CHASCON 2025

(18th Chandigarh Science Congress)

NATIONAL CONFERENCE

on

Empowering Humanity: Science, Technology, and Healthcare for All

November 6-8, 2025

ABSTRACT BOOK

ABSTRACT BOOK CHASCON 2025

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Prof. Renu Vig

Vice Chancellor, Panjab University, Chandigarh

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ABOUT CHASCON 2025

The 18th Chandigarh Science Congress (CHASCON) will take place at Panjab University from November 06 - 08, 2025. Introduced in 2007, CHASCON has grown into a major national conference that brings together young researchers, experienced faculty, industry professionals, and policymakers from across India and beyond. CHASCON provides a platform for sharing research, exchanging fresh ideas, and finding innovative scientific and technological solutions to realworld problems. This year's theme, "Empowering Humanity: Science, Technology, and Healthcare for All," puts the spotlight on the crucial role of scientific discovery and technological advancements in improving lives and ensuring access to quality healthcare for everyone.

Across three days, CHASCON 2025 will feature plenary lectures by leading scientists, engaging panel discussions, and a series of oral and poster presentations by students, scholars, and researchers. The program also includes an interactive industry expo, special innovation competitions, and opportunities for researchers to display their latest work. Organized in partnership with the Chandigarh Region Innovation and Knowledge Cluster (CRIKC), the event strengthens the bridge between academia, industry, and government. By bringing together participants from multiple disciplines and backgrounds, CHASCON nurtures scientific curiosity, encourages collaboration, and builds a vibrant network dedicated to transforming society through knowledge and innovation. We encourage students, researchers, and professionals to participate in CHASCON 2025 and help shape a future where science, technology, and healthcare truly empower every individual.

ABOUT PANJAB UNIVERSITY

Panjab University, established in 1882 in Lahore and supported by public funding, is among India’s earliest universities. After Partition, it was relocated to its current campus in Chandigarh (1958–59), where it continues its tradition of academic excellence. The university’s legacy includes distinguished alumni such as former President Dr. Shankar Dayal Sharma and former Prime Ministers Shri I.K. Gujral and Dr. Manmohan Singh, as well as Nobel laureates, scientists, public figures, artists, and athletes. The Chandigarh campus houses 73 teaching and research departments, institutes, and centres, alongside four independent research chairs. The university network extends to 189 affiliated and constituent colleges across Punjab and Chandigarh, and regional centres in Muktsar, Ludhiana, Hoshiarpur, and Kauni. Panjab University has been awarded an ‘A++’ grade by NAAC (2023) and secured the top rank in the ARIIA innovation rankings (2021).

The university is a partner in prominent global high-energy physics programs at Fermilab (USA), CERN (Switzerland), and KEK (Japan), and has MoUs with leading institutions in the UK, Australia, Thailand, the USA, and others. It also collaborates with premier Indian institutes such as IARI, GBPUAT, HFRI, IIT Roorkee, PGIMER, IMTECH, and CSIO. Through initiatives like RUSA-supported Pre-Incubation and Skill Development Centres, BioNEST-PU (with BIRAC), and the DST-funded Technology Enabling Centre, Panjab University promotes research, innovation, entrepreneurship, and strong industry-academia partnerships.

About CRIKC

The Chandigarh Region Innovation and Knowledge Cluster (CRIKC), established at Panjab University in 2012, is a consortium of 29 premier institutions aimed at fostering academic alliances, promoting innovation, and advancing knowledge creation while preserving institutional autonomy. Inspired by the Narayan Murthy Report (2012), Knowledge Commission Report, 12th Plan Document, MHRD's RUSA (Meta-University concept), and STI Policy 2013, CRIKC was formally named in November 2012 and gained support from MP Shri Pawan Bansal, who allocated ₹1 crore for its development. Its mission is to cultivate collaboration among higher education and research institutions in the region to achieve excellence in education and research aligned with national priorities and UN SDGs. CRIKC focuses on joint research projects, collaborative teaching/ training programs, shared use of research facilities, and nurturing scientific culture from school level. It promotes excellence in Biomedical Sciences, Nano-science & Nanotechnology, and Theoretical Studies, while supporting policy planning for better understanding of GOI programs and societal needs. Key initiatives include CHASCON (annual science congress), CRIKC Ignited Minds (scientific temper in schools), Shodh Samvad (PhD collaboration), and the Advance Drone Tech Centre at Panjab University. Member institutes and universities include PGIMER, GMCH-32, IIT Ropar, IISER, PEC, NIPER, CSIR-IMTECH, DRDO labs (SASE, TBRL), NABI, INST, Chitkara University, Rayat-Bahra University, and Desh Bhagat University. Through these alliances, CRIKC enables resource pooling, interdisciplinary research, and industry-academia partnerships. Its programs also foster leadership among young researchers, strengthen links between academia and society, and provide a platform to address regional and national development goals. Over the years, CRIKC has emerged as a significant driver of innovation-led socio-economic growth, transforming Chandigarh into a hub of research, knowledge exchange, and scientific excellence.

ABOUT CHANDIGARH

Chandigarh, envisioned as the dream city of India's first Prime Minister, Pandit Jawaharlal Nehru, was designed by renowned French architect Le Corbusier. Nestled at the base of the Shivalik Hills, it stands as a remarkable example of 20th-century urban planning and modern architecture in India. Conceived to replace Lahore, the former capital of Punjab, the city's development began in 1948 under the Government of Punjab, with support from the Government of India. Its foundation stone was laid in 1952. Following the reorganization of Punjab in 1966, Chandigarh was designated as a Union Territory, yet continues to serve as the capital of both Punjab and Haryana. The city's design is centered around four key functions: living, working, care of the body and spirit, and circulation. The residential sectors represent the living component, while areas such as the Capitol Complex, City Centre, Educational Zone (including institutions like PGIMER, Punjab Engineering College, and Panjab University), and the Industrial Area form the working segment. For physical and mental well-being, spaces like the Leisure Valley, gardens, sector greens, and open courtyards were created. The transport network is structured around seven types of roads, known as the 7Vs, with an additional V8 route later developed specifically for cyclists. Chandigarh offers several popular tourist attractions. The Leisure Valley, stretching across 8 km, features a series of beautifully maintained parks such as the Rose Garden, Bougainvillea Garden, and Topiary Park. The iconic Rock Garden is a unique artistic space displaying vibrant sculptures and installations crafted from recycled materials salvaged from demolished buildings. Another must-visit spot is Sukhna Lake, known for its serene atmosphere and range of activities, including boating on paddle boats and shikaras, camel rides, portrait sketching, and mechanical bull rides. Visitors can also explore the nearby Bird Park. Additionally, the scenic hill stations of Shimla and Kasauli are located just a short drive away, making them perfect for day trips.

