Banoo, M, Sah, A. K.; Roy, R. S.; Kaur, B.; Kommul, B.; Sanyal, D.; Gautam, U. K.\*; A surface reconstruction route for increasingly improved photocatalytic H<sub>2</sub>O<sub>2</sub> production using Sr<sub>2</sub>Bi<sub>3</sub>Ta<sub>2</sub>O<sub>11</sub>Cl, *Chemical Sciences*, 2024 (ASAP, DOI: 10.1039/D4SC04866K)
- Banoo, M.; Chatterjee, K.; Mondal, S.; Vinod, C. P.; Gautam, U. K., A 'self-activating' Bi<sub>3</sub>Ta<sub>0</sub>7–Bi<sub>4</sub>Ta<sub>0</sub>8Br photocatalyst and its use in the sustainable production of pro-fluorophoric rhodamine-110, *Green Chemistry* 2022, 24, 5514-5523.
- Banoo, M.; Roy, R. S.; Bhakar, M.; Kaur, J.; Jaiswal, A.; Sheet, G.; Gautam, U. K., Bi<sub>4</sub>Ta<sub>0</sub>8Cl as a new class of layered perovskite oxyhalide materials for piezopotential driven efficient seawater splitting, *Nano Letters* 2022, 22, 8867-8874.

# BIO-FLAVONOIDS: NATURAL COMPOUNDS WITH PROMISING THERAPEUTIC POTENTIAL FOR PANCREATIC CANCER



Dr. Abir De Sarkar

Professor (Scientist-G / Senior Professor H)  
& Dean (Faculty), INST, Mohali.

## ABSTRACT

Pancreatic cancer is an aggressive malignancy of gastrointestinal tract characterized by poor response to chemotherapy and high rates of relapse. Therefore, it is of urgent need to develop alternative strategies for its treatment. Various natural compounds like flavonoids derived from vegetables, as well as fruits are reported to possess potent antioxidant and anti-cancerous properties and are less toxic than current chemotherapeutic drugs. We studied the anticancer properties of natural flavonoids such as, Fisetin and Morin against pancreatic cancer cells and observed that these compounds bring about significant reduction in cancer associated phenomenon such as epithelial-mesenchymal transition, stemness and invasiveness. These findings collectively suggest that Fisetin and Morin possesses within cancer stem cells. Flavonoids also possess senotherapeutic effect and can reduce the pool of senescent cancer cells; thereby reducing senescence associated secretory factors which play important role in cancer development and progression. Additionally, these compounds possess potential to reduce inflammation, a characteristic pathological feature of pancreatic cancer. This anti-inflammatory effect, coupled with the down-regulation of genes associated with tumorigenic signaling pathways, underscores Fisetin's potential as an anti-tumorigenic agent, particularly in the context of pancreatic cancer. We also observed that these flavonoids target the mitochondrial functions of proliferating pancreatic cancer cells and facilitate their apoptosis. These observations suggest that combining the bioflavonoids with standard chemotherapy for pancreatic cancer can potentiate the specificity of currently used chemotherapeutic agents.

ABSTRACTS OF  
ORAL  
PRESENTATIONS

<b>Physical Sciences- Oral Presentations</b>			
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>			
<b>S.No</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
1.	Dr. Manish Dev Sharma	Department of Physics, Panjab University, Chandigarh.	Modified indigenous techniques for the preparation of monolayered cellular smears.
2.	Dr. Richa Rastogi Thakur	Centre for Nanoscience and Nanotechnology Panjab University, Chandigarh.	Advances in MXene based flexible supercapacitors: A review.
<b>Faculty/Scientists from Colleges and Other Institutions</b>			
<b>S. No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
3.	Dr. Manju	Department of Physics, Central University of Kashmir, Ganderbal, Jammu and Kashmir.	Excitation independent white emission from Ce Dy codoped SrZnO <sub>2</sub> nanophosphors.
4.	Dr. Shubhi Joshi	University of St. Augustine for Health Sciences, Rayat Bahra University, Mohali, Punjab; Department of Biophysics, Panjab University, Chandigarh.	Antibacterial paint additive: A sustainable strategy to prevent hospital-acquired infections.
<b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b>			
<b>Sr. No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>

5.	Mr. Jaideep	Department of Physics, Panjab University, Chandigarh.	Comparative study of multiplicity dependence of $\pi$ , K, and p production in pp collisions at $\sqrt{s} = 13$ TeV using EPOS4 event generator.
6.	Ms. Jaspreet Kaur	Department of Physics, Panjab University, Chandigarh.	Rapid removal of methylene blue from contaminated water using $\text{moo}_3/\text{v}_2\text{o}_5$ nanocomposites by adsorption techniques.
7.	Mr. Mahesh Kumar	Department of Physics, Panjab University, Chandigarh.	Dynamical evolution of the accretion disc associated with binary stellar systems.
8.	Ms. Monika	Energy Research Centre, Panjab University, Chandigarh.	Boron implanted silicon solar cell: X-ray photoelectron spectroscopy study.
9.	Ms. Ritika Charak	Energy Research Centre, Panjab University, Chandigarh.	The future of spintronics: Advancing magnetic tunnel junctions from memory devices to quantum technologies.
10.	Mrs. Ruchika	Panjab University, Chandigarh.	Pervoskite materials in dielectric applications.
11.	Mr. Swadheen Bharat	Department of Physics, Panjab University, Chandigarh.	Experimental study of high energy heavy-ion collision.
12.	Mr. Tushar Bhalla	Department of Physics, Panjab University, Chandigarh.	Comparative study of multiplicity dependent analysis of $\pi$ , k, and p in pp collisions at $\sqrt{s} = 13$ tev.
13.	Ms. Yukta Sharma	Department of Physics, Panjab University, Chandigarh.	Study of fusion-fission dynamics for the polonium isotopes.



<b>Research Scholars from Colleges and other Institutions (JRF, SRF, Project Fellow and Post Docs)</b>			
<b>Sr. No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
14.	Mr. Chuni Lal	Department of Physics, Career Point University Hamirpur, Himachal Pradesh.	Electrical and thermal properties of bimetallic nanocomposites: A review.
15.	Ms. Shruti Rialach	Department of Physics and Astronomical Science, Central University, Kangra, Himachal Pradesh.	Electrochemical investigation of dendritic fibrous ceo <sub>2</sub> /amorphous-RGO composites for energy storage applications.
<b>UG/PG Students of Panjab University Campus and Regional Centres</b>			
<b>Sr. No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
16.	Mr. Aman Aeri	Centre for Nanoscience and Nanotechnology, Panjab University, Chandigarh.	Metal chalcogenides-based nanomaterial for photodetector applications.
17.	Mr. Armeen Singh	Punjab Engineering College, Chandigarh.	Effect of carbon quantum dots on efficiency of dye-sensitized solar cells.
18.	Ms. Khushi Singla	Department of Physics, Panjab University, Chandigarh.	Vertexing in electron-proton/ion collider (epic).
19.	Ms. Vanshika Rana	Department of Physics, Panjab University Chandigarh.	Experimentally creating entangled states of photons.

<b>Abstract File</b>	
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>	
<b>S. No.</b>	<b>Abstract</b>
1.	<p><b>MODIFIED INDIGENOUS TECHNIQUE FOR THE PREPARATION OF MONOLAYERED CELLULAR SMEARS</b></p> <p>Shelly Sharma<sup>1</sup>, <u>Manish Dev Sharma</u><sup>2</sup>  <sup>1</sup> <i>Department of Cytology, Postgraduate Institute of Medical Education and Research, Chandigarh,</i> <sup>2</sup> <i>Department of Physics, Centre of Advance Study, Panjab University, Chandigarh.</i></p> <p>Monolayered cellular smears are prepared by various commercially available techniques available these days but all these techniques are costly and involve sophisticated instrumentation. Such techniques cannot be easily installed in low resource settings and remote laboratories. So, to overcome all these difficulties, we have standardized modified Millipore technique. This technique is relatively very simple and produces good results with minimal instrumentation and can be installed in low resource settings. The modified technique can be applied in body fluids, FNAC as well as cervical samples. The modified indigenous technique can be utilized as a liquid based cytology tool to make monolayered cellular smears. This innovative and novel technique can be utilized in routine laboratory for preparing single layered cellular smears in remote areas and in laboratories where there is limited workload, could be a useful indigenous technique nowadays.</p>
2.	<p><b>ADVANCES IN MXENE BASED FLEXIBLE SUPERCAPACITORS: A REVIEW</b></p> <p><u>Richa Rastogi</u>  <i>Centre for Nanoscience and Nanotechnology, Panjab University, Chandigarh.</i></p> <p>Our day today life is surrounded by the use of electronic gadgets. With increasing demand of portable, and wearable electronics research is gearing up in direction of more sustainable solutions for energy storage. Supercapacitors are offering great advantages in terms of long cycle life, high bendability, and safety and emerging as the sustainable solutions. MXenes, a distinctive class of 2D materials known for their exceptional physiochemical properties, have gained significant attention as promising electrode materials for supercapacitors. This comprehensive review addresses the current research on MXene-based flexible supercapacitors. Recent advances in flexible electrode fabrication utilizing MXene and their integration into supercapacitor are examined, considering different electrode materials and different flexible substrates.</p>

	<p>The review encompasses the fabrication techniques, electrochemical performance, and influential factors associated with MXene-based flexible SCs, providing a detailed analysis of their potential and performance. Finally, the review identifies challenges and prospects in this emerging field, charting a course for further advancements and applications of MXenes in supercapacitors.</p>
<p><b>Faculty/Scientists from Colleges and Other Institutions</b></p>	
<p>3.</p>	<p><b>EXCITATION INDEPENDENT WHITE EMISSION FROM CE DY CODOPED SRZNO2 NANOPHOSPHORS</b></p> <p><u>Manju</u><sup>1</sup>, Govind Gupta<sup>2</sup>, Parasmani Rajput<sup>3</sup>, Ankush Vij<sup>4</sup>, Anup Thakur<sup>5</sup>  <sup>1</sup> Department of Physics, Central University of Kashmir, Ganderbal, Jammu and Kashmir, <sup>2</sup> Sensor Devices and Metrology Group, Council for Scientific and Industrial Research, National Physical Laboratory, Dr. K S Krishnan Road, New Delhi, <sup>3</sup> Beamline Development and Application Section, Bhabha Atomic Research Centre, Trombay, Mumbai <sup>4</sup> Department of Physics and Astrophysics, Central University of Haryana, Mahendragarh, Haryana, <sup>5</sup> Advanced Materials Research Lab, Department of Physics, Punjabi University, Patiala, Punjab.</p> <p>The present study reports white emission from Ce Dy codoped SrZnO<sub>2</sub> system when excited with various wavelength (270, 325 and 375 nm). From previous investigations, Dy doping exhibited host controlled cool and cold white emission from dopant energy levels and host defect levels when excited at charge transfer band and host absorption band, respectively (J. Phys. Condens. Matter 33, 035703 (2021)). Whereas, Ce doping resulted in fast blue emission through charge transfer excitation of mixed valence states (3+ and 4+) of Ce in the system (Appl. Phys. Lett. 119, 121108 (2021)). Upon co-doping, it was observed from X-ray absorption near edge structure of Ce L<sub>3</sub> edge and O K edge that Ce is exhibiting mixed valence state and OK edge did not show any pre-edge feature due to Ce 4f levels below the conduction band. Photoluminescence excitation spectra exhibited three prominent absorption bands (270, 325 and 375 nm), excitation upon which resulted in emission from Ce and Dy energy levels, overlapped on host defect related emission. However, the relative intensity of these emissions was found to be varying upon varying the excitation wavelength. The overall emission was observed in white region of colour chromaticity diagram, irrespective of excitation energy, with slight variation in colour correlated temperature. The schematic band diagram is proposed to comprehend the speculated route of emission at different wavelengths. The combined analyses are beneficial in predicting the applicability of Ce Dy codoped SrZnO<sub>2</sub> system for white lighting applications.</p>
<p>4.</p>	<p><b>ANTIBACTERIAL PAINT ADDITIVE: A SUSTAINABLE STRATEGY TO PREVENT HOSPITAL-ACQUIRED INFECTIONS</b></p>

Shubhi Joshi<sup>1</sup>, Deeksha Sharma<sup>2</sup>, Gaurav Verma<sup>2</sup>, Avneet Saini<sup>3</sup>

<sup>1</sup>University of St. Augustine for Health Sciences, Rayat Bahra University, Mohali, Punjab, <sup>3</sup>Department of Biophysics, Panjab University, Chandigarh, <sup>2</sup> Dr. Shanti Swarup Bhatnagar University Institute of Chemical Engineering and Technology, Panjab University, Chandigarh, <sup>3</sup> Department of Biophysics, Panjab University, Chandigarh.

Contaminated surfaces serve as reservoirs for pathogenic microorganisms, significantly contributing to the spread of infectious diseases. Despite their seemingly clean appearance, surfaces such as walls, floors, medical devices, doorknobs and other fomites frequently harbour bacterial colonies. These colonies, imperceptible to the naked eye, play a pivotal role in the transmission of healthcare-associated infections (HAIs), which are among the primary causes of extended hospital stays and increased mortality rates worldwide. Addressing microbial contamination on such surfaces is not only crucial for infection control but also for reducing the heavy burden on healthcare systems and improving patient outcomes. To address this, a sustainable nano formulation as an antibacterial additive for acrylic wall paint was developed conjugating a 15 amino acid long synthetic antimicrobial peptide with reduced graphene oxide (Indian Patent Office, Application No. 202211011934 A). Further, the nano formulation was evaluated for its potential as an antibacterial additive in water-borne indoor paint. The modified paint was evaluated for its in-vitro anti-bacterial efficacy against different bacterial pathogens that cause HAIs. The modified paint demonstrated consistent effectiveness, regardless of variations in environmental factors such as pH, temperature and duration. In addition to this, the modified paint displayed two-fold increase in antibacterial efficacy against Gram-positive (*Bacillus subtilis* and *Staphylococcus aureus*) and Gram-negative (*Escherichia coli* and *Salmonella Typhi*) bacteria as compared to commercial antimicrobial paint. These results affirm that the peptide-RGO paint additive is a sustainable approach for preventing bacterial adherence to surfaces, resulting in reduced indoor bacterial air load and lower incidences of HAIs.

**Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)**

5.	<p><b>COMPARATIVE STUDY OF MULTIPLICITY DEPENDENCE OF <math>\pi</math>, K, AND P PRODUCTION IN PP COLLISIONS AT <math>\sqrt{s} = 13</math> TEV USING EPOS4 EVENT GENERATOR</b></p> <p><u>Jaideep Tanwar</u>, Lokesh Kumar  <i>Department of Physics, Panjab University, Chandigarh.</i></p> <p>We present a comparative study of the multiplicity dependence of <math>\pi^\pm</math>, <math>K^\pm</math>, and <math>p/\bar{p}</math> production in pp collisions at <math>\sqrt{s} = 13</math> TeV using the EPOS4 event generator. EPOS4 is a sophisticated high-energy physics model that incorporates hydrodynamic evolution and parton interactions, allows detailed simulations of particle production mechanisms in these collisions. The generated results are compared with ALICE data from the Large Hadron Collider (LHC). This study highlights the interplay between hydrodynamic evolution in the core, multiple parton scattering in the corona, and saturation effects, while accounting for the ALICE detector's configuration and calibration. The analysis is performed at mid-rapidity (<math> y  &lt; 0.5</math>) within the EPOS4 framework. The transverse momentum (<math>p_T</math>) spectra for <math>\pi^\pm</math>, <math>K^\pm</math>, and <math>p/\bar{p}</math> at various centralities are compared with pp <math>\sqrt{s} = 13</math> TeV data from ALICE. Additionally, the <math>p_T</math>-integrated particle yield ratios as a function of multiplicity are examined. The study provides insights into the impact of hydrodynamic evolution, parton saturation, and multiple parton scattering on particle production. The findings underscore EPOS4's ability to capture key physical processes and demonstrate its predictive power in modelling high-energy pp collisions.</p>
6.	<p><b>RAPID REMOVAL OF METHYLENE BLUE FROM CONTAMINATED WATER USING MOO3/V2O5 NANOCOMPOSITES BY ADSORPTION TECHNIQUES</b></p> <p><u>Jaspreet Kaur</u>, Rajesh Kumar  <i>Department of Physics, Panjab University, Chandigarh.</i></p> <p>In this study, we synthesized MoO<sub>3</sub>/V<sub>2</sub>O<sub>5</sub> nanocomposites (NCs) with different weight ratios of Mo to V precursors by using a straightforward sol-gel method. The nanocomposites were characterized using X-ray Diffraction, Raman Spectroscopy, Field Emission Scanning Electron Microscopy, High Resolution Transmission Electron Microscope, Zeta Potential and Brunauer-Emmett-Teller &amp; Barrett-Joyner-Halenda to analyse their structural, functional groups, morphology, and surface properties. The optimized percentage weight ratio was approximately 50 wt.% MoO<sub>3</sub>/V<sub>2</sub>O<sub>5</sub>, demonstrating outstanding adsorption performance results with faster treatment. The negative surface charge on the surface of NCs enables effective attraction and removal of cationic Methylene Blue (MB) dye through electrostatic interactions. The maximum achieved adsorption capacity of MoO<sub>3</sub>/V<sub>2</sub>O<sub>5</sub> NCs was 737.6 mg/g. Kinetic and isotherm model studies indicated that the adsorption of MB on MoO<sub>3</sub>/V<sub>2</sub>O<sub>5</sub> NCs adhered to the Pseudo-second-order model and was consistent</p>

	<p>with the Langmuir isotherm, respectively. Furthermore, the material exhibited excellent recyclability with minimal loss even after five cycles. Experimental investigations have been conducted on actual real wastewater to assess the efficacy of adsorption as a treatment method, resulting its effectiveness in removing various pollutants and highlighting its practical applicability in real-world scenarios.</p>
7.	<p><b>DYNAMICAL EVOLUTION OF THE ACCRETION DISC ASSOCIATED WITH BINARY STELLAR SYSTEMS</b></p> <p><u>Mahesh Kumar</u>, Sandeep Sahijpal  <i>Department of Physics, Panjab University, Chandigarh.</i></p> <p>We have developed N-body numerical simulation code for the dynamical evolution of the circumstellar accretion disc associated with binary stars. The simulations were performed by taking into account the gravitational interaction of the two stars with the test mass particles introduced within the accretion disc. The code was developed on a parallel processor platform. The preliminary results will be presented in the talk.</p>
8.	<p><b>BORON IMPLANTED SILICON SOLAR CELL: X-RAY PHOTOELECTRON SPECTROSCOPY STUDY</b></p> <p><u>Monika Verma</u><sup>1</sup>, Sanjeev Gautam<sup>2</sup>, Devarani Devi Kshetrimayum<sup>3</sup>, Ram Charan Meena<sup>3</sup>, Bibek Ranjan Suvankar Chakraverty<sup>4</sup>, K.H. Chae<sup>5</sup>  <sup>1</sup><i>Energy Research Centre, Panjab University, Chandigarh,</i> <sup>2</sup><i>Dr. Shanti Swarup Bhatnagar University Institute of Chemical Engineering and Technology, Panjab University, Chandigarh,</i> <sup>3</sup><i>Inter University Accelerator Centre, New Delhi,</i> <sup>4</sup><i>Institute of Nano Science and Technology, Mohali, Punjab,</i> <sup>5</sup><i>Korea Institute of Science and Technology, South Korea.</i></p> <p>Silicon solar cell formed by p-n junction led to generation of electron-hole pair when light fall on it, and its mechanism in transport properties decide its quantum efficiency. In this research, the p-n junction layer is fabricated by the ion-implantation, where the implantation of boron ions into p-type Si (100) substrates with energy and fluences at 35 keV and 1e14, 1e15, 1e16 ions/cm<sup>2</sup>, respectively. Formation of silicon dioxide on the surface of implanted samples occurred due to reactive nature of silicon was chemically etch out using the nitric acid (70%) 5 ml and hydrofluoric acid (49%) 3 ml for 10 minutes to remove the surface silicon dioxide. X-ray diffraction (XRD) and Rutherford backscattering spectroscopy (RBS), although crucial for determining the crystal structure and thin film thickness, were insufficient to detect boron in the silicon lattice due to their limitation. The presence of implanted boron was detected using X-ray photoelectron spectroscopy (XPS), a sensitive surface analysis technique that confirmed the incorporation of boron into the silicon matrix. Formation of various of oxidation states in the Silicon 2p scan confirmed the presence of boron, with shifting towards higher binding energy leading to the higher oxidation states. XPS of boron 1s</p>

	<p>scans also agreed with the results, as the fluence of boron in silicon increases, shifting towards higher binding energy take place. Therefore, the XPS technique is efficient for the detection of dopants at 1000 ppm level, as compared to XRD, RBS, etc.</p>
9.	<p><b>THE FUTURE OF SPINTRONICS: ADVANCING MAGNETIC TUNNEL JUNCTIONS FROM MEMORY DEVICES TO QUANTUM TECHNOLOGIES</b></p> <p><u>Ritika Charak</u>, Sanjeev Gautam  <i>Energy Research Centre, Panjab University, Chandigarh.</i></p> <p>Magnetic tunnel junctions (MTJs) are key components driving the future of spintronics, offering promising applications in data storage, sensors, and energy-efficient electronics. MTJs exploit the tunnelling magnetoresistance (TMR) effect, where electron spin orientation across a thin insulating barrier between two ferromagnetic layers controls the resistance. This makes them ideal for high-speed, non-volatile memory devices such as magnetic random-access memory (MRAM), providing improved data retention, faster switching, and lower power consumption compared to traditional technologies. In addition to established applications, MTJs show immense potential in emerging fields such as quantum computing, neuromorphic systems, and flexible electronics. For instance, spin-transfer torque (STT) and voltage-controlled magnetic anisotropy (VCMA) technologies are opening new pathways for low-power, scalable MTJs in quantum information processing. MTJs are also critical in spin-based logic circuits, enabling the integration of storage and computing within the same architecture, leading to energy-efficient, high-density computing systems. However, challenges remain in improving the efficiency, stability, and manufacturing processes of MTJs for widespread adoption. This presentation will outline both the opportunities and obstacles in bringing MTJ-based spintronics to the forefront of modern technology, highlighting key research directions that will shape its future.</p>
10.	<p><b>PEROVSKITE MATERIALS IN DIELECTRIC APPLICATIONS</b></p> <p><u>Ruchika</u>, Manish Dev Sharma  <i>Panjab University, Chandigarh.</i></p> <p>Perovskites, a class of materials with the general formula <math>ABX_3</math>, have been extensively studied due to their exceptional structural flexibility and highly tunable properties. Named after the mineral perovskite (<math>CaTiO_3</math>), these materials exhibit a distinctive crystal structure, which consists of a large cation at the A-site, a smaller cation at the B-site, and an anion (usually oxygen) at the X-site. This simple structure offers a wide</p>

	<p>variety of compositional substitutions, allowing for extensive modification of electrical, optical, and thermal properties. One of the most promising areas of application for perovskites is in energy storage devices, particularly as dielectric materials for capacitors, where their high dielectric constants and low losses are highly desirable. Integrating perovskite materials into next-generation energy storage systems, such as hybrid capacitors or solid-state batteries, holds great promise. The continued exploration of doping strategies, composite designs, and nano structuring techniques will likely lead to even greater improvements in perovskite materials' dielectric properties and energy storage capabilities.</p>
11.	<p><b>EXPERIMENTAL STUDY OF HIGH ENERGY HEAVY-ION COLLISION</b></p> <p><u>Swadheen Bharat</u>, Lokesh Kumar  <i>Department of Physics, Panjab University, Chandigarh.</i></p> <p>To get the overview of the early universe and study the strong force, particle accelerators at LHC and RHIC are dealing with ultra relativistic collisions between heavy nuclei; which results in the formation of Quark Gluon Plasma (QGP). Studying this fluid helps to predict the state of nuclear matter at temperatures similar to that of the early universe. Quarks are the building blocks of hadrons. Gluon is the mediating particle of strong nuclear force. QGP is a state of matter in which quarks and gluons are no longer confined in hadrons but instead behave quasi freely over a relatively large volume. A heavy ion collision is a head-on smash up between two very heavy nuclei, like gold (Au), lead (Pb), etc. at incredibly high speeds. Each incident nucleus is a Lorentz contracted disc. We can't directly observe QGP, so we look for specific signatures in the aftermath of the collision. These signatures show the effect of QGP, such as jet quenching, strangeness enhancement, <math>J/\Psi</math> suppression, direct photons etc. The phase diagram of QCD is a study of the baryon-chemical potential (<math>\mu_B</math>) vs the temperature (T). Ultra- relativistic collisions between heavy nuclei give rise to the production of a lot of particles. These particles come in all different flavors such as resonance, strange, light flavor hadrons, and also the (anti-) nuclei etc.</p>
12.	<p><b>COMPARATIVE STUDY OF MULTIPLICITY DEPENDENT ANALYSIS OF <math>\Pi</math>, K, AND P IN PP COLLISIONS AT <math>\sqrt{s} = 13</math> TEV</b></p> <p><u>Tushar Bhalla</u>, Lokesh Kumar  <i>Department of Physics, Panjab University, Chandigarh.</i></p> <p>Primary particle production in heavy-ion collisions provides crucial insights into the underlying collision mechanisms. In this work, we use PYTHIA8, a multi-purpose Monte Carlo event generator, to investigate the impact of tuning the PYTHIA model on production of <math>\pi^\pm</math>, <math>K^\pm</math>, and <math>p/p^-</math> as a function of charged-particle multiplicity density in proton-proton (pp) collisions at <math>\sqrt{s} = 13</math>TeV. The generated results are compared with ALICE data from the LHC. This study highlights the importance of model tuning, particularly in relation to the ALICE detector configuration and calibration. The</p>



	<p>analysis is conducted at mid rapidity (<math> y  &lt; 0.5</math>) for three PYTHIA tunes: Monash CR, Monash NoCR and Color Ropes, each based on different physics models, such as Color Reconnection and Rope Hadronization mechanisms. The pT spectra for <math>\pi</math>, K, and p for various centralities are compared with pp <math>\sqrt{s} = 13</math> TeV data. Additionally, pT-integrated particle yield ratios, mean pT and strangeness enhancement as a function of multiplicity are examined. The study discusses the effect of Color Reconnection and Rope Hadronization on various physical observables, giving a better understanding of these mechanisms in the lines with PYTHIA tuning. Finally, our findings underline the scope of improving the tunes further to achieve better agreement with experimental data, which could enhance the predictive power of Monte Carlo simulations.</p>
13.	<p><b>STUDY OF FUSION-FISSION DYNAMICS FOR THE POLONIUM ISOTOPES</b></p> <p><u>Yukta Sharma</u>, N.K. Rai, B.R. Behera <i>Department of Physics, Panjab University, Chandigarh.</i></p> <p>Study of fusion-fission dynamics helps in synthesis of superheavy elements and understanding nucleosynthesis. We intend to probe the impact of factors such as collective enhancement of level density, orientation degree of freedom of the compound nucleus spin and shell effect in level density on the evolution of compound nucleus. Theoretical calculations using statistical model incorporating Kramer's fission width and based on Monte Carlo sampling techniques are performed for pre-scission neutron multiplicity (Mpre). In the present study we consider Polonium isotopes populated by <math>48\text{Ti} + 144\text{Sm}</math>, <math>48\text{Ti} + 154\text{Sm}</math>, <math>12\text{C} + 194,198\text{Pt}</math>, and <math>18\text{O} + 192\text{Os}</math> at various excitation energy. Dissipation factor is used to reproduce existing experimental data of Mpre. We analyse the role of N/Z ratio and shell closure for our system at similar excitation energy(<math>E^*</math>) and the trend of Mpre with <math>E^*</math>. Also, the impact of entrance channel in deciding the fate of compound nucleus is studied. Results show that experimental data is underestimated by exclusion of each effect which is dependent on energy. In this presentation, we will discuss these theoretical results, compare them with experimental data, and explore the impact of the aforementioned factors on the fusion-fission dynamics.</p>
<p><b>Research Scholars from Colleges and other Institutions (JRF, SRF, Project Fellow and Post Docs)</b></p>	
14.	<p><b>ELECTRICAL AND THERMAL PROPERTIES OF BIMETALLIC NANOCOMPOSITES: A REVIEW</b></p> <p><u>Chuni Lal</u>, Naveen Thakur <i>Department of Physics, Career Point University, Hamirpur, Himachal Pradesh.</i></p> <p>Bimetallic nanocomposites, composed of two different metals at the nanoscale, exhibit</p>