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18th CHANDIGARH SCIENCE CONGRESS (CHASCON-2025)
National Conference
on
'Empowering Humanity: Science, Technology and Healthcare for All'
November 6-8, 2025
Program
Day 1 (November 06, 2025)
Venue: Law Auditorium, Panjab University, Chandigarh

08:30 AM-09:30 AM	**Registration of Participants**
09:45 AM-11:30 AM	**Inauguration of CHASCON-2025**
09:45 AM	PU Anthem
09:50 AM	Welcome of Guests and Lamp Lighting
10:00 AM	**Introduction to the theme of CHASCON-2025 by Prof Kashmir Singh**
10:05 AM	Release of CHASCON-2025 Souvenir and Book on Technology Transfer
10:10 AM	**Inaugural address by Prof Renu Vig** Hon'ble Vice-Chancellor, Panjab University, Chandigarh
10:20 AM	**Keynote Address by: Sh R. R. Mittar** Ex DG Telecommunications Engineering Center and presently member of TRAI
11:00 AM	**Address by the Guest of Honour: Sh Sanjiv Singh Sethi** Managing Director, Gilard
11:10 AM	**Address by Chief Guest Dr. Sanjay Kumar** Chairman, Agricultural Scientist Recruitment Board, ICAR, Govt of India.
11:25 AM	**Vote of thanks: Prof Meenakshi Goyal** Director, Research and Development Cell, PU
11:30 AM	**Inauguration of EXPO-CHASCON-2025** Venue: Law Auditorium Grounds
11:30 AM -12:00 PM	Networking Tea
Technical Session-I: Research and Innovation ecosystem in India **Venue: Law Auditorium, Panjab University, Chandigarh** **Session Chair: Prof (Dr.) Naveen Gupta, Chairperson, Dept. of Microbiology, PU**	
12:00 PM -12:45 PM	**Plenary Lecture 1** **"Inclusive innovations through sustainable & responsible science"** **Prof. Anil Gupta, (Padma Shree Awardee), IIIM-Ahmedabad**
12:45 PM -13:30 PM	**Plenary Lecture 2** **"The Fork in the Road: Corporate Ladder VS Entrepreneurial Leap"** **Sh Manish Verma, CEO Blue Angel**
13:30 PM -14:15 PM	Lunch Break & Networking
Technical Session-II: Health and Medical Sciences **Venue: Law Auditorium, Panjab University, Chandigarh** **Session Chair: Prof Deepak Gupta, Principal, HSJIDS, PU**	
14:30 PM -15:15 PM	**Plenary Lecture 3** **"Health care in the era of Artificial Intelligence"** **Prof Dr Digambar Behera (Padma Shree)** **President, National Academy of Medical Sciences**
15:15 PM -16:00 PM	**Plenary Lecture 4** **"Genetics of cardiomyopathies"** **Dr. Ajay Bahl, Cardiologist, PGIMER, Chandigarh**
16:00 PM	Networking Tea
18:00 PM	**Cultural Program (law Auditorium)**

Day 2 (November 07, 2025)

Venue: Respective Departments for Sectional Activities

09:00 AM -10:30 AM	**Scientific Session**
10:30 AM -11:00 AM	Tea Break & Networking
11:00 AM -13:00 PM	**Oral Presentations**
13:00 PM -14:00 PM	Lunch Break & Networking (grounds opposite law auditorium)
14:00 PM -16:30 PM	**Poster Presentations**
15:00 PM -16:30 AM	**[CHASCON - CRIKC SHODH SAMVAD]** **Moderator: Prof. (Dr) Naveen Gupta** **Venue: Seminar room, Department of Biotechnology, BMS Block I, Sector 25, Chandigarh.**
16:30 PM	Tea Break & Networking

Day 3 (November 08, 2025)

Valedictory Function

Venue: English Auditorium, Panjab University, Chandigarh

10:00-11:30 AM	**Valedictory Function and Prize Distribution**
10:00 AM	PU anthem
10:05 AM	Felicitation of Guests
10:10 AM	**Summary of various activities conducted and the outcome of CHASCON-2025 by Prof Naveen Gupta**
10:20 AM	**Address by Prof Renu Vig** Hon’ble Vice Chancellor, Panjab University, Chandigarh
10:30 AM	**Address by Guest of Honour Dr. A. Suryachandra Rao** Director, Indian Institute of Tropical Meteorology, Pune
10:40 AM	**Address by Chief Guest, Dr. M. Ravichandran** Secretary, Ministry of Earth, Government of India
10:55 AM	**Prize Distribution Ceremony**
11:30 AM	**Vote of Thanks: Prof Deepak Gupta**
11:35 AM	High Tea

SCIENTIFIC SECTIONS

SECTIONS	THEMATIC AREAS
Basic Medical Sciences	Biochemistry, Biophysics, Biotechnology, Microbiology, Microbial Biotechnology, Stem Cell & Tissue Engineering, Human Genome Studies and Research, Systems Biology & Bioinformatics, Nuclear Medicine, Public Health
Chemical Sciences	Chemistry
Dental Sciences	Dr. Harvansh Singh Judge Institute of Dental Sciences & Hospital
Earth And Environmental Sciences	Geology, Geography, Environment Studies
Engineering Sciences	University Institute of Engineering & Technology (UIET), University Institute of Chemical Engineering and Technology(UICET), Sophisticated Analytical Instrumentation Facility (SAIF)
Management Sciences	University Institute of Applied Management Sciences (UIAMS), University Business School (UBS), University Institute of Hotel & Tourism Management (UIHTM), University Institute of FashionTechnology & Vocational Development (UIFT)
Life Sciences	Botany, Zoology, Anthropology, Forensic Science and Criminology
Mathematical Sciences	Mathematics, Statistics, Computer Science and Applications
Pharmaceutical Sciences	University Institute of Pharmaceutical Sciences
Physical Sciences	Physics, Nanoscience & Nanotechnology, Medical Physics

MESSAGES

नायब सिंह
NAYAB SINGH

सत्यमेव जयते

मुख्य मन्त्री, हरियाणा,
चण्डीगढ़।
CHIEF MINISTER, HARYANA,
CHANDIGARH

Dated 31-10-2025

Message

I am pleased to learn that Panjab University, Chandigarh, in collaboration with the Chandigarh Region Innovation and Knowledge Cluster (CRIKC) is organizing the 18th Chandigarh Science Congress (CHASCON) 2025 from 6th–8th November 2025.

The theme of this year's congress, "Empowering Humanity: Science, Technology and Healthcare for All," is both timely and deeply aligned with our nation's vision of inclusive growth and public welfare. In Haryana, we are committed to harnessing the power of science, technology and innovation to improve the quality of life for every citizen with accessible and high-quality healthcare as a key priority.

Chandigarh has long been a beacon of knowledge, research and progress. Events like CHASCON play a crucial role in bringing together leading scientists, industry experts and young researchers to address the pressing challenges of our time. Science and technology remain the driving forces of national development and such platforms are instrumental in advancing our shared vision of a "Viksit Bharat".

The collaboration fostered by CRIKC between academia, research institutions and industry exemplifies the kind of innovation ecosystem that transforms ideas into impactful solutions for society.

I congratulate the organizers for this commendable initiative. I am confident that the deliberations over the next three days will inspire new ideas, foster meaningful collaborations and contribute significantly to the advancement of science and technology for the benefit of our nation.

My best wishes.

(Nayab Singh)

Professor Renu Vig
Vice - Chancellor

PANJAB UNIVERSITY
CHANDIGARH, *India* 160 014

Message from the Vice-Chancellor's Desk

It is with profound pleasure and a deep sense of honour that I extend a sincere welcome to all esteemed delegates, distinguished scientists, researchers, students, and industry partners attending the 18th Chandigarh Science Congress (CHASCON), hosted by Panjab University, an institution of esteemed academic tradition since 1882.

The central theme for CHASCON 2025, "Empowering Humanity: Science, Technology, and Healthcare for All", is exceptionally pertinent, serving to underscore the critical role of scientific discovery and technological advancements in comprehensively improving lives and guaranteeing universal access to quality healthcare.

This Congress is significantly strengthened through its vital partnership with the Chandigarh Region Innovation and Knowledge Cluster (CRIKC) , a consortium comprising 29 premier institutions. This indispensable collaboration aims to reinforce the essential bridge between academia, industry, and government , driving excellence in research and education that is firmly aligned with national priorities and the United Nations Sustainable Development Goals.

The meticulously planned three-day program (November 6–8, 2025) is engineered to facilitate profound scholarly exchange and collective action. The schedule encompasses plenary lectures from leading scientists, engaging panel discussions, an interactive industry expo, special innovation competitions, and presentations through both oral and poster sessions. Notably, the inclusion of the CHASCON-CRIKC SHODH SAMWAD offers a dedicated forum for collaborative PhD-level engagement. These concentrated events are designed to provide the scientific community with a robust platform for sharing research, exchanging fresh ideas, and collectively formulating innovative scientific and technological solutions to contemporary real-world challenges.

This Congress serves as a crucial nexus for nurturing scientific curiosity, encouraging meaningful interdisciplinary collaboration, and building a dynamic network committed to transforming society through knowledge and innovation. By fostering these alliances, we aim to shape a future where science, technology, and healthcare genuinely empower every individual.

I offer my sincere appreciation to the Coordinator, Co-coordinators, and all members of the committees for their exemplary commitment. I wish all participants a highly successful, productive, and intellectually inspiring Congress.

(Renu Vig)

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Professor Yojna Rawat

Dean of University Instruction

MESSAGE

Global science is for global wellbeing, continuously strengthening our confidence and our enduring curiosity to unravel the intricate mysteries of life and nature that surround us. The human drive to create, discover, and innovate has always been nurtured by an unbounded sense of wonder and the freedom to explore beyond established limits. The rapid advances we witness today in technology and healthcare are not merely outcomes of scientific progress but of an intellectual climate that values open inquiry and collective responsibility.

At this annual celebration of science—CHASCON 2025: National Conference on "Empowering Humanity: Science, Technology, and Healthcare for All"—our purpose must be to reaffirm this freedom and rekindle that innate curiosity which drives the scientific spirit. It is only through such a spirit that research may transcend laboratory walls to transform lives, ensuring that innovation serves humanity and not the other way around. The pursuit of science should not become confined by institutional boundaries or professional anxieties but should remain a creative endeavour guided by compassion and imagination.

The long tradition of scientific inquiry across centuries stands rooted in intellectual freedom—an inheritance we must guard with vigilance. In an era when research directions are often shaped by commercial interests or fleeting metrics of success, we must remind ourselves that the true measure of science lies not in its immediacy of gain but in its capacity to empower and heal. The sciences, technology, and healthcare must converge to create a more equitable and sustainable future—one that reflects our moral and social commitment to the welfare of all.

Let us, therefore, be cautious not to surrender our intellectual independence to convenience or conformity. The strength of our research community lies in its ability to imagine, to question, and to act with integrity. CHASCON 2025 offers us the opportunity to reaffirm this collective vision of science as a humane and transformative force.

My warm wishes to all participants and organizers for the success of this conference and for their dedication to the advancement of knowledge that truly empowers humanity.

Prof Yojna Rawat

Director
Research & Development Cell

PANJAB UNIVERSITY
CHANDIGARH
INDIA -160014

MESSAGE

I am pleased to write about CHASCON 2025, a distinguished annual event that reflects the research, innovation, and developmental endeavors of Panjab University and its collaborating institutions across the region. Over the years, CHASCON has emerged as a vibrant platform celebrating the pursuit of science and technology while nurturing a culture of inquiry and collaboration. Since its inception in 2007, it has evolved dynamically to address contemporary challenges and promote excellence in interdisciplinary research.

The theme of CHASCON 2025 — "Empowering Humanity: Science, Technology, and Healthcare for All" — resonates deeply with the university's mission to advance knowledge for the welfare of society. It highlights the transformative power of science and innovation in improving health, sustainability, and equity. The conference brings together a diverse community of researchers, educators, practitioners, and students to exchange ideas and explore pathways for inclusive scientific progress.

I take pride in noting that CHASCON 2025 continues the legacy of fostering dialogue between academia and industry, strengthening the synergy between research and application. The event also provides young scientists and scholars a valuable opportunity to present their work, interact with eminent experts, and cultivate collaborations that may shape the future of scientific discovery.

I extend my sincere gratitude to our Hon'ble Vice Chancellor, Professor Renu Vig, for her guidance and support in organizing this conference. I also commend the organizing team for their commitment and effort in making CHASCON 2025 a meaningful and inspiring scientific gathering.

My best wishes for the success of the conference and for the continued advancement of science and technology for the betterment of humanity.

Meenakshi
23.10.2025

Prof. Meenakshi Goyal

Director
Research & Development Cell(RDC)
Panjab University, Chandigarh

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नैनो विज्ञान एवं प्रौद्योगिकी संस्थान
(विज्ञान एवं प्रौद्योगिकी विभाग, भारत सरकार का एक स्वायत्त संस्थान)
Institute of Nano Science and Technology
(An Autonomous Institute of Department of Science and Technology, Govt. of India)

Professor Akash Deep
Director

MESSAGE

It gives me immense pleasure to extend my warm greetings on the occasion of the Chandigarh Science Congress (CHASCON 2025), being organized by Panjab University, Chandigarh on the theme *"Empowering Humanity: Science, Technology, and Healthcare for All."* The chosen theme resonates deeply with the vision of integrating scientific innovation and technological progress toward improving human life, health, and sustainability.

CHASCON has established itself as a premier scientific forum that bridges diverse disciplines, institutions, and sectors. Its 2025 edition continues this tradition by offering an invaluable platform for researchers, innovators, educators, and industry professionals to share ideas, present discoveries, and forge collaborations. The conference reflects the true spirit of modern science — one that is interdisciplinary, inclusive, and aimed at addressing the real-world challenges faced by humanity.

At the Institute of Nano Science and Technology (INST), we are dedicated to advancing cutting-edge research in nanoscience and nanotechnology to create innovative solutions in energy, environment, materials, and healthcare. The transformative potential of nanotechnology aligns closely with this year's CHASCON theme, underscoring how scientific excellence, when directed toward societal benefit, becomes a cornerstone of sustainable development and wellbeing.

I congratulate Panjab University and the organizing committee of CHASCON 2025 for bringing together such a vibrant community of thinkers and innovators. I extend my best wishes for the grand success of the conference and hope it continues to inspire collaborative scientific endeavors that empower humanity through knowledge and innovation.

Prof Akash Deep

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प्रो. राजीव आहूजा
PROF. RAJEEV AHUJA
निदेशक
DIRECTOR

MESSAGE

It is with great pleasure that I extend my congratulations to Panjab University for organizing the 18th Chandigarh Science Congress (CHASCON) 2025. As a patron of this esteemed event, I am delighted to see this tradition of scientific congregation continue, bringing together the brightest minds to deliberate on pressing challenges.

This year's theme, "Empowering Humanity: Science, Technology, and Healthcare for All," is particularly significant. At institutions like the Indian Institute of Technology, Ropar, our core mission is to push the frontiers of knowledge and innovation for the betterment of society. This theme aligns perfectly with our commitment to developing technological solutions that are not only advanced but also accessible and impactful, especially in critical areas like healthcare.

CHASCON provides a unique and invaluable platform for fostering collaboration. The partnership with the Chandigarh Region Innovation and Knowledge Cluster (CRIKC), which unites premier institutions from the region, exemplifies the power of a collective, interdisciplinary approach to problem-solving. It is through such synergistic efforts—linking engineering, medical sciences, and basic research—that we can create holistic solutions for a healthier future.

I am particularly encouraged to see the emphasis on providing a stage for students and young researchers to present their work through oral and poster sessions. Nurturing the next generation of scientists and innovators is our most crucial responsibility, and platforms like CHASCON are essential for inspiring them to pursue careers in science and technology.

I wish all the delegates a highly productive and engaging conference. May the discussions be fruitful, the collaborations strong, and the outcomes beneficial for all of humanity.