	<p>unique properties arising from the synergistic interactions between the metals, enabling superior conductivity and thermal management. The synthesis techniques employed for producing these nanocomposites emphasizing their influence on the structural and functional attributes of the materials. The electrical properties are critically analysed, focusing on factors such as electron mobility, resistivity, and the role of interfacial interactions in enhancing electrical conductivity. The review highlights how these enhancements facilitate advancements in applications such as sensors, photovoltaic devices, and energy storage systems. The thermal properties of bimetallic nanocomposites are explored, particularly their thermal conductivity and stability. The impact of nanoscale effects on heat dissipation and thermal expansion behaviour is discussed, demonstrating the potential of these materials for thermal management in electronic devices and other applications.</p>
15.	<p><b>ELECTROCHEMICAL INVESTIGATION OF DENDRITIC FIBROUS CeO<sub>2</sub>/AMORPHOUS-RGO COMPOSITES FOR ENERGY STORAGE APPLICATIONS</b></p> <p><u>Shruti Rialach</u><sup>1</sup>, Sanjeev Gautam<sup>2</sup>, Surinder Paul<sup>1</sup>, Navdeep Goyal<sup>3</sup>  <sup>1</sup><i>Department of Physics and Astronomical Science, Central University, Kangra, Himachal Pradesh,</i> <sup>2</sup><i>Advanced Functional Materials Lab, Dr. Shanti Swaroop Bhatnagar University Institute of Chemical Engineering and Technology, Panjab University, Chandigarh,</i> <sup>3</sup> <i>Department of Physics, Panjab University, Chandigarh.</i></p> <p>The growing demand for advanced energy storage solutions calls for the creation of novel materials with strong structural integrity and mechanical durability. This study focuses on the synthesis and characterization of dendritic fibrous cerium oxide/amorphous-reduced graphene oxide (CeO<sub>2</sub>/a-rGO) composites derived from cerium-based metal-organic frameworks (Ce-MOFs) combined with graphene oxide (GO) via thermal treatment. Two distinct organic ligands were used to prepare Ce-MOF/GO precursors, which were annealed at 500 °C to produce CeO<sub>2</sub>/a-rGO composites. X-ray diffraction (XRD) analysis with Rietveld refinement confirmed the formation of fluorite CeO<sub>2</sub>/a-rGO with an average crystallite size of 8.28 nm. High-resolution transmission electron microscopy (HR-TEM) showed well-dispersed fibrous CeO<sub>2</sub> crystallites within the a-rGO matrix. Electrochemical testing, including cyclic voltammetry (CV), galvanostatic charge-discharge (GCD), and electrochemical impedance spectroscopy (EIS), demonstrated that CeO<sub>2</sub>/a-rGO achieved a specific capacitance of 1195.63 F g<sup>-1</sup> at a current density of 1 A g<sup>-1</sup>, with an energy density of 382.60 Wh kg<sup>-1</sup> at a power density of 4.00 kW kg<sup>-1</sup>. This work highlights the potential of dendritic CeO<sub>2</sub>-based composites for high-performance supercapacitors, offering enhanced charge storage, mechanical strength, and fast charge/discharge capabilities, addressing the rising needs for efficient energy storage.</p>

**UG/PG Students of Panjab University Campus and Regional Centres**

16.	<p><b>METAL CHALCOGENIDES BASED NANOMATERIAL FOR PHOTODETECTOR APPLICATIONS</b></p> <p><u>Aman Aeri</u>, Rohit, Sajjad Hussain, Akash Katoch <i>Centre for Nanoscience and Nanotechnology, Panjab University, Chandigarh.</i></p> <p>Metal chalcogenides have emerged as strong candidates for photodetection applications due to their unique optical and electrical properties. These materials feature wide bandgaps (2.42 eV-3.70 eV), high absorption coefficients, and exceptional charge transport characteristics, enabling them to detect a broad spectrum of wavelengths, from ultraviolet to infrared. In this study, metal sulphide (Zinc and Cadmium) based chalcogenide was synthesized via chemical reduction method in an inert atmosphere where nitrogen gas was used as the inert gas to prevent contamination from oxygen species and to avoid the formation of any metal oxide traces. The crystallographic characterization of the synthesized product was confirmed through X-ray diffraction (XRD) analysis (ICDD: 49-1302), which verified the formation of a hexagonal crystal structure. Further, the crystallite size calculated using XRD major peak for (100), (002) and (101) was found to be 3 nm. High-resolution transmission electron microscopy analysis revealed the presence of quantum dots (4 nm) and its clusters. Moreover, the presence of nanorods with an average length of 40 nm and a width of 5 nm was also noted. The I-V characteristics were evaluated in both UV light (UV wavelength of 365 nm) and dark conditions. The synthesized metal sulphide (Zinc and Cadmium) based chalcogenide exhibits significant photodetection performance. Key parameters of the photodetector, including sensitivity, responsivity, response time, recovery time, and detectivity, were calculated to evaluate its effectiveness.</p>
17.	<p><b>EFFECT OF CARBON QUANTUM DOTS ON EFFICIENCY OF DYE-SENSITIZED SOLAR CELLS</b></p> <p><u>Armeen Singh</u>, Jaskirat Kaur <i>Punjab Engineering College, Chandigarh.</i></p> <p>Energy is required in every sector of the economy, and to obtain energy, we need resources. These energy sources can be classified into renewable sources and non-renewable sources of energy. Using conventional or non-renewable sources of energy contributes to problems such as global warming and the depletion of fossil fuels, with their prices being subject to demand and supply fluctuations. Transitioning to renewable sources is not without challenges. The most straightforward and practical solution involves the installation of solar cells on unused rooftops. This approach is advantageous due to its ease of installation and low maintenance requirements. Among the three generations of solar cells, the third generation, namely thin film solar cells, is widely studied due to their potential to overcome the Shockley-Queisser limit of 31-</p>

	<p>41% power efficiency. Dye Sensitised Solar Cells (DSSCs) are particularly noteworthy among the third generation due to multiple exciton generation and low cost of manufacturing. Efforts are being made to improve the efficiency of these solar cells. A new class of 0-D materials called Quantum dots are seen as useful way to achieve the same due to their unique electronic and optical properties. Carbon quantum dots, due to their non-toxicity and simpler synthesis methods, present a promising method for achieving higher efficiency and advancing solar technology. Here we dive deeper into methods of preparation, mechanisms and structure of Dye Synthesised solar cells and utilising CQDs to achieve higher efficiency.</p>
18.	<p><b>VERTEXING IN ELECTRON-PROTON/ION COLLIDER (EPIC)</b></p> <p><u>Khushi Singla</u>, Lokesh Kumar  <i>Department of Physics, Panjab University, Chandigarh.</i></p> <p>The electron-Proton Ion Collider (ePIC) is an upcoming experiment at the Brookhaven National Laboratory (BNL), USA where an Electron Ion Collider (EIC) is being built and will replace the Relativistic Heavy Ion Collider (RHIC). EIC will be a discovery machine for unlocking the secrets of "glue" that binds the building blocks of visible matter in the universe. It will be operational around 2030. The ePIC detector's reconstruction software is currently under development in which we are contributing to the Track and Vertex Reconstruction group which focuses on reproducing the vertex of an event occurred in the detector accurately. The main motivation of the work has been to test the current Vertexing algorithm and check its performance by running the algorithm on simulated data similar to what we expect when the detector will become operational. The data has been simulated using PYTHIA8, a Monte Carlo event generator and GEANT4, a geometry and tracking program. The events simulated through these platforms are Deep Inelastic Scattering (DIS) events which are electron-proton collisions at high energies (like 18x275 GeV). The simulated events are reconstructed and the accuracy of the existing reconstruction algorithm is quantified using various parameters. The main parameters for vertexing studies include Vertex Resolution, Vertexing Efficiency and number of tracks associated with the reconstructed vertex. We will discuss these parameters and the current status of the simulation.</p>
19.	<p><b>EXPERIMENTALLY CREATING ENTANGLED STATES OF PHOTONS</b></p> <p><u>Vanshika Rana</u><sup>1</sup>, Kavita Dorai<sup>2</sup>  <sup>1</sup><i>Department of Physics, Panjab University, Chandigarh,</i> <sup>2</sup><i>Indian Institutes of Science Education and Research, Mohali, Punjab.</i></p> <p>Quantum entanglement is the key feature of quantum computing. The major task in a QC is to create and measure these entangled states. Creation of entangled states can be achieved but the tricky part is to measure the entanglement without destroying these</p>

<p>states. Partial transpose is a known mathematical method to estimate entanglement however it is not possible to implement it directly in an experiment. Hence, we use the method of Spatial Physical Approximation to generate and measure these entangled states in NMR Quantum Computer. Here I have done the necessary mathematical calculations and computations of the results so that they can be implemented on a Quantum Computer.</p>
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ABSTRACTS OF  
POSTER  
PRESENTATIONS

<b>Physical Sciences- Poster Presentations</b>			
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>			
<b>S. No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
1.	Dr. Akash Katoch	Centre for Nanoscience and Nanotechnology, Panjab University, Chandigarh.	Porous metal oxide thin films for anti-fingerprint coatings.
2.	Dr. Vivek Kumar	Centre for Medical Physics, Panjab University, Chandigarh.	Artificial intelligence in medical physics.
<b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b>			
<b>S. No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>
3.	Ms. Anureet Kaur	Department of Physics, Panjab University, Chandigarh.	Online monitoring system for the CMS gem detectors.
4.	Mr. Gh Mustafa	Department of Applied Sciences, University Institute of Engineering and Technology, and Department of Physics, Panjab University, Chandigarh.	Investigation of optoelectronic properties of germanium doped $\text{CsPbI}_2\text{Br}$ perovskite using first-principles calculation.
5.	Mrs. Jyoti Kumari	Department of Physics, Centre for Advanced Study in Physics, Panjab University, Chandigarh.	High performing materials for advancement in thermoelectric technology.
6.	Ms. Kashish Verma	Department of Physics, Panjab University Chandigarh.	Applications of machine learning in physics and medicine.
7.	Ms. Komal	Department of Physics, Panjab University, Chandigarh.	Fusion excitation function measurements using CCFULL calculations for $^{28}\text{Si}+^{68,70}\text{Zn}$ systems.

8.	Ms. Neelam Minhas	Department of Applied Sciences, University Institute of Engineering and Technology, and Department of Physics, Panjab University, Chandigarh.	Exploring corrugation effect in planar monolayer graphitic carbon nitride (g-c <sub>3</sub> n <sub>4</sub> ): A DFT study.
9.	Ms. Nimisha Chaudhary	Centre for Nanoscience and Nanotechnology, Panjab University, University Institute of Engineering and Technology, Panjab University, Indian Institutes of Science Education and Research, Mohali.	Directed evolution approach to assess infectivity of SARS-COV-2 variants and the utility of nanobodies.
10.	Mr. Pradyuman	Department of Physics, Panjab University, Chandigarh.	Variable speed of light, gravity and galactic redshift.
11.	Ms. Ritu Rani	Department of Physics, Panjab University, Chandigarh.	Measurements of elastic scattering cross sections for 33.297, 37.761 and 38.776 Kev x-ray photons in elements with $45 \leq z \leq 56$ .
12.	Ms. Riya Gaba	Department of Physics, Panjab University, Chandigarh.	Straw tube trackers for sand in dune and their advantages
13.	Mr. Sahil	Department of Physics, Panjab University, Chandigarh.	Germanium based mixed cation perovskite solar cells: A review.
14.	Ms. Sajal Shradha	Department of Physics, Panjab University, Chandigarh.	Bipolar resistive switching studies in epitaxial barium titanate thin films.
15.	Mr. Sumit	Department of Physics, Panjab University Chandigarh.	Machine learning in physics and medicine.
<b>UG/PG Students of Panjab University Campus and Regional Centres</b>			
<b>S. No.</b>	<b>Name of Participant</b>	<b>Affiliating Institution</b>	<b>Title of Abstract</b>



16.	Ms. Alisha Garg	Department of Physics, Panjab University, Chandigarh.	Synthesis and characterization of zirconium oxide-based films for memory device application.
17.	Mr. Aman Pathania	Centre of Nanoscience and Nanotechnology Panjab University Chandigarh.	Plasmon enhanced perovskite solar cell: A review.
18.	Ms. Armaandeep Kaur	Department of Physics, Panjab University, Chandigarh.	Mass identification of W and Z bosons.
19.	Ms. Arshdeep Kaur	Centre for Nanoscience and Nanotechnology, Panjab University, Chandigarh.	“Single DNA translocation and electrical characterization using AFM and nanoelectrodes”.
20.	Mr. Aryan Dhar	Centre for Nanoscience and Nanotechnology, Panjab University, Chandigarh.	Recent developments in intranasal drug delivery of nanomedicines for the treatment of neuropsychiatric disorders.
21.	Mr. Ashish Kumar	Centre for Nanoscience and Nanotechnology, Panjab University, Chandigarh.	Nanotechnology In Alzheimer's Disease: Advancements In Diagnosis And Targeted Therapy Through Biocompatible Nanoparticles.
22.	Ms. Devanshika	Centre for Nanoscience and Nanotechnology, Panjab University, Chandigarh.	Nanoparticles in cosmetics: The safety and hidden risks.
23.	Ms. Komal Rana	Centre of Nanoscience and Nanotechnology, Panjab University, Chandigarh.	Advancements in real-time dopamine detection using nanomaterial sensors: Implications for neuroscience and healthcare.
24.	Er. Muin U Din Dar	Centre for Nanoscience and Nanotechnology, Panjab University, Chandigarh.	MXene based piezo-resistive pressure sensors: An insight into structural components.
25.	Mr. Rajat Preet	Centre for Nanoscience and Nanotechnology, Panjab University, Chandigarh.	Nanomaterials for energy conversion devices.

26.	Ms. Vanshika	Department of Physics, Panjab University, Chandigarh.	FPGAs as data acquisition systems for detectors.
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Abstract File	
S. No.	Abstract
<b>Faculty/Scientists of Panjab University Campus and Regional Centres</b>	
1.	<p><b>POROUS METAL OXIDE THIN FILMS FOR ANTI FINGERPRINT COATINGS</b></p> <p><u>Akash Katoch</u>, Sandeep kaur, Rohit, Sajjad Hussain  <i>Centre for Nanoscience and Nanotechnology, Panjab University, Chandigarh.</i></p> <p>Fingerprints are a common problem when it comes to the appearance and functionality of various surfaces, including glass, metals, and electronics. To solve this problem, many studies have been conducted to form a surface with a self-clearing function. Metal oxide-based coatings of ZnO, TiO<sub>2</sub>, WO<sub>3</sub>, etc. can be a better alternative, as they possess better transmittance and conducting properties, are non-toxic, as well as hydrophilic/hydrophobic, and act as an active photocatalyst in the visible region. Among these materials, TiO<sub>2</sub> coatings offer a better practical solution, as it possesses a superior catalytic nature than the other metal oxides. In this study, a porous TiO<sub>2</sub> solution was prepared using the sol-gel method, and its physical properties were investigated. The surface area of the thin films was controlled by varying the amount of TiO<sub>2</sub> nanoparticles, which also affects the physical properties of the films. The surface area of the TiO<sub>2</sub> film was determined using BET analysis whereas, the microstructure and thickness were analysed by field emission scanning electron microscopy (FE-SEM) and atomic force microscopy (AFM), respectively. The results showed that, as the amount of TiO<sub>2</sub> nanoparticles were increased, the specific surface area of the TiO<sub>2</sub> film also increased.</p>
2.	<p><b>ARTIFICIAL INTELLIGENCE IN MEDICAL PHYSICS</b></p> <p><u>Vivek Kumar</u>  <i>Centre for Medical Physics, Panjab University, Chandigarh.</i></p> <p>Artificial intelligence (AI) is developing rapidly and has found widespread applications in medicine, especially radiotherapy. Indeed, in the area of medical physics and radiation oncology, data-driven solutions are quickly evolving and promise to change our practice. The implication of AI in the medical physics field is enormous and all indications suggest that AI will transform the ways that many tasks are done in the clinic. In general, the process includes imaging simulation, contouring, treatment planning, quality assurance (QA), treatment delivery, and follow-up assessment. In each of the steps, there exist multiple difficult decisions to be made and the decision-making process can be either manual or automatic with AI assistance. An overview of the applications of AI in radiation oncology and medical physics is explained in brief. The future of medical physics lies at the intersection of human</p>

	expertise and artificial intelligence, offering a beacon of hope for more effective, accessible, and personalized healthcare.
<b>Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)</b>	
3.	<p><b>ONLINE MONITORING SYSTEM FOR THE CMS GEM DETECTORS</b></p> <p><u>Anureet Kaur</u>, Sushil Singh Chauhan, Vipin Bhatnagar <i>Department of Physics, Panjab University, Chandigarh.</i></p> <p>Upgrades to the CMS Muon system for the high-luminosity LHC (HL-LHC) include the new GEM detectors GE1/1, GE2/1 and ME0. The development of the GEM-online monitoring system (OMS) is crucial for their successful operation. The GEM-OMS provides real-time monitoring of key parameters, enabling the detection of anomalies by filtering data directly through different controllers. With a focus on enhancing efficiency and stability, the GEM-OMS offers a data visualization framework that facilitates easy interpretation of database data through tables, graphs, and charts. This ensures the effective functioning of the upgraded muon system, contributing to the success of the HL-LHC physics program. This presentation offers insights into the current status of the GEM-OMS, highlighting its most recent developments and advancements.</p>
4.	<p><b>INVESTIGATION OF OPTOELECTRONIC PROPERTIES OF GERMANIUM DOPED CSPBI2BR PEROVSKITE USING FIRST-PRINCIPLES CALCULATION</b></p> <p><u>Gh Mustafa</u><sup>1</sup>, Neelam Minhas<sup>1</sup>, Harjot Singh<sup>1</sup>, Gurinder Singh<sup>2</sup>, J K Goswamy<sup>3</sup> <sup>1</sup> <i>Department of Applied Sciences, University Institute of Engineering and Technology, and Department of Physics, Panjab University, Chandigarh;</i> <sup>2</sup> <i>University Institute of Engineering and Technology, Panjab University, Swami Sarvanand Giri Regional Centre Hoshiarpur, Panjab,</i> <sup>3</sup> <i>Department of Applied Sciences, University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Inorganic mixed halide CsPbI2Br perovskites demonstrate significant promise for light harvesting and optoelectronic applications due to their structural stability and optimally tunable bandgap. This study employs density functional theory calculations to explore the structural, electronic, optical, and chemical bonding characteristics of Ge-doped CsPbI2Br. The tolerance factor provides an empirical measure of the compound's phase stability, indicating that it remains within a stable range. We have computed the electronic properties, including band structure and partial density of states (PDOS) for both CsPbI2Br and CsGexPb1-xI2Br structures. Calculating the band gap using GGA-PBE and HSE06 functionals indicates that the material exhibits a direct gap. The estimated band gap value using the hybrid functional of Ge-doped</p>

	<p>CsPbI<sub>2</sub>Br significantly decreases to 1.70 eV from 2.00 eV for CsPbI<sub>2</sub>Br. PDOS analysis offers crucial insights into the atomic orbitals contributing to the formation of the band edges. The perovskite shows improved absorption in the visible spectrum, as evidenced by a higher absorption coefficient value. Optical absorption spectra show a red shift with doping of Ge in CsPbI<sub>2</sub>Br. Bader charges analysis and the electron localization function (ELF) plots were utilized to investigate the change in the bonding nature with Ge doping. These findings indicate that incorporating germanium into the bulk CsPbI<sub>2</sub>Br enhances its optoelectronic properties. This research represents a significant advancement in the exploration of photovoltaic materials and is likely to attract considerable interest in investigating CsPbI<sub>2</sub>Br as a potential solar cell material.</p>
5.	<p><b>HIGH PERFORMING MATERIALS FOR ADVANCEMENT IN THERMOELECTRIC TECHNOLOGY</b></p> <p><u>Jyoti Kumari</u>, Sukhdeep Singh, Navdeep Goyal  <i>Department of Physics Centre for Advanced Study in Physics, Panjab University, Chandigarh.</i></p> <p>Recently thermoelectric (TE) materials have drawn a lot of attention and sparked eddy research because of their potential for energy conversion and wide range of applications, such as waste heat recovery, power generation, sensors, and refrigeration. In addition, they offer eco-friendly methods for energy production and harvesting prioritizing sustainability and environmental impact. This article summarizes the different aspects of TE technology which includes the best performing materials, device morphology along with the fields of applications. A wide range of prospective TE material classes, including chalcogenides, oxides, perovskites, skutterudites, half-heusler series, organic–inorganic composites series, and GeTe/PbTe series, etc. are addressed. The performance of most promising thermoelectric materials is briefed across different series, focusing on their thermoelectric efficiency characterized by the dimensionless figure of merit (ZT). By integrating the recent findings, it is evident that TE technology with further optimizations can pave a pathway in solving the world’s problem of energy crisis and development of India on the indigenous power generation front.</p>
6.	<p><b>APPLICATIONS OF MACHINE LEARNING IN PHYSICS AND MEDICINE</b></p> <p><u>Kashish Verma</u><sup>1</sup>, Sumit<sup>1</sup>, Bhumika Mehta<sup>1</sup>, Vipin Bhatnagar<sup>1</sup>, Sunil Bansal<sup>2</sup>  <sup>1</sup> <i>Department of Physics, Panjab University, Chandigarh,</i> <sup>2</sup> <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Machine learning (ML) has become a transformative tool in high-energy physics, reshaping data analysis and deepening our understanding of fundamental particles. The award of this year’s Nobel Prize in Physics acknowledges how key concepts from physics have influenced the development of modern machine learning techniques. These advancements have greatly enhanced ML’s capacity to analyse complex datasets</p>

	<p>and uncover novel patterns in particle interactions. Beyond its success in physics, ML is also making considerable progress in the medical field. Through real-life examples, we will demonstrate how ML can improve medical diagnostics and treatment planning, showcasing its ability to connect the theoretical realm of physics with the practical applications in medicine. This synergy highlights how physics-based models have expanded ML's potential not only for scientific breakthroughs but also for addressing pressing challenges in healthcare.</p>
7.	<p><b>FUSION EXCITATION FUNCTION MEASUREMENTS USING CCFULL CALCULATIONS FOR 28SI+68,70ZN SYSTEMS</b></p> <p><u>Komal</u>, B.R. Behera  <i>Department of Physics, Panjab University, Chandigarh.</i></p> <p>Sub-barrier fusion reaction means the fusion of two nuclei at energies below the Coulomb barrier, where the fusion probability is dominated by quantum tunnelling effects. Effects of various channels couplings such as vibrational and rotational excitations of the nuclei, nucleon transfer, deformation can significantly enhance the fusion cross-section in sub-barrier region. Understanding these couplings is essential for accurately describing the fusion dynamics in heavy-ion collisions. In this study, we present a systematic analysis of the fusion cross-sections for the system 28Si+68,70Zn using the Coupled-Channels calculations (CCFULL). For 28Si+68Zn, we try to fit the experimental data in our calculations and for 28Si+70Zn, we provide only theoretical calculations. The CCFULL model allows us to include different types of couplings, including the inelastic excitations of the interacting nuclei and neutron transfer channels, to investigate their influence on sub-barrier fusion. By incorporating these couplings into our calculations, we aim to better understand how they modify the fusion barrier and enhance the probability of tunnelling at sub-barrier energies. Our findings demonstrate that the inclusion of neutron transfer channels is essential to reproduce the experimental fusion cross-sections for the 28Si+68Zn system accurately.</p>
8.	<p><b>EXPLORING CORRUGATION EFFECT IN PLANAR MONOLAYER GRAPHITIC CARBON NITRIDE (G-C3N4): A DFT STUDY</b></p> <p><u>Neelam Minhas</u><sup>1</sup>, Gh. Mustafa<sup>1</sup>, Harjot Singh<sup>1</sup>, Gurinder Singh<sup>2</sup>, J K Goswamy<sup>3</sup>  <sup>1</sup> <i>Department of Applied Sciences, University Institute of Engineering and Technology, and Department of Physics, Panjab University, Chandigarh;</i> <sup>2</sup> <i>Department of University Institute of Engineering and Technology, Panjab University, Swami Sarvanand Giri Regional Centre Hoshiarpur, Punjab;</i> <sup>3</sup> <i>Department of Applied Sciences, University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Two-dimensional (2D) materials have demonstrated outstanding potential in optoelectronic applications. The graphitic carbon nitride g-C3N4 of heptazine-based</p>

	<p>structure has adjustable characteristics that can be controlled precisely by layer number. In this study, we employed density functional theory (DFT) computations within the VASP framework to examine the electronic and optical properties of mono layer graphitic carbon nitride (g-C<sub>3</sub>N<sub>4</sub>). We specifically investigated the impact of corrugation on the properties of planar g-C<sub>3</sub>N<sub>4</sub>. We observe a notable reduction in the density of states (DOS) peaks for nitrogen atoms, indicating a change in the chemical bonding environment. The slight increase in the band gap of the corrugated structure indicates that electronic states are modified. Furthermore, the corrugation also alters the positions of the conduction band minimum (CBM) and valence band maximum (VBM), which suggests potential implications for photo-catalytic applications. The corrugated structure also exhibits a red shift in the optical absorption spectrum. Considering the effect of corrugation in g-C<sub>3</sub>N<sub>4</sub> mono-layer calculations allows researchers to obtain more precise and reliable results, which can improve our understanding and application of this promising material. This research is expected to benefit future theoretical studies on heptazine-based g-C<sub>3</sub>N<sub>4</sub> in various applications.</p>
9.	<p><b>DIRECTED EVOLUTION APPROACH TO ASSESS INFECTIVITY OF SARS-COV-2 VARIANTS AND THE UTILITY OF NANOBODIES</b></p> <p>Nimisha Chaudhary<sup>1</sup>, Abhishek Dubey<sup>2</sup>, Azeez Tehseen<sup>2</sup>, Sudhakar Singh<sup>2</sup>, Sharvan Sehrawat<sup>2</sup>, Madhu Khatri<sup>3</sup></p> <p><sup>1</sup> Centre for Nanoscience and Nanotechnology, Panjab University, Chandigarh; University Institute of Engineering and Technology, Panjab University, Chandigarh; Indian Institutes of Science Education and Research, Mohali; <sup>2</sup> Indian Institutes of Science Education and Research, Mohali; <sup>3</sup> University Institute of Engineering and Technology, Panjab University, Chandigarh.</p> <p>SARS-CoV-2 via receptor binding domain (RBD) contained in the spike (S) protein binds to angiotensin converting enzyme 2 (ACE-2) to infects the host cells. Given an infidel replication machinery, the viral S protein has accumulated several mutations primarily in between position 1 and 55. These mutations led to SARS-CoV-2 variants, some of which have been flagged as variants of concern (VOCs) based on their enhanced transmissibility potential or the immune escape mechanisms. Some of the VOCs include alpha (B.1.1.7), beta (B.1.351), gamma (P.1), delta (B.1.617.2) and omicron (B.1.1.529). Since the spike (S) protein plays an essential role in viral attachment, fusion, and entry, it has become an essential target for the development of neutralizing antibodies, entry inhibitors, and vaccines. We aimed at generating variants of RBD of SARS-CoV-2 using a directed evolution approach to assess their ability to interact with the ACE-2 receptor so that the future mutants with high potential of transmission could be predicted. Error prone PCR was used to generate such mutants and the mutated versions of the RBD were surface displayed using M13 bacteriophages. Using the internalization assay, high affinity mutants were selected to select specific single domain antibodies with high neutralization potential.</p>

10.	<p><b>VARIABLE SPEED OF LIGHT, GRAVITY AND GALACTIC REDSHIFT</b></p> <p><u>Pradyuman</u>  <i>Department of Physics, Panjab University, Chandigarh.</i></p> <p>The spatial and temporal variations in speed of light can produce the effects of gravity and galactic redshift respectively. Moreover, these effects can be reproduced in the analogue experiments where the speed of sound is analogue to that of light, and these experiments suggests as the space being made up of some type of condensed matter and the elementary particle physics being the effective theory of such condensed matter, studying thermodynamics of such matter can help us in peeking into the physics of vacuum. This poster is about the thermodynamics of such condensed matter and its consequences.</p>
11.	<p><b>MEASUREMENTS OF ELASTIC SCATTERING CROSS SECTIONS FOR 33.297, 37.761 AND 38.776 KEV X-RAY PHOTONS IN ELEMENTS WITH <math>45 \leq Z \leq 56</math></b></p> <p><u>Ritu Rani</u>, Devinder Mehta  <i>Department of Physics, Panjab University, Chandigarh.</i></p> <p>Differential elastic scattering cross sections were determined for X-ray photon energies of 33.297 keV (La-<math>K\alpha</math>), 37.761 keV (La-<math>K\beta_{1,3}</math>) and 38.776 keV (La- <math>K\beta_{2,4}</math>) at a scattering angle of <math>143^\circ</math> for elements having atomic numbers <math>45 \leq Z \leq 56</math>. The measurements were conducted using a reflection mode setup with <math>^{57}\text{La}</math> secondary exciter which is excited by a <math>^{241}\text{Am}</math> radioisotope. Scattered X-ray photons were detected by a Si (Li) detector which is connected to a computerized multichannel analyser. The intensity of the X-ray photons and geometrical factors were derived from theoretical knowledge of K X-ray fluorescence cross sections and measured K X-ray yields from the excited targets. The measured differential cross sections are compared with available theoretical values based on non-relativistic and relativistic form factor theories and second-order S-matrix (SM) approaches and their relative appropriateness is discussed.</p>
12.	<p><b>STRAW TUBE TRACKERS FOR SAND IN DUNE ND AND THEIR ADVANTAGES</b></p> <p><u>Riya Gaba</u>, Vipin Bhatanagar  <i>Department of Physics, Panjab University, Chandigarh.</i></p> <p>Gaseous ionization detectors are essential instruments in particle physics for detecting ionizing particles and measuring radiation in various applications. One notable type are the straw tubes, which consists of gas-filled cylindrical tubes with a conductive inner layer serving as a cathode and an anode wire along the cylinder's axis. These detectors facilitate the reconstruction of neutrino interactions in targets, enabling</p>