(RAJEEV AHUJA)

Punjab State Council for Science & Technology

(A State Govt. Undertaking)
Adj. Sacred Heart School, Sector-26, Chandigarh–160019 (India)
☎0172-2795001, 2792325, Fax : 0172-2793143
E-mail : **pritpalsingh8@punjab.govt.in** Website : **www.pscst.punjab.gov.in**

Message

The Punjab State Council for Science and Technology extends its sincere appreciation and commendation to Panjab University and the CRIKC Consortium for organizing the 18th Chandigarh Science Congress (CHASCON-2025) from November 6–8, 2025.

The theme, *"Empowering Humanity: Science, Technology, and Healthcare for All,"* is highly relevant to the mandate of the Council, which is dedicated to promoting the application of Science and Technology for the socio-economic development of the State. CHASCON-2025 will serve as an important platform for fostering dialogue among academia, policymakers, and industry leaders. Such convergence is essential to ensure that scientific innovations move beyond laboratories and benefit society at large. The Congress will provide an excellent opportunity to deliberate upon how emerging research in personalized medicine, sustainable technologies and digital healthcare can be harnessed to address regional and national priorities.

It is hoped that the deliberations during the three days of CHASCON-2025 will lead to meaningful recommendations and foster enduring collaborations that advance scientific progress while strengthening the State's capacity for responsible and inclusive technological growth.

On behalf of the Council, I convey my best wishes for the grand success of the Congress and an enriching experience for all participants.

(Pritpal Singh)
Executive Director

भारतीय विज्ञान शिक्षा एवं अनुसंधान संस्थान मोहाली
(शिक्षा मंत्रालय, भारत सरकार)
सैक्टर–81, नॉलेज सिटी, डाकखाना मनौली, एस.ए.एस. नगर, मोहाली–140306
INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH MOHALI
(Ministry of Education, Govt. of India)
Sector-81, Knowledge City, P.O. Manauli, S.A.S. Nagar, Mohali, Punjab-140306, India
• Phone : +91-172-2240266 • Fax: 0172-2240124 • http://www.iisermohali.ac.in

प्रो. अनिल कुमार त्रिपाठी
निदेशक
Prof. Anil Kumar Tripathi
Director
Email : director@iisermohali.ac.in

Message

It is a privilege to extend my best wishes to Panjab University on the occasion of the 18th Chandigarh Science Congress (CHASCON-2025), being held during November 6-8, 2025 in close collaboration with the Chandigarh Region Innovation and Knowledge Cluster (CRIKC). This Congress represents an important confluence of scientific community of our region and the nation.

As an institution committed to excellence in fundamental research and integrated science education, IISER Mohali deeply values platforms like CHASCON. The chosen theme, "Empowering Humanity: Science, Technology, and Healthcare for All," is very relevant. It prompts us to reflect not just on the pursuit of knowledge, but on the ethical and societal imperative to translate scientific breakthroughs into tangible benefits for the human well-being.

Technological advancements, particularly in healthcare, rest on the bedrock of rigorous basic sciences. I urge the participating faculty, researchers, and students to embrace interdisciplinary discourse, recognizing that the complex challenges addressed by this theme—from personalized medicine to sustainable development—demand a seamless synergy between physics, chemistry, biology, mathematics, and engineering.

CHASCON-2025 is a unique opportunity to mentor and inspire the next generation of scientists. I encourage our young scholars to enrich themselves from the plenary lectures, oral, and poster sessions as catalysts for their own research and as a forum for building enduring academic networks and collaborations. By strengthening the cooperative ties among academic and research institutions of this region, we solidify our collective ability to contribute significantly towards national scientific initiatives and missions.

I am confident that the three-day Congress will be intellectually stimulating and highly successful in fostering a culture of innovation and collaborative excellence.

I once again convey my sincere best wishes to the organizers for this commendable endeavor.

24.10.25

Anil Kumar Tripathi

प्रो. दुलाल पाण्डा
एफ.एन.ए., एफ.ए.एससी., एफ.एन.ए.एससी
निदेशक
Prof. Dulal Panda
FNA, FASc, FNASc
Director

राष्ट्रीय औषधीय शिक्षा एवं अनुसंधान संस्थान
NATIONAL INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH (NIPER)
(औषध विभाग, रसायन एवं उर्वरक मंत्रालय, भारत सरकार)
(Deptt. of Pharmaceuticals, Ministry of Chemicals & Fertilizers, Govt. of India)
सैक्टर 67, एस.ए.एस. नगर (मोहाली)–160 062, पंजाब, भारत
Sector 67, S.A.S. Nagar (Mohali) - 160 062 Punjab, India

MESSAGE

It is with great enthusiasm that I extend my best wishes to Panjab University on the occasion of the 18th Chandigarh Science Congress (CHASCON) 2025.

This year's theme, "Empowering Humanity: Science, Technology, and Healthcare for All," profoundly resonates with the core mission of NIPER. The field of pharmaceutical sciences is at the very forefront of the global endeavor to improve human health. From drug discovery and development to ensuring the quality and accessibility of medicines, our work is intrinsically linked to empowering communities through better healthcare.

The vision of "Healthcare for All" can only be realized through relentless innovation and interdisciplinary collaboration. CHASCON, through its partnership with the Chandigarh Region Innovation and Knowledge Cluster (CRIKC), provides an exemplary platform for fostering such collaborations. It brings together researchers from pharmaceutical sciences, biotechnology, medicine, and engineering, creating a fertile ground for the cross-pollination of ideas that can lead to breakthrough therapies and affordable healthcare solutions.

I am particularly encouraged by the focus on involving young scholars and students in the congress. Their passion and novel perspectives are the driving force for future scientific advancements. Platforms like CHASCON are vital for inspiring them to tackle the most pressing health challenges of our time.

I congratulate the organizing committee for their commendable efforts and wish all the participants a productive and enriching experience. May this congress catalyze new research directions and strengthen our collective resolve to build a healthier world.

Dulal Panda

(Prof. Dulal Panda)
Director

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Email : director@niper.ac.in / Web : www.niper.gov.in

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

राष्ट्रीय तकनीकी शिक्षक प्रशिक्षण एवं अनुसंधान संस्थान
(सम विश्वविद्यालय. विशिष्ट श्रेणी. शिक्षा मंत्रालय. भारत सरकार)
सेक्टर 26, चंडीगढ़ 160019

NATIONAL INSTITUTE OF TECHNICAL TEACHERS TRAINING AND RESEARCH
(Deemed To Be University, Distinct Category, Ministry of Education, Govt of India)
SECTOR 26, CHANDIGARH 160 019

MESSAGE

It gives me immense pleasure to extend my warm greetings on the occasion of the Chandigarh Science Congress (CHASCON 2025), organized by Panjab University, Chandigarh, on the theme *"Empowering Humanity: Science, Technology, and Healthcare for All."* The theme aptly captures the spirit of our times—when the integration of science, technology, and education has become indispensable for building a sustainable, inclusive, and resilient society.

CHASCON has established itself as a distinguished platform for fostering scientific inquiry, technological innovation, and interdisciplinary collaboration. The 2025 edition continues this tradition by uniting scientists, technologists, healthcare professionals, educators, and students to deliberate on how scientific research can be translated into meaningful solutions that improve quality of life and promote social wellbeing.

At the National Institute of Technical Teachers Training and Research (NITTTR), Chandigarh, we are deeply committed to strengthening technical education and enhancing research capacities that align with national priorities. The Institute's mission—to empower educators and institutions through innovation, training, and technology-enabled learning—resonates strongly with the theme of CHASCON 2025. Such platforms play a crucial role in nurturing creativity, critical thinking, and problem-solving abilities among young minds.

As India advances toward a knowledge-driven and self-reliant future, the collaboration between academic institutions, research organizations, and industry partners becomes vital for ensuring that science and technology truly serve humanity. I commend the organizers of CHASCON 2025 for their efforts in bringing together diverse scientific communities and extend my best wishes for the grand success of this conference.

प्रो. (डॉ.) भोला राम गुर्जर
निदेशक

निवास: डायरेक्टर रेजिडेंस, एनआईटीटीटीआर, सेक्टर 26, चंडीगढ़ Resi: Director Residence, NITTTR, Sector 26, Chandigarh
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राष्ट्रीय कृषि–खाद्य जैव प्रोद्यौगिकी संस्थान
(जैव प्रोद्यौगिकी विभाग, भारत सरकार)
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पंजाब (भारत)।

National Agri-Food Biotechnology Institute
(Department of Biotechnology, Govt. of India)
Sector-81 (Knowledge City), P.O. Manauli
S.A.S. Nagar, Mohali-140306
Punjab, (INDIA)

प्रो. अश्वनी पारीक
कार्यकारी निदेशक

Prof. Ashwani Pareek
Ph.D, FNASc., FNAAS
Executive Director

MESSAGE

It gives me great pleasure to convey my greetings on the occasion of the Chandigarh Science Congress (CHASCON 2025), organized by Panjab University, Chandigarh on the theme "Empowering Humanity: Science, Technology, and Healthcare for All." This timely and thought-provoking theme reflects the growing realization that science and innovation must serve as powerful tools for human welfare, sustainability, and equity.

CHASCON has consistently provided a valuable platform that unites scientists, technologists, healthcare professionals, and young researchers to share their discoveries, deliberate on emerging challenges, and explore collaborative solutions. The 2025 edition continues this tradition by emphasizing the translation of scientific advances into tangible benefits for society — whether through improved public health, sustainable agri-food systems, or cutting-edge biomanufacturing innovations.

At BRIC–National Agri-Food and Biomanufacturing Institute (BRIC–NABI), we firmly believe that the convergence of science, technology, and health forms the foundation of a resilient, sustainable, and nourished nation. Conferences such as CHASCON nurture this ecosystem by fostering interdisciplinary dialogues, encouraging innovation-driven thinking, and inspiring young researchers to go beyond conventional scientific boundaries. The event also provides emerging scientists with an opportunity to interact with mentors and innovators, thereby strengthening the bridge between academia, research institutions, and industry.

As India progresses toward its vision of Atmanirbhar Bharat and global scientific leadership, CHASCON 2025 reaffirms our shared mission to harness the power of science for the empowerment of humanity. I commend the organizers for their dedication and extend my warm wishes for the success of this conference and for the many fruitful collaborations and ideas that will arise from it.

(Prof Ashwani Pareek)

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PANJAB UNIVERSITY
CHANDIGARH - 160014

Professor Narinder Kumar
Dean, Faculty of Science
[DUI Nominee]

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Tel: 0172-2534536 (O)

MESSAGE

This year, the 18th Chandigarh Science Congress (CHASCON) is being organized as a National Conference at Panjab University on the theme "Empowering Humanity: Science, Technology, and Healthcare for All" from November 6 - 8, 2025. The theme highlights the pivotal role of science and innovation in addressing the global challenges of equity, sustainability, and human wellbeing. It reflects our collective responsibility to ensure that the benefits of scientific progress reach every section of society through inclusive and ethical research practices.

Over the years, CHASCON has evolved into a vibrant confluence of scientific ideas and collaborative research. The 2025 edition continues this legacy by bringing together scientists, researchers, technologists, and students from diverse disciplines. The deliberations, plenary lectures, and poster presentations will offer a unique platform for the exchange of knowledge and for promoting interdisciplinary collaborations. The SHODH SAMWAD Session is designed to encourage young innovators and provide them an opportunity to connect with academia, industry, and policymakers.

As India advances towards becoming a global leader in science and technology, CHASCON 2025 reaffirms Panjab University's commitment to fostering research that empowers humanity and enhances the quality of life. The event aligns with the national vision of "Vasudhaiva Kutumbakam" - the world as one family - and aims to strengthen cooperation among various scientific and social stakeholders for a sustainable and equitable future.

I extend my best wishes for the success of CHASCON 2025.

(Narinder Kumar)

Department of Biotechnology
Panjab University
Chandigarh-160014, India
(http:\\Biotechnology.puchd.ac.in)

Dr. Kashmir Singh
Professor & Coordinator
kashmirbio@pu.ac.in

No:..........

MESSAGE

It is my privilege and distinct pleasure, as the coordinator of the 18th Chandigarh Science Congress (CHASCON) 2025, to extend a warm welcome to all delegates, esteemed scientists, industry partners, and our bright young researchers to Panjab University.

Since its inception in 2007, CHASCON has evolved into a premier national platform for the scientific community. My role, along with our dedicated co-coordinators and committees, has been to ensure that this tradition of excellence continues, providing a fertile ground for sharing research and fostering innovation.

This year's theme, "Empowering Humanity: Science, Technology, and Healthcare for All," was chosen to steer our collective focus towards a singular goal: harnessing scientific discovery to improve lives and ensure equitable access to healthcare. We are not merely discussing science abstractly; we are actively seeking solutions to real-world problems.

To that end, we have meticulously organized a dynamic three-day program. You will find plenary lectures from leading minds, engaging panel discussions, a vibrant industry expo, and extensive oral and poster sessions designed to showcase the excellent work of our students and scholars. Our partnership with the Chandigarh Region Innovation and Knowledge Cluster (CRIKC) further strengthens our mission, bridging the gap between academia, industry, and government.

I urge every participant to engage fully—to question, to connect, and to collaborate. This congress is more than a series of presentations; it is an opportunity to build the networks that will define the future of science in our nation.

My sincere gratitude goes to our Chief Patron, Patrons, and every member of the advisory, organizing, and sectional committees for their unwavering support and tireless efforts in bringing CHASCON 2025 to fruition.

I look forward to three days of insightful deliberations and groundbreaking ideas.

Kashmir Singh

(Prof. Kashmir Singh)
Coordinator, CHASCON-2025

DEPARTMENT OF MICROBIOLOGY
PANJAB UNIVERSITY
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Phones: +91-172-2534140; Emails: micro@pu.ac.in

No.:D- MIC/25/
Dated:

CHAIRPERSON
Prof. Naveen Gupta

Dr. Naveen Gupta

Co-Coordinator, CHASCON 2025
Professor and Chairperson,
Department of Microbiology
Panjab University, Chandigarh

MESSAGE

It gives me immense pleasure to extend a warm welcome to all participants of the 18th Chandigarh Science Congress (CHASCON-2025) organized under the aegis of the Chandigarh Region Innovation and Knowledge Cluster (CRIKC) at Panjab University, Chandigarh. This annual congregation of scientists, academicians, and young researchers provides a dynamic platform for the exchange of ideas, presentation of innovative research, and fostering of 5interdisciplinary collaborations.

The theme for this year, *"Empowering Humanity: Science, Technology, and Healthcare for All,"* resonates deeply with the global need to integrate scientific knowledge with societal welfare. Through plenary sessions, panel discussions, oral and poster presentations, and the CHASCON-CRIKC Shodh Samwad, this event aims to inspire transformative thinking and promote impactful research aligned with national and international goals.

I congratulate all contributors whose abstracts have been included in this book, reflecting the breadth and depth of scientific inquiry across diverse disciplines. I also extend my sincere appreciation to the organizing committees, volunteers, and sponsors for their dedicated efforts in making CHASCON 2025 a grand success.

Let this conference ignite curiosity, collaboration, and innovation that truly empower humanity through science.

DR HARVANSH SINGH JUDGE INSTITUTE OF DENTAL SCIENCES & HOSPITAL PANJAB UNIVERSITY, CHANDIGARH.

Dr Deepak Kumar Gupta

Co-Coordinator, CHASCON 2025
Principal-cum-Professor
Dr Harvansh Singh Judge Institute of Dental Sciences & Hospital
Panjab University, Chandigarh.