	<p>accurate tracking of charged particles and particle identification. The Deep Underground Neutrino Experiment (DUNE) features a far detector located at the Sanford Underground Research Facility (SURF) in South Dakota and a Near Detector (ND) complex at Fermilab. Within the ND, the System for on Axis Neutrino Detection (SAND) employs tracking modules composed of straw tubes. Here we explain the operational principles of straw tube detectors and discuss their advantages in neutrino detection.</p>
13.	<p><b>GERMANIUM BASED MIXED CATION PEROVSKITE SOLAR CELLS: A REVIEW</b></p> <p><u>Sahil Singh</u>, Neeru Chaudhary  <i>Department of Physics, Panjab University, Chandigarh.</i></p> <p>Perovskite solar cells (PCSs) have attracted great attention all over the world because of the advantages of adjustable band gap, long carrier diffusion length, high light-absorption coefficient and solution processability of organic metal halide perovskite absorbers. As the first-generation PSCs, the highest efficiency of lead PSCs has reached 25.5%, which is comparable with that of the silicon solar cells. However, the toxicity issue of lead raises the concern of environmental pollution and health problems. Therefore, development of lead-free perovskite materials is desirable to produce the next-generation PSCs. In the past few years, Germanium (Ge) based PSCs have emerged as a promising candidate for ecofriendly Photovoltaic technology. This paper will review the mixed cation Ge based perovskite solar cells in comparison to their efficiencies with the use of organic and inorganic charge transport layers. This will provide an insight into the design of complete inorganic perovskite solar cell discussing the challenges and methods to achieve more power conversion efficiency.</p>
14.	<p><b>BIPOLAR RESISTIVE SWITCHING STUDIES IN EPITAXIAL BARIUM TITANATE THIN FILMS</b></p> <p><u>Sajal Shradha</u><sup>1</sup>, Sunil K. Arora<sup>2</sup>, Shivank Kalia<sup>3</sup>, Ravi Kumar<sup>4</sup>, Seema<sup>5</sup>, Kaushik Ghosh<sup>5</sup>  <sup>1</sup> <i>Department of Physics, Panjab University, Chandigarh;</i> <sup>2</sup> <i>Centre for Nanoscience and Nanotechnology, Panjab University, Chandigarh</i> <sup>3</sup> <i>Department of Physics and Photonics Science, National Institute of Technology, Hamirpur,</i> <sup>4</sup> <i>Department of Material Science and Engineering, National Institute of Technology, Hamirpur,</i> <sup>5</sup> <i>The Institute of Nano Science and Technology, Mohali, Punjab.</i></p> <p>The ongoing miniaturization of silicon-based devices and the demand for increased storage capacity have spurred significant research into novel materials and properties for memory and switching devices. Among the various mechanisms, resistive switching, which exploits hysteresis effects in resistivity under external stimuli, has emerged as a promising approach due to its simple read/write techniques. In this report, epitaxial BaTiO<sub>3</sub> (BTO) films of varying thickness from 10nm to 100 nm were</p>

	<p>prepared on the LaAlO<sub>3</sub> (LAO) single crystal substrate by pulsed laser deposition. X-ray diffraction (XRD) results clearly indicate that all the heterostructures are highly crystalline. The atomic force microscopy reveals a smooth surface for all heterostructures, indicating a high quality of samples. Bipolar resistive switching (RS) behaviour was observed in the prepared samples. The RS effect was more dominant in sample of lower thickness and was suppressed in the sample of higher thickness.</p>
15.	<p><b>MACHINE LEARNING IN PHYSICS AND MEDICINE</b></p> <p><u>Sumit</u><sup>1</sup>, Kashish Verma<sup>1</sup>, Bhumika Mehta<sup>1</sup>, Vipin Bhatnagar<sup>1</sup>, Sunil Bansal<sup>2</sup>  <sup>1</sup> <i>Department of Physics, Panjab University, Chandigarh;</i> <sup>2</sup> <i>University Institute of Engineering and Technology, Panjab University, Chandigarh.</i></p> <p>Machine learning (ML) has emerged as a transformative tool in high-energy physics, revolutionizing data analysis and enhancing our understanding of fundamental particles. This year's Nobel Prize in Physics recognizes how foundational concepts from physics have shaped modern machine learning techniques. These innovations have transformed ML's ability to analyse complex data and reveal new patterns in particle interactions. In parallel to its success in physics, ML is also making significant strides in the medical field. We will illustrate real-life examples to show how ML can significantly enhance medical diagnostics and treatment planning, highlighting its ability to bridge the two diverse domains of theoretical physics and practical medicine. This synergy underscores how physics-based models have not only enhanced ML's potential in scientific discovery but also in solving critical challenges in medicine.</p>
<p><b>UG/PG Students of Panjab University Campus and Regional Centres</b></p>	
16.	<p><b>SYNTHESIS AND CHARACTERIZATION OF ZIRCONIUM OXIDE BASED FILMS FOR MEMORY DEVICE APPLICATION</b></p> <p><u>Alisha Garg</u>, Nirmal Manyani, S.K. Tripathi  <i>Department of Physics, Panjab University, Chandigarh.</i></p> <p>This comprehensive study focuses on the synthesis, characterization, and performance evaluation of ZrO<sub>2</sub>-based thin films, highlighting their significant potential for memory device applications. The films exhibit high yield and stability, as well as impressive dielectric constants and favourable switching behaviour, rendering them ideal for various memory device architectures. We specifically investigate their applicability in both resistive switching memory devices and transparent transistor memory devices. The research encompasses a detailed review of the properties of ZrO<sub>2</sub>-based films produced at varying concentrations using different coating methods. Structural and optical characteristics are thoroughly analysed using UV-Vis spectroscopy and photoluminescence spectroscopy, which provide valuable insights into the films' composition and performance metrics. Notably, our findings reveal that films with increased ZrO<sub>2</sub> concentration exhibit enhanced properties conducive to the</p>

	<p>development of high-efficiency memory devices. The ability of these films to modulate band gaps and improve dielectric constants positions them as promising candidates for a wide array of applications in memory technology and optoelectronics. As we continue to explore and optimize these materials, they hold the potential to revolutionize the field of electronic devices, leading to significant advancements in both performance and energy efficiency.</p>
17.	<p><b>PLASMON ENHANCED PEROVSKITE SOLAR CELL: A REVIEW</b></p> <p><u>Aman Pathania</u>, Jadab Sharma  <sup>1</sup> <i>Centre of Nanoscience and Nanotechnology, Panjab University, Chandigarh.</i></p> <p>Plasmonic nanostructured perovskite solar cells have emerged as a promising avenue for enhancing solar energy conversion efficiency. By integrating plasmonic materials, such as gold or silver nanoparticles, within perovskite layers, these solar cells leverage localized surface plasmon resonance (LSPR) to improve light absorption and charge carrier dynamics. The synthesis and characterization of plasmonic nanostructures and their impact on perovskite solar cell performance. Key mechanisms, including enhanced light trapping and increased exciton generation, are discussed, alongside challenges related to stability and scalability. Recent advancements demonstrate efficiency improvements, with some devices achieving over 23.7% power conversion efficiency. Future directions for research include optimizing plasmonic designs and exploring new material combinations to further enhance the performance and durability of these innovative solar cells.</p>
18.	<p><b>MASS IDENTIFICATION OF W AND Z BOSONS</b></p> <p><u>Armaandeeep Kaur</u>, Khushpreet Kaur, Lokesh Kumar  <i>Department of Physics, Panjab University, Chandigarh.</i></p> <p>In this study, we present the determination of the invariant mass of W and Z bosons utilizing the open-source data from the CERN at the Large Hadron Collider (LHC). The data we analyse are from the CMS collaboration in IG format and using a browser-based event display called ISPY. This software allows researchers to view and interact with data in a meaningful way, aiding in the discovery and understanding of fundamental particles and their interactions. Particle collisions generate complex datasets involving thousands of particles and interactions. ISPY helps to visualize these intricate processes in 3D, visualization of detector geometries, event reconstruction algorithms, visual inspection of reconstructed events, and production of images, making the data easier to understand and extract information. We will discuss the method of computing the invariant mass of Z bosons and W bosons using the data analysed. The Z bosons are reconstructed from their daughter particles electron-positron and muon-antimuon. The W bosons are reconstructed from electron-neutrino and muon-neutrino. We plot the invariant mass distributions and from there we obtain the mass of Z boson (89.3622 GeV/c<sup>2</sup>) and that of W bosons (78.644457 GeV/c<sup>2</sup>). These results yield invariant mass values consistent with theoretical</p>

	<p>prediction as well as the measured experimental values. This experiment provides an insight into high energy physics and aids in the exploration of physics involved in the discovery of higher energy particles, alongside reinforcing CERN's role as a pivotal hub for cutting-edge particle physics research.</p>
19.	<p><b>“SINGLE DNA TRANSLOCATION AND ELECTRICAL CHARACTERIZATION USING AFM AND NANO-ELECTRODES”</b></p> <p><u>Arshdeep Kaur</u>  <i>Centre for Nanoscience and Nanotechnology, Panjab University, Chandigarh.</i></p> <p>“Precision control over DNA translocation is vital for achieving high-accuracy single-molecule DNA sequencing. In this, we introduce an atomic force microscopy (AFM)-based technique to linearise double-stranded DNA and examine its electrical properties during translocation through a platinum (Pt) nanoelectrode gap. <math>\lambda</math> DNA strands were initially deposited onto a charged mica surface, scanned, and a single strand suitable for translocation was selected. The DNA was then electrostatically attached to the AFM probe tip without the need for chemical modifications and lifted off the mica surface. The pulling force required matched the theoretical adhesion force of DNA to mica. The DNA was subsequently translocated at controlled speeds across the Pt nanoelectrode gap, where its electrical behaviour was measured. Finite element analysis corroborated the experimentally observed gap currents. Additionally, molecular dynamics simulations investigated single-stranded DNA translocation through nanoscale electrode gaps under a constant driving force. The simulations revealed that a 1.5 nm gap is sufficient for DNA translocation, with a minimum initiation force of approximately 0.3 nN. Significant DNA deformation was observed as it passed through the nanogap, and the translocation velocity was found to depend on the length of the DNA segment, influenced by varying drag forces. This research highlights the feasibility of using nanoelectrodes for integration into rapid genomic sequencing technologies.</p>
20.	<p><b>RECENT DEVELOPMENTS IN INTRANASAL DRUG DELIVERY OF NANOMEDICINES FOR THE TREATMENT OF NEUROPSYCHIATRIC DISORDERS</b></p> <p><u>Aryan Dhar</u><sup>1</sup>, Anglina Kisku<sup>2</sup>, Ambresh Nishad<sup>3</sup>, Saurabh Agrawal<sup>2</sup>, Rishi Paliwal<sup>4</sup>, Ashok Kumar Datusalia<sup>5</sup>, Gaurav Gupta<sup>6</sup>, Sachin Kumar Singh<sup>7</sup>, Kamal Dua<sup>8</sup>, Kunjbihari Sulakhiya<sup>2</sup></p> <p><sup>1</sup> <i>Centre for Nanoscience and Nanotechnology, Panjab University, Chandigarh;</i> <sup>2</sup> <i>Neuro Pharmacology Research Laboratory, Department of Pharmacy, Indira Gandhi National Tribal University, Amarkantak;</i> <sup>3</sup> <i>Neuro Pharmacology Research Laboratory, Department of Pharmacy, Indira Gandhi National Tribal University, Amarkantak;</i> <sup>4</sup> <i>Nanomedicine and Bioengineering Research Laboratory, Department of Pharmacy, Indira Gandhi National Tribal</i></p>

University, Amarkantak,; <sup>5</sup> Laboratory of Molecular Neuro Therapeutics, Department of Pharmacology and Toxicology, National Institute of Pharmaceutical Education and Research, Raebareli, Uttar Pradesh; <sup>6</sup> Centre for Research Impact and Outcome, Chitkara College of Pharmacy, Chitkara University, Rajpura; <sup>7</sup> School of Pharmaceutical Sciences, Lovely Professional University, Phagwara, India, Faculty of Health, Australian Research Centre in Complementary and Integrative Medicine, University of Technology, Sydney, New South Wales, Australia; <sup>8</sup> Faculty of Health, Australian Research Centre in Complementary and Integrative Medicine, University of Technology, Sydney, New South Wales, Australia, Discipline of Pharmacy, Graduate School of Health, University of Technology, Sydney, New South Wales, Australia.

Neuropsychiatric disorders, including anxiety, depression, autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD), schizophrenia, Tourette’s syndrome, dementia, delirium, vascular cognitive impairment, and apathy, account for roughly 15% of the global disease burden, with India heavily impacted, according to the World Health Organization (WHO). A significant challenge in treating these disorders is the blood-brain barrier (BBB), which blocks many drugs from reaching the brain. However, advancements in nanotechnology, molecular biology, and neuroscience are offering new treatment possibilities. One promising solution is the nose-to-brain (N2B) drug delivery system using nano-formulations (NFs). This method bypasses the BBB, improving drug delivery, bioavailability, and patient adherence. The N2B system works through intranasal (IN) administration, where drugs travel from the nasal cavity to the brain via the olfactory and trigeminal nerves. Current research focuses on both plant-based and synthetic nano-formulations for this purpose. This review explores the potential of N2B delivery to treat neuropsychiatric disorders and overcome existing therapeutic barriers.