Message

Welcome to Chandigarh Science Congress **CHASCON 2025**, a celebration of ideas, innovation, and the enduring power of humanity.

It is my great pleasure to welcome you all to **CHASCON 2025**, the National Conference on *"Empowering Humanity: Science, Technology, and Healthcare for All,"* to be held from **November 6–8, 2025,** at Panjab University, Chandigarh.

This conference brings together eminent researchers, academicians, and young minds to exchange knowledge and ideas that transcend disciplinary boundaries. The chosen theme reflects our collective commitment to harnessing the power of scientific innovation for the welfare of humankind.

The conference theme reminds us that progress is not just about invention—it is about inclusion, empathy, and shared growth. Every discovery gains its true worth when it touches lives and transforms communities. The theme embodies our vision of blending scientific excellence with social responsibility. As we explore new frontiers in research and innovation, let us also reflect on how our work can bridge inequalities and create a healthier, more inclusive world.

Over the years, CHASCON has become a testament to what we can achieve when intellect and empathy unite. May this conference inspire collaboration, ignite curiosity, and strengthen our resolve to use knowledge for the greater good of humanity.

Together, may we dream boldly, think fearlessly, and act compassionately—for science is most powerful when guided by purpose. May CHASCON 2025 serve as a vibrant platform for meaningful dialogue, collaboration, and advancement—paving the way for a future where science and compassion go hand in hand.

Conference Speakers

Chief Guest
Dr. Sanjay Kumar
Chairman, Agriculture Scientist Recruitment Board, New Delhi

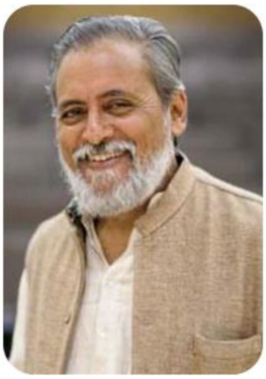
Dr. Sanjay Kumar joined CSIR-Institute of Himalayan Bioresource Technology (CSIR-IHBT), Palampur (HP) as Scientist in 1990 and superannuated as Director of the same institute in 2023; also, during this period, held additional charge as Director of CSIR-IGIB, CSIR-CSIO and Head of CSIR-HRDG. With a strong emphasis on bioeconomy, the number of technologies and products developed at CSIR-IHBT surged to 85 during the relatively short period of 2015-2023; several of these were commercialized to ensure their availability in the market; pioneered the establishment of a startup culture, resulting in the launch of 56 ventures in the institute. The rise of entrepreneurial activity significantly increased industry collaborations, as evidenced by the 8-fold increase in MoUs, agreements, and MTAs signed (from 110 during 1984-2014 to 995 during 2015-2023).

Guest of Honour
Sh. Sanjiv Singh Sethi
Managing Director, Gilard

S. Sanjiv Singh is the Managing Director of Gilard Electronics Pvt. Ltd. and Chief Executive Officer at Gilard Application Programmers LLP, based in Mohali, India. He is recognized for leadership in smart manufacturing, Industry 4.0, and global operations, driving innovation and employee empowerment in the company. Gilard is known for manufacturing advanced electromechanical automotive components and has earned accolades as a Great Place to Work. Sanjiv Singh emphasizes technology, quality, and customer satisfaction, building high-performing teams and pioneering new business solutions in both electronics manufacturing and software programming.

Keynote speaker
Mr. Ritu Ranjan Mittar, Member (TRAI)

Sh R R Mittar was appointed as a Whole-Time Member of TRAI in January 2025. Prior to joining TRAI, he served as the Head and Advisor of the Telecommunication Engineering Centre (TEC), the technical and standardization arm of the Department of Telecommunications. He was an officer of the Indian Telecommunication Services (ITS), 1985 batch. Sh. Mittar has a strong history of international involvement. He has participated in international standards bodies like the ITU, ETSI, and 3GPP and was appointed as Chairman of the International Telecommunication Union (ITU-T) Study Group 11. With over 35 years of experience, he has contributed to policy-making and standards development for new technologies like 5G, IoT, and M2M. His experience covers multiple aspects of the telecom sector, including spectrum management, telecom security, and IPv6 implementation.



Speaker
Professor Anil Gupta
Padma Shree and founder Honey Bee Network. IIM Ahmedabad

Professor Anil Kumar Gupta is a distinguished Indian scholar of grassroots innovations, who retired as a full-time professor from IIM Ahmedabad in 2017 and is now a visiting professor. He is the founder of the Honey Bee Network and a recipient of the Padma Shri award in 2004 for his contributions to management education. He specializes in grassroots innovations, sustainable agriculture, indigenous ecological knowledge, and intellectual property rights. He developed popular courses at IIM Ahmedabad, including the "Shodh Yatra" (research walk) which took students to rural areas to learn from local communities. Beyond academia, he has been a member of the National Innovation Foundation and the National Innovation Council. Has led numerous "Shodhyatras," or walking expeditions across India, to interact directly with grassroots innovators and traditional knowledge holders.

Speaker
Professor (Dr) Digambar Behera (Padma Shree)
President National Academy of medical Sciences

Prof. (Dr.) Digambar Behera (Padma Shri Awarde 2020) is a renowned pulmonary medicine specialist, recognized for over 40 years of clinical and research excellence at PGIMER, Chandigarh. He has served as Dean (Research), Head of Pulmonary Medicine, and Director at National Institute of TB and Respiratory Diseases. Dr. Behera is a pioneer in lung cancer chemotherapy and TB elimination, founding the Indian Society for the Study of Lung Cancer and chairing the National Task Force for TB Elimination. He has over 500 publications, numerous national and international awards, and currently leads pulmonary medicine at Fortis Hospital, Mohali.

Speaker
Sh. Manish Verma
CEO Angel Blue

Sh. Manish Verma is a business leader with over 27 years of experience across industries, geographies and cultures. He is now leading his third venture, AngelBlue-a platform that supports startups and aspiring entrepreneurs & students across sectors and regions. AngelBlue offers funding, mentorship, advisory services and collaboration opportunities. It also runs entrepreneurship courses for students, helping them build the skills and confidence to explore entrepreneurship as a career path. Sh Manish currently serves as Chair of the Startup & Entrepreneurship Forum at the PHD Chamber of Commerce & Industry (Chandigarh, Punjab & Haryana Chapter), where he works to strengthen the regional startup ecosystem and promote inclusive growth. He is also a member of the Advisorv Board at MDI Gurgaon Incubation Centre and a Charter Member of TiE. He has led the Chandigarh Chapter for TiE Young Entrepreneurs (TYE) and regularly conducts workshops for students and young founders in schools, colleges and universities as a certified Independent Director.

Speaker
Dr Ajay Bahl
Cardiologist, PGIMER Chandigarh

Dr. Ajay Bahl is Professor of Cardiology at PGIMER, Chandigarh, and a recognized specialist in cardiomyopathies and advanced cardiac care. He has played pivotal roles in heart transplant programs at PGIMER, contributing directly to landmark transplants and published research in the field. Dr. Bahl holds an MD, DM, DNB, and MRCP(UK), and is known for his expertise in managing complex heart diseases, patient care, and training. His compassionate leadership and involvement in PGIMER's advanced cardiac center have made significant impacts in clinical practice and patient outcomes in cardiology.