21. **NANOTECHNOLOGY IN ALZHEIMER'S DISEASE: ADVANCEMENTS IN DIAGNOSIS AND TARGETED THERAPY THROUGH BIOCOMPATIBLE NANOPARTICLES**

Ashish Kumar

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Alzheimer's disease (AD) is a progressive neurodegenerative disorder that severely affects cognitive functions, including memory, thinking, and behaviour. Notably, brain alterations associated with AD can commence 10 to 20 years prior to the onset of clinical symptoms, complicating early diagnosis and timely intervention due to a lack of reliable biomarkers. Recent advancements in nanotechnology offer promising solutions for the diagnosis and treatment of AD. Nanoparticles (NPs), measuring between 1 to 100 nm, enable targeted drug delivery, allowing medications like

	<p>Rivastigmine to be administered directly to the brain while minimizing systemic side effects by effectively crossing the blood-brain barrier. Furthermore, biocompatible nanoparticles improve imaging modalities, facilitating earlier and more precise detection of AD, which is crucial for timely therapeutic interventions. The increasing body of research supporting the use of NPs in the central nervous system underscores their potential to revolutionize the management of Alzheimer's disease. This review highlights the current challenges faced in AD diagnosis and therapy and discusses the multifaceted advantages of biocompatible nanoparticles as both imaging agents and drug carriers. By enhancing our ability to detect and treat AD at earlier stages, nanotechnology has the potential to transform the landscape of Alzheimer's disease management, offering hope for improved patient outcomes and quality of life.</p>
22.	<p><b>NANOPARTICLES IN COSMETICS: THE SAFETY AND HIDDEN RISKS</b></p> <p><u>Devanshika</u><sup>1</sup>, Pratiksha Shitole<sup>2</sup>, Yash Chaudhari<sup>3</sup>, Swarup Matkar<sup>3</sup>, Prashik Jamdhade<sup>4</sup>, Tanmay Gharat<sup>3</sup>, Rohit Doke<sup>5</sup>, Nutan Badhe<sup>2</sup></p> <p><sup>1</sup> Centre for Nanoscience and Nanotechnology, Panjab University, Chandigarh; <sup>2</sup> Department of Quality Assurance Techniques, Samarth College of Pharmacy, Belhe, Pune; <sup>3</sup> Department of Pharmacy, Samarth College of Pharmacy, Belhe, Pune; <sup>4</sup> Department of Pharmacy, Samarth College of Pharmacy, Belhe, Pune; <sup>5</sup> Department of Pharmacology, Jaihind College of Pharmacy, Vadgaon Sahani, Pune.</p> <p>Nanotechnology is revolutionizing the cosmeceutical industry by enhancing product effectiveness through advanced techniques. As cosmetics, particularly for hair, skin, lips, and nails, continue to grow rapidly, nano-cosmeceuticals are being used to address issues like aging, wrinkles, hyperpigmentation, and hair loss. However, the ability of nanoparticles to penetrate the skin has raised health concerns, with potential risks to human health and the environment. Ensuring the safety, biocompatibility, and long-term effects of nanoparticles is a major challenge, necessitating strict regulation and ongoing research. This article highlights both the benefits and risks of using nanoparticles in cosmetics, focusing on their application, safety, and future prospects.</p>
23.	<p><b>ADVANCEMENTS IN REAL TIME DOPAMINE DETECTION USING NANOMATERIAL SENSORS: IMPLICATIONS FOR NEUROSCIENCE AND HEALTHCARE</b></p> <p><u>Komal Rana</u></p> <p>Center of Nanoscience and Nanotechnology, Panjab University, Chandigarh.</p> <p>Real-time detection of dopamine using nanomaterial sensor. These sensors use materials like graphene, carbon nanotubes, and metal nanoparticles to improve how well they conduct electricity and detect dopamine. Techniques such as screen printing</p>

	<p>and modifying electrodes make it possible to create cost-effective and flexible sensors. The sensors typically measure dopamine levels using methods like voltammetry and impedance spectroscopy, which provide accurate readings. By combining these sensors with microfluidic systems, researchers can continuously monitor dopamine in real-time within the body, such as in brain tissue or blood. Additionally, there is progress in developing wearable sensors that can track dopamine levels non-invasively, which is valuable for managing mental health and studying neurodegenerative diseases. However, there are challenges to overcome, such as making sure the sensors can accurately distinguish dopamine from other substances and ensuring they remain stable over time. Researchers are addressing these issues by carefully selecting materials and using protective coatings. Overall, the development of nanomaterial sensors for real-time dopamine detection offers promising tools for exploring how dopamine works in the brain and improving early diagnosis of related health conditions.</p>
24.	<p><b>MXENE BASED PIEZO-RESISTIVE PRESSURE SENSORS: AN INSIGHT INTO STRUCTURAL COMPONENTS</b></p> <p><u>Muin U Din Dar</u><sup>1</sup>, Nihal<sup>1</sup>, Harpreet Kaur<sup>2</sup>, Richa Rastogi<sup>1</sup>  <sup>1</sup><i>Centre for Nanoscience and Nanotechnology, Panjab University, Chandigarh,</i>  <sup>2</sup><i>Department of Chemistry, Panjab University, Chandigarh.</i></p> <p>The two-dimensional (2D) transition metal carbides, nitrides, and carbonitrides known as MXenes e.g. (Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub>) have shown great promise as materials for piezoresistive pressure sensors because of their distinct hydrophilicity, mechanical flexibility, and electrical conductivity. Due to these extraordinary properties, <i>MXene</i>-based materials can be used in various applications, such as energy storage, pollutant monitoring, and their degradation, one such application is in pressure sensors which can be used in human automotive, aerospace, medical, and industrial applications. A pressure sensor is an apparatus that detects the force that applies to a surface and transforms that force into an electrical signal. They function according to various principles, such as resistive, capacitive, piezoelectric, or triboelectric, depending on the application and surroundings. The output signal from the sensor usually changes in proportion to the pressure that is applied. An important factor in determining the sensor's performance is its reaction time, sensitivity, accuracy, and the range of pressure it can detect. Additionally, for improved usefulness, certain sophisticated pressure sensors come with capabilities like temperature correction, overload protection, and digital communication interfaces. Besides identifying static and dynamic pressures, contemporary pressure sensors are also capable of measuring absolute pressure and differential pressure (between two places). The performance, efficiency, and safety of the system are greatly enhanced by these adaptable gadgets. Thus, our study aims to represent the detailed description of MXene based piezo resistive pressure sensors.</p>
25.	<p><b>NANOMATERIALS FOR ENERGY CONVERSION DEVICES</b></p> <p><u>Rajat Preet</u></p>

	<p><i>Centre for Nanoscience and Nanotechnology, Panjab University, Chandigarh.</i></p> <p>As technological advancements push beyond single crystal silicon, nanomaterials have emerged as promising candidates for various energy applications due to their ease of fabrication and comparable efficiencies of nanomaterial-based devices. The high cost and size limitations of silicon, coupled with the environmental risks posed by III-V semiconductors, necessitate alternative materials for future devices. This poster presents the process of fabrication of lead halide perovskite nanorod-based solar cells. Perovskite nanorods are synthesized through a facile method in our labs. Additionally, we explore the potential of 2D heterostructures in thermoelectric generators, which can recover wasted heat energy from daily processes. Graphene and transition metal dichalcogenides (TMDCs) show great promise in thermoelectric devices due to their unique electronic and thermal properties. We detail the material selection process, alongside first-principles simulations using the VASP and Phonopy packages to predict the dynamic, thermal, and mechanical stability of these materials. The effects of twist and strain on the stability of graphene-TMDC heterostructures are also discussed. We conclude by outlining the future prospects of nanomaterials in energy conversion technologies.</p>
26.	<p><b>FPGAS AS DATA ACQUISITION SYSTEMS FOR DETECTORS</b></p> <p><u>Vanshika</u>, Vipin Bhatnagar, Sushil S Chauhan  <i>Department of Physics, Panjab University, Chandigarh.</i></p> <p>Field Programmable Gate Arrays (FPGAs) are integrated circuits that can be programmed and reprogrammed rapidly after manufacturing. FPGAs support parallel processing, allowing multiple operations to be executed simultaneously. They also allow logic optimization. Hence, due to their high performance, low latency, and flexibility, FPGAs are widely used in hardware design and testing. FPGAs are ideal for Data Acquisition (DAQ) in detector hardware. DAQ systems convert real-world analog signals to digital form and process these signals directly, which can be done by FPGAs. This allows FPGAs to act as triggers, quickly filtering significant events, due to their parallelisation support. They can also run algorithms, like the Hough Transformation for edge detection, amongst other things. This poster will include these merits and application of FPGAs and how they can be implemented and used in detector physics. It will include the conversion of input analog signals to digital and performing logical operations. It will focus on how FPGAs overcome the limitations of fixed logic circuits and serial processing constraints, providing a more flexible, high-performance solution with optimized capabilities.</p>





# SHODH SAMVAD

## LIST OF THE CANDIDATES FOR SHODH SAMWAD COMPETITION

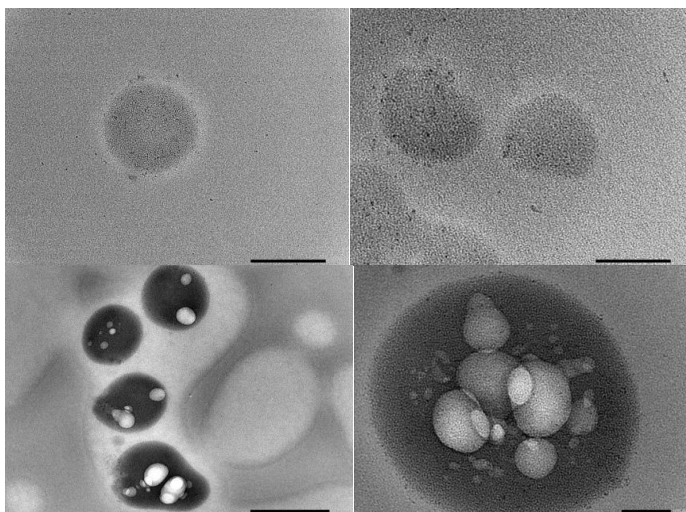
S.No.	Name of the Participant	Affiliating Institution	Title of Abstract
1.	Parina Kumari	Department of Pharmaceutics, University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Dissolvable wound healing patches for diabetic foot ulcer.
2.	Purvi Arora	Department of Pharmaceutics, University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Trigonelline loaded nanoshots for the treatment of gastric ulcer.
3.	Vandita kakkar	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.	Journey from ideation to proof of concept: topical ointment for skin inflammatory conditions.
4.	Dr. Harender kumar	Post Graduate Government college, Sector-11, Chandigarh.	Probiotics and prebiotics: bridging the interplay of gut microbiota and stress resilience.
5.	Dr. Priyanka Sinha	Resource Center, Lamrin Tech Skills University, Ropar, Punjab.	Revolutionary Library Accessibility through Novel Virtual Tours and Interactive Frameworks.
6.	Ankita Priyadarshini	Department of Biological Sciences, Indian Institute of Science Education and Research, Mohali, Punjab.	Long non-coding RNA 19146, an emerging therapeutic target against impaired diabetic wound healing.
7.	Dr. Buntly Sharma	SAIF/CIL Panjab University, Chandigarh.	Engineered Nano-Functionalized Natural Fiber Membranes for Wastewater Treatment.
8.	Payal Arora	Department of Zoology, Punjab Agricultural	Cutting-Edge Rodent Control: Harnessing Papaya Seed

		University, Ludhiana, Panjab.	Nanoparticles for Sustainable Pest Management.
9.	Deepak Kumar Goyal	Parasitology Laboratory, Department of Zoology, Panjab University, Chandigarh	Evaluation of prophylactic vaccines against fatal 'kala-azar.'
10.	Panchali Barman	Institute of Forensic Science and Criminology, Panjab University, Chandigarh.	A Portable User-Friendly Biosensor for Sensitive and Selective Detection of Prostate-Specific Antigen in Blood and Semen Samples.
11.	Divjot Kaur	Child Growth and Anthropology Unit, Department of Pediatrics, PGIMER, Chandigarh.	Head circumference-for-age percentiles for Down Syndrome Children: A mixed-longitudinal study from North-West India.
12.	Dr. Moneesh Thakur	Veterinary Polyclinic Kotla Behar, Kangra, Himachal Pradesh.	Green synthesized nano-silver formulations along with its amelioration with herbal essential oils to cure demodicosis in dogs.

S. No.	Abstract
1.	<p data-bbox="337 296 1419 373"><b>DISSOLVABLE WOUND HEALING PATCHES FOR DIABETIC FOOT ULCER</b></p> <p data-bbox="337 436 1354 548"><u>Parina Kumari and Vandita Kakkar</u> <i>Department of Pharmaceutics, University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p data-bbox="337 600 1419 1436">Diabetic foot ulcers (DFUs) are a prevalent complication among diabetes mellitus patients, posing significant clinical challenges and high healthcare costs. Despite advancements in treatment, many DFUs remain unhealed within a year, leading to severe outcomes such as infections and amputations. This study aims to develop an innovative therapeutic approach to address the limitations of conventional treatments. We propose a dissolvable patch embedded with nanostructured lipid carriers (NLCs) co-loaded with tetrahydrocurcumin (THC) and folic acid (FA). THC, known for its anti-inflammatory and antioxidant properties, and FA, crucial for DNA synthesis and cellular proliferation, offer promising benefits for wound healing. The research involved preformulation studies to select appropriate lipidic components and establish a scalable method for NLC preparation through microemulsification and high-speed homogenization. Characterization studies confirmed the stability, particle size, and entrapment efficiency of the NLCs. <i>In-vitro</i> studies demonstrated sustained drug release and acceptable cytotoxicity profiles, indicating the patch's potential efficacy. The dissolvable nature of the patch ensures ease of application and enhances patient compliance, while its biodegradable composition eliminates the need for painful dressing removal. This novel formulation represents a significant advancement in DFU management, with the potential to improve clinical outcomes and reduce healthcare burdens. Future directions include conducting clinical trials, optimizing the formulation, exploring applications for other wound types, and ensuring scalability and regulatory compliance. This research lays the foundation for a patient-friendly, effective, and safe treatment option for DFUs, promising to transform wound care management.</p>
2.	<p data-bbox="337 1482 1419 1549"><b>TRIGONELLINE LOADED NANOSHOTS FOR THE TREATMENT OF GASTRIC ULCER</b></p> <p data-bbox="337 1587 1370 1654"><u>Vandita Kakkar, Purvi Arora</u> <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p data-bbox="337 1692 1419 1831">The phytochemical from fenugreek, Trigonelline, shows promising results as stimulant for gastric mucosa secretion and protects stomach lining from ulcers. We aimed to overcome the challenges associated with the drug molecule, including hygroscopicity, bitter taste, odor, and limited potency. We prepare Nanoshot of</p>

trigonelline for prophylactic use as well as treatment of alcohol induced stomach ulcers.

TRG nanoshot was successfully prepared by high-speed homogenization technique. Preformulation studies and solubility studies aided in selection of suitable oils, surfactants, polymers, rheology modifiers and surfactant: co-surfactants. Characterization of the pure drug revealed the hygroscopic nature of TRG powder. Formulated TRG nanoshot had mean particle size < 150 nm, zeta potential of -0.21 mV and PDI was found to be 0.138.



**Figure 1: HRTEM images of prepared TRG nanoshot**

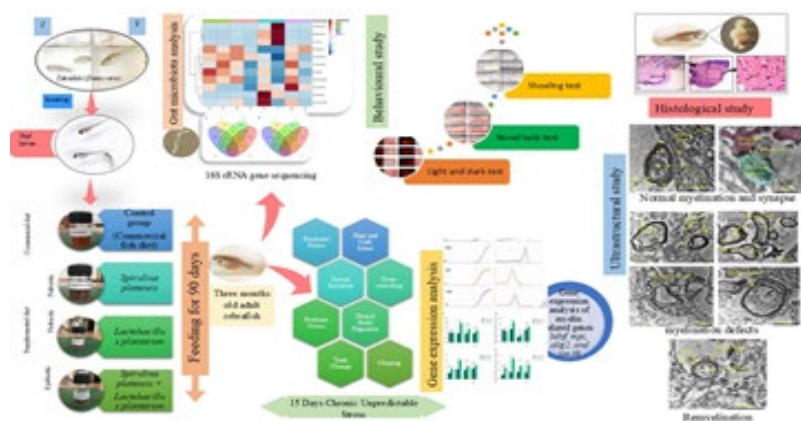
The ANC (Acid Neutralizing Capacity) of prepared nanoshot was assessed using an in vitro antiulcer activity approach. Although TRG nanoshot demonstrated a lower ANC compared to marketed formulation (Gelusil), it still displayed a favorable acid neutralizing capacity despite of very low dose (1.2 mg/ml).

*In-vivo* anti-ulcer activity of TRG nanoshot were assessed in experimental Wistar rats by employing acidified ethanol induced ulcer model. Ulcer healing potential of the treatment group was found similar to the standard treated as both showed complete healing of ulcers. Prophylactic group also showed significant ( $p < 0.001$ ) reduction in ulcer formation indicated the preventive action of TRG nanoshot. Biochemical estimation further confirms the anti-oxidant and anti-inflammatory action of nanoshot.

Present research encompasses the development and characterization of herbal nanoformulation which aimed at treating gastric ulcers. Through rigorous in-vitro and in-vivo investigations, the formulation has demonstrated remarkable efficacy in promoting ulcer healing and prevention, validating the therapeutic potential of its constituent drug molecules. The purposed nanoshot of TRG has been thought to potentially replace the current proton pump inhibitors (such as omeprazole, pantoprazole, etc.) which demonstrate side effects on their chronic usage like gastric neoplasia, impaired absorption of micronutrients, liver disease etc. Switching to herbal formulation alternatives such as Trigonelline will promise patient compliance with minimum side effects. Moreover, intake of trigonelline with versatile properties like anti-oxidant, anti-diabetic, anti-ulcer, hypolipidemic, neuroprotective and anti-

	tumor will serve as nutraceutical supplement and protective agent against wide array of ailments.
3.	<p><b>JOURNEY FROM IDEATION TO PROOF OF CONCEPT: TOPICAL OINTMENT FOR SKIN INFLAMMATORY CONDITIONS</b></p> <p>Vandita Kakkar, <u>Komal Saini</u>  <i>University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.</i></p> <p>Envisaging the multiplex pathogenic events in atopic dermatitis, which includes inflammation, oxidative stress and involvement of immune system, we evaluated a synergistic combination comprising of tetrahydrocurcumin (THC) loaded into nanoparticles (THC-LNs) for its antioxidant and anti-inflammatory properties in addition to being a non-staining and non-irritating molecule with high stability (pH 7.4) along with tacrolimus in form of an ointment. Particle size analysis and nanoparticle tracking analysis confirmed the particle size and concentration of THC-LNs. The confirmation of encapsulation of drug into nanoparticles was observed using FTIR and DSC. THC-LNs were found to be non-toxic and safe. <i>In-vitro</i> cytotoxicity and biocompatibility were confirmed by incubating THC-LNs with HDF cells, which showed high cell viability at 24 and 48 h. Flow cytometry was carried out to quantify the intracellular accumulation of nanoparticles. HDF cells demonstrated the concentration dependent uptake showing increase in uptake with increase in R-THC-LNs concentration. In case of pharmacodynamic study, biochemical estimation and histopathological investigations confirmed the efficacy of developed THC-Tacro ointment for the treatment of inflammation induced in animal model of atopic dermatitis. THC-Tacro ointment is expected to be safe, cost effective and a patient compliant product especially for pediatrics segment where no treatment is available till date. Keywords: Atopic dermatitis, tetrahydrocurcumin, tacrolimus, cell viability, biochemical estimation.</p>
4.	<p><b>PROBIOTICS AND PREBIOTICS: BRIDGING THE INTERPLAY OF GUT MICROBIOTA AND STRESS RESILIENCE</b></p> <p>Dr. Harender Kumar  <i>Post Graduate Government college, Sector-11, Chandigarh.</i></p> <p>In a fascinating investigation involving zebrafish, we aimed to uncover the crucial link between diet, gut health, and stress resilience. Central to this study was the gut-brain axis, a complex network facilitating communication between the gut and brain through neural, hormonal, and immune pathways. Stress is an inevitable part of everyone's life. To overcome it, different people have developed different coping mechanisms. Though some people become resilient to it, however, in others, its severity can result in a variety of mental health issues. A perusal of relevant literature indicated that stress can alter the basic composition of gut bacteria. Various brain</p>

related diseases have reported variations in the gut microbes composition. It has been observed that eating a healthy diet can help to counter the damaging effects of mental illnesses. It promotes the growth of beneficial gut bacteria which in turn affect brain functions directly or indirectly by the release of certain components. In light of this, the research was focused on two promising nutraceuticals gaining traction in the nutrition field: probiotics and prebiotics. We chose to investigate the effects of prebiotic *Arthrospira platensis* (commonly known as *Spirulina*) and probiotic *Lactobacillus plantarum*, both individually and in a synbiotic combination, on stress resilience in zebrafish. The study commenced with the supplementation of these nutrients in the diets of young zebrafish. As the fish matured, they were subjected to chronic unpredictable stress (CUS), simulating real-world stressors. The researchers meticulously assessed the fish behavior and analyzed changes in gut microbiota, brain histology, ultrastructure, and molecular responses. The results were striking. Zebrafish that had received the supplemented diets displayed remarkable resilience to stress. Unlike their counterparts on a standard diet, these fish did not exhibit anxiety-like behaviors when exposed to CUS. Furthermore, the supplemented fish showed a upheld gut microbiota composition, and enhanced myelin protection—crucial for healthy neural function—along with increased expression of myelin-related genes, effectively counteracting the adverse effects of stress. Ultimately, the study suggested that early dietary interventions with prebiotics, probiotics, and synbiotics could serve as a protective barrier against stress later in life. By nurturing the gut from a young age, the zebrafish demonstrated that it is possible to bolster stress resilience and mitigate the negative consequences of future stress exposure. Through this research, the intricate relationship between gut health and mental well-being became clearer, highlighting the importance of what we consume in shaping our emotional landscape. This investigation not only illuminated potential pathways for enhancing mental health but also opened doors to new dietary strategies for fostering resilience in the face of life's inevitable challenges.



Overview of the experimental design for the assessment of stress resilience in zebrafish with prebiotic, probiotic and symbiotic.



5.

## REVOLUTIONARY LIBRARY ACCESSIBILITY THROUGH NOVEL VIRTUAL TOURS AND INTERACTIVE FRAMEWORKS

Dr. Priyanka Sinha<sup>1,4\*</sup>, Dr. Hreetabh Kishore<sup>2</sup>, Abhishek Sinha<sup>3</sup> and Dr Khushpreet Singh Brar<sup>4</sup>

<sup>1</sup>Learning Resource Center, Lamrin Tech Skills University, Ropar, Punjab, India-140001. <sup>2</sup>Research and Innovation Section, Lamrin Tech Skills University, Ropar, Punjab, India-140001. <sup>3</sup>House No 230 New, Lane No -3, Muzaffarpur, Bihar, India - 842002. <sup>4</sup>Department of Library and Information Science, Panjab University, Chandigarh.

In today's digital age, libraries face the challenge of providing flexible, user-centered resources that can meet the dynamic needs of patrons. The idea of an interactive virtual library tour is a pioneering concept that aims to enhance library accessibility through an immersive digital experience. This transnational research project validates a novel system that combines IoT, Bluetooth Low Energy (BLE), and web service technologies, offering library users a new way to engage with library collections and services virtually.

**Methodology:** The project's framework is structured across three layers to ensure efficient and streamlined user interaction:

1. **Layer-1 (GATT Server - Shelves):** The GATT server consists of the library shelves, each embedded with BLE technology. These shelves periodically broadcast unique beacon signals UUID (Universally unique identifier) and RSSI (Received Signal Strength Indicator), which serve as identifiers for the library sections and collections.
2. **Layer-2 (GATT Client - User Devices):** Smart devices such as smartphones or laptops act as GATT clients. They continuously scan for nearby beacons and retrieve relevant data about specific shelves. When a user approaches a shelf, the client identifies the closest one based on RSSI values and sends this beacon ID to the cloud server.
3. **Layer-3 (Web Service - Cloud Server):** The cloud server receives the beacon ID from Layer-2 and returns a list of books in that particular shelf to the user's device, enabling further sorting and searching.

This layered system ensures a seamless flow of information between physical and virtual spaces. The user can explore the library collections on their device through a responsive interface, allowing a virtual "tour" experience.

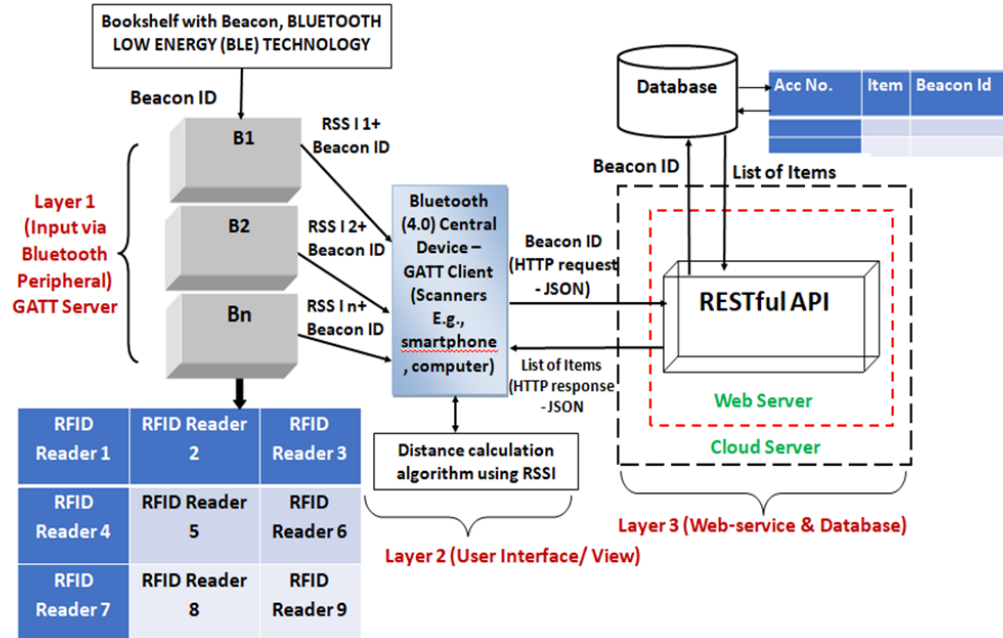


Figure 1: Schematic representation of virtual library tour system (IoT Beacon technology)

**Benefits to Society:** The virtual library tour framework offers multiple benefits for both library patrons and the larger community deal into education system. New users can quickly familiarize themselves with the library’s layout, collections, and resources. Reference librarians can also guide users through virtual interactions, making remote assistance feasible. For individuals with visual impairments, additional features such as Pytesseract integration enable enhanced accessibility, ensuring an inclusive experience. Additionally, the framework fosters a learning environment where primary research and exploration are encouraged. Users can receive live updates on new additions to the library, enhancing information literacy and promoting lifelong learning. The project’s scalability suggests potential applications in various sectors, such as museums, educational institutions, and other public resource centers. The National Education Policy (NEP) 2020 places a lot of emphasis on the IoT in an effort to better align the Indian educational system with the demands of the twenty-first century. NEP 2020 promotes the use of technology to raise educational standards, expand access, and improve the teaching-learning process as this project aligns to NEP.

**Potential Outcomes for Public Welfare:** This interactive and intuitive framework transforms library engagement, making resources more accessible and user-friendly. By enabling a digital bridge between users and library resources, it fosters efficient knowledge sharing and information accessibility. The technology’s versatility also implies future expansions into related fields, creating a blueprint for smart, interactive spaces that serve public welfare.

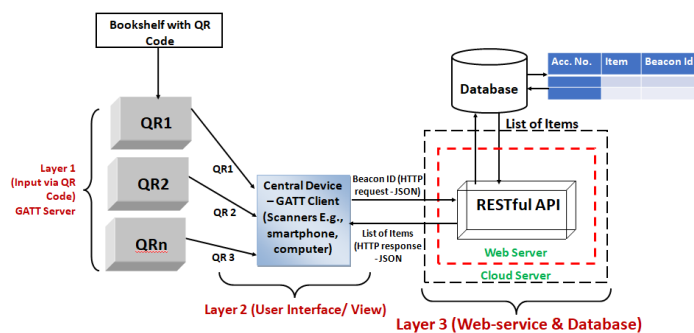


Figure 2: Schematic representation of virtual library tour system (QR Code)

### Terminologies

1. GATT: Generic AT Tribute
2. GATT Server: A device that advertises its presence
3. GATT Client: A device that scans for and connects to BLE peripherals
4. BLE: Bluetooth Low Energy, supported by Bluetooth 4.0 and above
5. RSSI: Received Signal Strength Indicator
6. RFID: Radio Frequency Identification
7. UUID: Universally unique identifier
8. IoT: Internet of Things
9. QR: Quick Response code

**Acknowledgement:** Inventors of this conceptual and novel research story have acknowledged Department of Library and Information Science for its contribution in providing administrative facilities, proofreading, and originality checking. Its contribution is highly appreciable.

## 6. LONG NON-CODING RNA 19146, AN EMERGING THERAPEUTIC TARGET AGAINST IMPAIRED DIABETIC WOUND HEALING

Ankita Priyadarshini<sup>1\*</sup>, Riya Madan<sup>1</sup>, Soumyodeep Das<sup>1</sup>, Debajyoti Basu<sup>1</sup>, Khushi Bhattacharya<sup>1</sup>, Parijat Senapati<sup>2</sup> and Sadhan Das<sup>1</sup>

<sup>1</sup>Department of Biological Sciences, Indian Institute of Science Education and Research, Mohali, Punjab, India, <sup>2</sup>BRIC-Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram, Kerala.