Scientific Sections

SECTIONS	THEMATIC AREAS
BASIC MEDICAL SCIENCES	Biochemistry, Biophysics, Biotechnology, Microbiology, Microbial Biotechnology, Stem Cell & Tissue Engineering, Human Genome Studies and Research, Systems Biology & Bioinformatics, Nuclear Medicine, Public Health
CHEMICAL SCIENCES	Chemistry
DENTAL SCIENCES	Dr. Harvansh Singh Judge Institute of Dental Sciences & Hospital
EARTH AND ENVIRONMENTAL SCIENCES	Geology, Geography, Environment Studies
ENGINEERING SCIENCES	University Institute of Engineering & Technology (UIET), University Institute of Chemical Engineering and Technology (UICET), Sophisticated Analytical Instrumentation Facility (SAIF)
MANAGEMENT SCIENCES	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)
LIFE SCIENCES	Botany, Zoology, Anthropology, Forensic Science and Criminology
MATHEMATICAL SCIENCES	Mathematics, Statistics, Computer Science and Applications
PHARMACEUTICAL SCIENCES	University Institute of Pharmaceutical Sciences
PHYSICAL SCIENCES	Physics, Nanoscience & Nanotechnology, Medical Physics

BASIC MEDICAL SCIENCES

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

Sectional President
Prof Amarjit Singh Naura

Sectional Secretary
Prof Archana Bhatnagar

CHASCON 2025

NATIONAL CONFERENCE ON

"*Empowering Humanity:*

Science, Technology, and Healthcare for All

November 06 - 08, 2025

Section: Basic Medical Sciences

Program

November 07, 2025

Venue: Department of Biochemistry, Seminar Hall, Ground Floor,
BMS Block-II, Sector-25 Campus, Panjab University, Chandigarh

Sectional President	Sectional Secretary
Name – Prof. Amarjit Singh Naura Mobile -7837233155	Name – Prof. Archana Bhatnagar Mobile -9815502214

Time (Hrs)	**Program**
08:30-09:00	**Display of posters by participants** **Venue:** Ground Floor, BMS Block-II, Sector-25 Campus, Panjab University, Chandigarh
09:00-9:15	**Inauguration of Sectional Program** ***Venue:*** *Seminar Hall, Ground Floor,* *BMS Block-II, Sector-25 Campus, Panjab University, Chandigarh*
9:15-9:45	**Session Chair:** Dr. Charu Sharma, IMTECH; Prof. Jyotdeep Kaur, PGIMER **Speaker:** Dr. Sabyasachi Rakshit, Associate Prof., IISER, Mohali ***Title "Tip-links in inner ear serve as band-stop-like filters of forc***
9:45-10:15	**Session Chair:** Prof. Sanjeev Puri, UIET, PU; Prof. Geeta Shukla, PU **Speaker:** Dharam Paul Chaudhary, Director Research, Maharana Pratap Horticultural University, Karnal ***Title " Horticultural Production: Cultivating health and prosperity"***
10:15-10:45	Tea Break
10:45-12:00 noon	**Oral Presentation Session-I** (Faculty & Research Scholars) ***Venue:*** *Seminar Hall, Ground Floor,* *BMS Block-II, Sector-25 Campus, Panjab University, Chandigarh*
12:00-13:00	**Oral Presentation Session-II** (UG/PG Students) ***Venue:*** *Seminar Hall, Ground Floor,* *BMS Block-II, Sector-25 Campus, Panjab University, Chandigarh*
13:00-14:00	Lunch
14:00-17:00	**Poster Presentation** **Venue:** Ground Floor, BMS Block-II, Sector-25 Campus, Panjab University, Chandigarh **Tea break from 15:30-16:00**

Abstracts of Invited Talks

TIP-LINKS IN INNER EAR SERVE AS BAND-STOP-LIKE FILTERS OF FORCE

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ABSTRACT

From the mellifluous voices at home to the thundering beats of heavy metal in a hard rock café, we effortlessly absorb an astonishing range of sounds, all thanks to a tiny molecular complex in our inner ear known as the tip-link. This delicate protein–protein assembly acts as the gating spring of hearing. In this talk, I will describe how tip-links sense the faintest mechanical vibrations from sound waves, transmit threshold tension to mechanosensitive ion channels to trigger their opening, and protect our auditory machinery by dissipating excessive excitation. Remarkably, the gentle buzz of a mosquito generates enough tension to open these ion channels, everything louder represents a state of mechanical over-excitation for them.Using a combination of single-molecule force-clamp experiments with atomic force microscopy (AFM) and custom-built magnetic tweezers (MT), along with all-atom steered molecular dynamics and coarse-grained simulations, we discovered that the tip-link interface forms a unique slip–ideal–slip bonding pattern under tension. The initial slip bond facilitates force transmission, while the ideal bond phase reflects a remarkable force insensitivity across a wide tension range, indicating that tip-links effectively buffer variations in external forces. This means that moderate changes in sound amplitude are not transmitted directly to the ion channels. At extremely loud sound levels, tip-links exhibit a protective response: temporary disengagement of their interacting partners prevents irreversible damage to sensory cells. We also observed instantaneous unfolding events within tip-link domains under force, a process that reduces their stiffness. We propose that this unfolding represents a force-adaptation mechanism, enabling the auditory system to maintain sensitivity across diverse acoustic environments. Overall, our findings reveal that tip-links act as a band-pass filter for mechanical force, transmitting low-level tensions necessary for channel gating while blocking excessive mechanical loads. At very high forces, the complex disengages entirely to safeguard the system. However, this finely tuned filtering ability deteriorates with aging or genetic mutations, leading to progressive or age-related hearing loss. In this seminar, I will discuss how we uncovered this biophysical model of hearing, illustrating how the molecular resilience of tip-links underlies both the sensitivity and fragility of our auditory perception.

HORTICULTURAL PRODUCTION: CULTIVATING HEALTH AND PROSPERITY

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ABSTRACT

Horticultural sector is a major part of the country's agricultural economy, with production consistently outpacing food grain output despite using significantly less land. The country is a world leader in producing a wide range of fruits, vegetables, spices, and plantation crops. According to the second advanced estimates for 2024–25, India's total horticultural production is estimated at a record high of 367.72 million tonnes. India leads the world in producing mango, banana, papaya, and spices. Other major crops include citrus fruits, guava, potato, and onion. In India, the transition from traditional cereal-based farming to high-value crops defines the next stage of agricultural development. The horticulture sector is central to this shift. The focus is on integrating modern innovations to address challenges and create opportunities for nutritional security, economic growth, and sustainable practices. There are many challenges being faced in horticulture sector. The horticulture produce is highly perishable. The short shelf life of many fruits and vegetables leads to substantial post-harvest losses, with some estimates suggesting up to 15–40% wastage along with a major loss in terms of nutritional security. A major emphasis is being laid on increasing shelf life and Value addition in the horticultural produce. Emphasis is being placed on processing horticultural produce into value-added products like juices, jams, and dried snacks with minimum loss of nutritional value. This increases the shelf life and profitability of crops. As the average productivity of horticulture crops in India is five times higher than that of food grains, there is need to shift a major segment of the research components towards increasing the shelf life of horticultural products. Although chemicals-based treatments are being used to preserve the horticulture produce but the practice is leading towards long term health problems. A vast scope exists to use botanicals and natural products in order to increase the shelf life of fruits and vegetables. A tremendous scope exists to explore the safe commodities to be used for this purpose. There is a need to divert a segment of research components of Basic Sciences in the traditional universities towards harnessing nutritionally safe benefits of micronutrient enriched horticultural produce in order to cultivate health and prosperity.