Impaired wound healing is one of the major complications of diabetes resulting in severe morbidity and mortality worldwide. In India, approximately 15% of diabetic patients suffer from foot ulcers and often undergo lower-leg amputation. One of the key immune cells involved in wound healing is the macrophages. Macrophages show a remarkable feature of phenotypic switching from M1 (pro-inflammatory) to M2 (anti-inflammatory) phenotype. The failure of this M1 to M2 transition in diabetic conditions leads to a sustained pro-inflammatory environment contributing to delayed wound healing/closure. Emerging evidence reveals the role of epigenetic regulators such as long non-coding RNAs (lncRNAs) in macrophage function. lncRNAs are involved in diverse cellular functions and can be used as promising diagnostic

	<p>markers for various diseases like cancer, cardiovascular diseases and diabetes. However, their functional role in macrophage polarization and diabetic wound healing remains unclear. Here, we isolated primary (<i>ex-vivo</i>) splenic monocytes from diabetic (db/db) and non-diabetic (db/+) mice and differentiated them into uncommitted (UT), M1, and M2 macrophages using standard cytokine cocktails and performed RNA-sequencing and gene expression analysis. Our RNA-sequencing analysis identifies differentially expressed coding and non-coding genes including lncRNAs in UT, M1, and M2 splenic macrophages of diabetic mice. We identified and validated a novel lncRNA called <i>lncRNA 19146</i> which was upregulated in splenic M2 macrophages as compared to M1 macrophages. To understand the role of <i>lncRNA 19146</i> in diabetic wound-site, we generated wounds in db/+ and db/db mice and collected the cells post-7 days of wound induction and performed gene expression analysis. Our RT-qPCR analysis revealed <i>lncRNA 19146</i> is downregulated in M2 macrophages of db/db mice as compared to db/+ mice. This data indicates that <i>lncRNA 19146</i> could be an anti-inflammatory lncRNA whose downregulation in db/db mice might contribute to delayed wound closure. Further to explore the regulatory mechanism of <i>lncRNA 19146</i>, which majorly depends upon its subcellular localization, we performed cellular fractionation and found <i>lncRNA 19146</i> is localized in the cytoplasm suggesting its plausible role at the translational/post-translational level. Moreover, lncRNAs have been shown to influence the expression of nearby or distant genes through <i>cis</i> or <i>trans</i> mechanism. Through <i>in-silico</i> analysis we found <i>lncRNA 19146</i> is a natural antisense transcript that completely overlaps on <i>Gas6</i>. <i>Gas6</i> is an anti-inflammatory protein that regulates the macrophage function and polarizes M1 to M2 macrophages. We checked the expression of <i>Gas6</i> in db/+ and db/db wound-site derived macrophages and found a decreased expression of <i>Gas6</i> in db/db M2 macrophages similar to <i>lncRNA 19146</i> indicating <i>lncRNA 19146</i> and <i>Gas6</i> might be co-regulated and play a protective role in diabetic wound healing. Further <i>lncRNA 19146</i> and its genomic organization is conserved in human, suggesting its possible role in wound healing. Currently we are focusing on elucidating the functional and mechanistic role of <i>lncRNA 19146</i> and <i>Gas6</i> in impaired macrophage polarization associated with delayed wound healing in diabetes. Targeting <i>lncRNA 19146</i> and <i>Gas6</i> through novel RNA-based therapies or CRISPR/Cas9 genome editing could help us explore its translational potential to treat diabetic foot ulcers. <b>Acknowledgements:</b> DBT/India Alliance, IISER-Mohali, and members of Das Laboratory.</p>
7	<p><b>ENGINEERED NANO-FUNCTIONALIZED NATURAL FIBER MEMBRANES FOR WASTEWATER TREATMENT</b></p> <p><u>Dr. Bunt Sharma</u><sup>1</sup>, Dr. Moondeep Chauhan<sup>2</sup>, Dr. Rajeev Kumar<sup>3</sup>, Prof. Ganga Ram Chaudhary<sup>4</sup></p> <p><sup>1</sup>SAIF/CIL Panjab University, Chandigarh, <sup>2</sup>School of Environment Science, Amity University, Mohali, 140306, Panjab, <sup>3</sup>Department of Environment Studies, Panjab University, Chandigarh, <sup>4</sup>Department of Chemistry and Centre for Advance Studies</p>

*in Chemistry, Panjab University, Chandigarh, and SAIF/CIL Panjab University, Chandigarh.*

A critical assessment of severe water pollutants highlights the accumulation of dyes and active pharmaceutical ingredients (APIs) in water reservoirs, posing significant risks to human and aquatic ecosystems. These pollutants, identified as concerns by WHO and the UN, are not effectively treated by existing wastewater treatment plants (WWTPs), leading to contamination of lakes and rivers. Conventional wastewater technologies struggle with these chemically stable, recalcitrant compounds, necessitating sustainable solutions for wastewater treatment. Our research focuses on the innovative use of natural materials, specifically engineered nano-functionalized natural fiber membranes. We present a novel method for synthesizing large-scale zinc oxide (ZnO) nanorods on substrates derived from *Sansevieria trifasciata* leaves. Using a two-step low-temperature hydrothermal growth strategy, we first apply a ZnO nanosol coating through sol-gel dip-coating, followed by hydrothermal growth to create vertically oriented, densely packed ZnO nanorods. This approach, encompassing all stages from fiber extraction to surface modification, is economical and environmentally friendly. The resulting nano-functionalized fibers exhibit exceptional photocatalytic and self-cleaning capabilities for degrading organic dyes and drugs, alongside impressive antimicrobial activity against MRSA. Additionally, these membranes demonstrate remarkable mechanical strength and recyclability. Our findings indicate that ZnO nanomaterial-functionalized fibers can significantly enhance water purification, biomedical applications, flexible electronics, and smart textiles. This work addresses critical environmental challenges and paves the way for sustainable technology solutions in materials science. We have successfully applied this technology to industrial effluent, demonstrating excellent results.

8. **CUTTING-EDGE RODENT CONTROL: HARNESSING PAPAYA SEED NANOPARTICLES FOR SUSTAINABLE PEST MANAGEMENT**

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<sup>1</sup>*Department of Zoology, Punjab Agricultural University,* <sup>2</sup>*Department of Zoology, Punjab Agricultural University.*

For the first time, papaya seed chloroform extract-based solid lipid nanoparticles (PSCEN) were formulated and its toxic and anti-reproductive effects were explored in male *Bandicota bengalensis*. The nanoparticles, ranging in size from 300 to 600 nm, were spherical in shape. Field-captured mature male rats were fed bait containing two different concentrations of PSCEN (5% and 10%) in bi-choice setup for 15 days. The mean total ingestion of the active ingredient varied from 21.30 to 29.40 g/kg body weight in the two treated groups. Significant effects were observed on the histology of testis and cauda epididymis, including reduced number of germ cells, dissociation of the seminiferous epithelial cycle, and a decrease in spermatozoa. Plasma levels of testosterone, FSH, LH, and GnRH significantly decreased in treated rats. Reduction in total soluble proteins, lipids, phospholipids, cholesterol, 17 $\beta$ -HSD, and 3 $\beta$ -HSD levels was also observed, further indicating PSCEN's anti-reproductive effects.

	<p>However, no significant changes were found in LDH, ACP, ALP, AST, or ALT levels in liver and plasma, nor were there any histological changes in the liver, indicating no toxic effects from the nanoparticles. There was a significant increase in SOD, CAT, GPx, and LPO levels and decrease in GR in plasma of treated rats. Even after 105 days of treatment withdrawal, there were no major differences in enzyme and biochemical levels between control and treated rats, suggesting long-term, irreversible effects. The findings indicate that PSCEN could be further evaluated for regulating rodent pest fertility in field conditions. Keywords: Antifertility effects, Chloroform extract, Nanoparticles.</p>
9.	<p><b>Evaluation Of Prophylactic Vaccines Against Fatal ‘Kala-Azar’</b></p> <p>Deepak Kumar Goyal, Poonam Keshav, Sukhbir Kaur <i>Parasitology Laboratory, Department of Zoology, Panjab University, Chandigarh.</i></p> <p>Infectious diseases have been thrilling the world since long time. Still, we are facing many such diseases and situation is tough as the preventive vaccine is not available to protect the populations. Protozoan parasite of genus <i>Leishmania</i> leads to the infectious disease named leishmaniasis with three forms viz. cutaneous, mucocutaneous and visceral. The latter is the dreaded and fatal in the absence of complete and timely treatment. Chemotherapy is given to patients that leads to severe side effects and recurrence of disease is also another challenge. No vaccine is available to prevent the leishmanial infection. Hence, we aimed to assess the vaccine against leishmaniasis in mouse model. Inactivated antigen was prepared to formulate the vaccine. The efficacy was improved by the addition of adjuvants. The findings of the study showed that formulated vaccines result in a low parasite burden and higher immune response in vaccinated animals. Hence, the tested vaccines can be further assessed in higher animal models.</p>
10.	<p><b>A PORTABLE USER-FRIENDLY BIOSENSOR FOR SENSITIVE AND SELECTIVE DETECTION OF PROSTATE-SPECIFIC ANTIGEN IN BLOOD AND SEMEN SAMPLES</b></p> <p><u>Panchali Barman</u><sup>1</sup>, Avneet Saini<sup>2</sup> <i><sup>1</sup>Institute of Forensic Science and Criminology, Panjab University, Sector 14, Chandigarh, <sup>2</sup>Department of Biophysics, Panjab University, Sector 25, Chandigarh.</i></p> <p>Prostate-specific antigen (PSA) is a key biomarker extensively used in healthcare for diagnosing and monitoring prostate cancer. Additionally, its high concentration in semen makes it an essential marker for identifying seminal fluid in forensic investigations. Considering its dual-role in healthcare and forensics, this study introduces a portable and user-friendly biosensor for sensitive and selective detection of PSA in both blood and semen, achieving a detection limit of 7 ng/mL. A novel peptide, derived from the complementarity-determining regions of a monoclonal antibody specific to PSA, was employed as the bioreceptor. Following a comprehensive evaluation of the peptide’s binding affinity to PSA, a colorimetric</p>

	<p>biosensor was developed using gold nanoparticles conjugated with the peptide, which was further integrated into paper strips fabricated using cellulose extracted from waste biomass. The biosensor was thoroughly characterized using spectroscopic and microscopic techniques, and its efficacy was tested on real-time biological samples collected from healthy volunteers and prostate cancer patients. This biodegradable and non-invasive biosensor offers a cost-effective solution for PSA detection, providing significant advantages for early disease diagnosis of prostate cancer in healthcare and aiding legal investigations with sustainable and zero-waste technology.</p>
11.	<p><b>HEAD CIRCUMFERENCE-FOR-AGE PERCENTILES FOR DOWN SYNDROME CHILDREN: A MIXED-LONGITUDINAL STUDY FROM NORTH-WEST INDIA</b></p> <p>Harvinder Kaur<sup>1</sup>, Anil kumar Bhalla<sup>2</sup>, <u>Divjot Kaur</u><sup>2</sup>, Neha Sudhera<sup>2</sup>, Rupinder Kaur<sup>2</sup>, Inusha Panigrahi<sup>2</sup></p> <p><sup>1</sup><i>Child Growth and Anthropology Unit, Department of Pediatrics, PGIMER Chandigarh,</i> <sup>2</sup><i>Child Growth and Anthropology Unit, Department of Pediatrics, PGIMER, Chandigarh.</i></p> <p>This study aims to create age- and gender-specific growth percentiles for head circumference (HC) to serve as a reference for Indian children with Down syndrome (DS). Methods: Over a period of 24 years, we gathered 2,474 head circumference measurements from 1,125 karyotypically confirmed cases of free trisomy 21, including 752 males and 373 females, aged from less than 1 month to 10 years. Measurements were taken using a standardized anthropometric technique within a mixed-longitudinal growth research framework. Results: Our analysis revealed a consistent increase in mean head circumference among both male and female DS children, with boys exhibiting significantly larger HC than girls. Of the cases studied, 12.9% had normal head circumference, 27.2% had small head size, and 59.9% presented with microcephaly. We constructed percentiles for head circumference specific to boys and girls with Down syndrome, covering ages from &lt;1 month to 10 years. Conclusion: There is a crucial need to monitor the growth of children with Down syndrome using tailored and population-specific growth charts. The age- and gender-specific head circumference percentiles developed in this study provide an essential resource for growth monitoring and can facilitate comparisons across different populations. These findings underscore the importance of specialized reference data for the effective management of children with Down syndrome in India.</p>
12.	<p><b>GREEN SYNTHESIZED NANO-SILVER FORMULATIONS ALONG WITH ITS AMELIORATION WITH HERBAL ESSENTIAL OILS TO CURE DEMODICOSIS IN DOGS</b></p> <p><u>Dr. Moneesh Thakur</u></p> <p><i>Veterinary Polyclinic Kotla Behar, Kangra, Himachal Pradesh.</i></p>

A total of 1200 dogs were screened for demodicosis and 35 cases were confirmed for demodicosis by skin scraping & PCR examination. Overall incidence of demodicosis was 2.91%. Month wise incidence study revealed highest incidence in summer season and lowest in the winter season. Dogs of 0-6 months and >3 years age group was found more susceptible to demodicosis. Sex wise incidence showed males were more susceptible. Breed wise incidence revealed crossbred dogs were more affected followed by American Pitbull. The typical characteristics of *Demodex* spp. were confirmed by skin scraping examination while PCR examination demonstrated 100% by the amplification of an approximately 483bp. Sequencing of PCR products were analyzed by BLAST. The sequence of the PCR product of positive samples was submitted to NCBI GenBank for accession number and MK177513 accession number was obtained for GenBank. Anaemia, Leucocytosis, Eosinophilia, Hypoalbuminemia significant increase in globulin, blood glucose, total protein were the characteristics haemato-biochemical changes in canine demodicosis. Study of oxidant-antioxidant status of demodicosis, revealed a significant reduction in the mean values TA, GSH, SOD, LPO in affected dogs. The therapeutic evaluation of herbal formulation against demodicosis revealed all the parameters viz, haemato-biochemical changes and oxidant-antioxidant status was improved on day 21 post therapy onwards which was similar with standard therapy. i.e. Amitraz. From the present study it seems that Herbo-Nano medicine can be an effective alternative of Amitraz in case of demodicosis. Keywords: Dog, Molecular Technique, Haemato-Biochemical, Oxidant-Antioxidant, Herbo Nano Medicine.

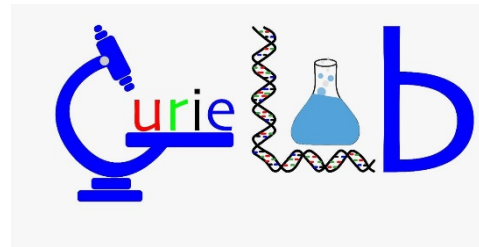


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