Abstracts of Oral Presentations

Oral Presentation- Basic Medical Sciences		
OP1	Dr. Ashutosh Rai	Cell Division Cycle 42 (Cdc42): an incognito culprit of clinically non-functioning pituitary neuroendocrine tumours
OP2	Ms. Mansi	Modulating the proof-reading ability of DNA polymerase lambda for increasing the natural diversification rate in *Glycine max*
OP3	Dr. Ranjeeta Bhari	Chicken feathers: Waste to a useful bioresource
OP4	Dr. Ayan Adhikari	Physiological and molecular insights into polystyrene nanoplastic induced oxidative stress and imbalance of cellular redox homeostasis in black mustard (*Brassica nigra* L.) seedlings
OP5	Ms. Ayushi Sandhu	Understanding complexity of immune pathway activation under conditions mimicking viral induced asthma exacerbation in mice
OP6	Mr. Jai Kumar Saini	A Rapid, Low-Cost Colorimetric Assay for the Serodiagnosis of Typhoidal Salmonellosis Using Flagellin-Based SMART nanobioProbes and Silver-Urease Interactions
OP7	Mr. Yaecob Gebre	Microbial production of xylitol from wheat straw hydrolysate
OP8	Mr. Sahil Sharma	Novel SelSA-1 Nanoparticles as superior Therapeutic modalities against experimental Colitis through modulation of Gut-Brain Axis.
OP9	Ms. Simarpreet Kaur	Finger Millet: A Natural Shield Against Postmenopausal Osteoporosis
OP10	Mr. Esoh Rene Tanwieh	Prevalence and Risk Factors of Vertical Transmission of HIV-1 in sub-Saharan Africa: A Systematic Review and Meta-analysis
OP11	Ms. Harmandeep Kaur	Integrated Enzymatic and Fermentation Processes for Valorisation of Black Rice (*Oryza sativa*)

ABSTRACTS OF ORAL PRESENTATIONS

OP1. CELL DIVISION CYCLE 42 (CDC42): AN INCOGNITO CULPRIT OF CLINICALLY NON-FUNCTIONING PITUITARY NEUROENDOCRINE TUMOURS

Ashutosh Rai[1], Bishan D Radotra[2], S K Gupta[3], Rajesh Chhabra[3], S S Dhandapani[3], Manjul Tripathi[3], Chirag K Ahuja[3], Marta Korbonits[4], Pinaki Dutta[5]

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ABSTRACT

Background: No effective medical treatment is available for non-functioning pituitary neuroendocrine tumours (NF-PitNETs). Recurrence (30-45%) is a common feature. By using high-throughput mass spectrometry combined with functional characterisation, we explored novel therapeutic targets for NF-PitNETs. Methods: Tandem mass tag-based mass spectrometry on 20 frozen tissue samples (non-recurrent (n=15), recurrent (n=5)) of clinically nonfunctioning PitNETs. We used RT-qPCR (n=20) and immunohistochemistry (n=50) for validation. Cell viability, invasion & migration, and wound healing assays were performed in mouse gonadotroph cell lines (αT3-1 and LβT2 cells) and primary human tumour cells. Results: Proteomic analysis showed upregulation of 31 proteins of the Cdc42 signalling pathway members in recurrent NF-PitNETs, and increased NTS, Cdc42, PAK3 and THBS1 expression was confirmed by immunohistochemistry in recurrent tumours. Significant activation of Cdc42 was observed in recurrent tumours as compared to non-recurrent ($p=0.02$). Time- and dose-dependent decrease in cell viability was seen in αT3-1 and LβT2 cells upon treatment with Cdc42 pathway inhibitors MBQ-167 ($p<0.0001$), ML141 ($P=0.0005$) and FRAX486 ($p<0.0001$). These agents also showed cytotoxic effect on primary human NF-PitNET cells (n=18) ($p<0.0001$). Significant inhibition observed in ML141-treated cells in migration assays (αT3-1, $p=0.006$; LβT2, $p=0.0006$), as well as in transwell invasion assays at 24 hrs (αT3-1, $p<0.0001$; LβT2, $p=0.01$), and 48 hrs (αT3-1, $p=0.01$; LβT2, $p=0.03$). Conclusion: Our results demonstrate that Cdc42 pathway is upregulated in recurrent NF-PitNETs. The potent inhibitory effect of ML141 on proliferation, migration and invasion of gonadotroph cell lines and human tumour cells in primary culture points to a therapeutical effect.

OP2. MODULATING THE PROOF-READING ABILITY OF DNA POLYMERASE LAMBDA FOR INCREASING THE NATURAL DIVERSIFICATION RATE IN *GLYCINE MAX*

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ABSTRACT

The enzyme responsible for DNA replication is called DNA polymerase. In order to create a complete double-stranded DNA molecule, it reads the nucleotide sequence of a template strand and builds a complementary strand to couple with it. DNA polymerase's major function is to efficiently and properly replicate the genome in order to maintain the genetic code and ensure that it is faithfully passed down through the generations. DNA polymerase lambda is a member of the X family of polymerases and is involved in the base excision repair of DNA damage as well as non-homologous end-joining of double-stranded breaks in DNA. The most important legume plant, *Glycine max* (Soybean), is a crop that is regularly consumed all over the world. By altering the replication process at the DNA polymerase level, natural diversification rate can be increased multi-fold. This may improve upon the habitat colonization of the *Glycine max*, so that it can be made widely adaptable possible without affecting the overall productivity and also simultaneously improving the fertility of the soil.

Keywords: DNA replication, DNA polymerase lambda, Proof-reading activity, Repair mechanism and *Glycine max*

OP3. CHICKEN FEATHERS: WASTE TO A USEFUL BIORESOURCE

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ABSTRACT

Enormous amount of chicken feathers is generated as poultry processing waste. Chicken feathers were hydrolysed by physical and chemical methods, and soluble protein, amino acid, and carbon content were estimated. Thermal hydrolysis showed 2.5±0.87%

degradation, accompanied by release of 696±3.61μg/ml soluble protein and 163.3±3.31 μg/ml amino acids. Ultra-sonication yielded 15.5±0.08% keratin, with soluble protein content 234±0.65μg/ml, amino acid content 97±0.57μg/ml, and carbon content 1.37±0.16%. The results indicate that oxidative method used was largely ineffective in disrupting keratin's resilient structure or promoting significant protein solubilization. Alkaline hydrolysis offers balance between keratin yield and amino acid preservation, while acid hydrolysis maximizes yield at the expense of amino acid retention. Feather degradation was also attempted using keratinolytic bacteria. *Bacillus sp.* was cultured with feathers as sole carbon and nitrogen source. Complete solubilization of white chicken feathers was observed. Maximum release of soluble proteins (2623.0μg/ml) and amino acids (1513.0μg/ml) was recorded. MALDI-TOF MS confirmed release of low molecular weight peptides in hydrolysates. Therefore, the hydrolysate can be used as animal feed and in agro-industry. Scanning Electron Microscopy revealed surface morphology differences among keratin samples obtained from various treatments. The present study highlights need for increased awareness, training and infrastructure to support waste-to-resource approaches in poultry operations, and efficiently harness the potential of chicken feather wastes as useful bioresource.

OP4. PHYSIOLOGICAL AND MOLECULAR INSIGHTS INTO POLYSTYRENE NANOPLASTIC INDUCED OXIDATIVE STRESS AND IMBALANCE OF CELLULAR REDOX HOMEOSTASIS IN BLACK MUSTARD (*BRASSICA NIGRA* L.) SEEDLINGS

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ABSTRACT

Improper disposal of non-biodegradable plastics has led to release of toxic nanoplastics in the environment presents a significant hazard to the ecological receptors including plants. The present study aims to evaluate the impact of PSNPs (100 mg kg-1 soil) on black mustard (*Brassica nigra* L.) seedlings. After 7th and 14th day of treatment, the key stress responses of PSNPs exposed seedlings include decline in plant height and biomass, high membrane damage, reduced photosynthetic pigment contents, and increased ROS generation. The presence of noticeable dark brown spots on leaves after DAB staining, and deep blue spots on roots following NBT staining, clearly demonstrates a severe oxidative damage in the plants stressed by PSNPs. Primary root growth impairment in PSNPs stressed seedlings might be associated with downregulation of *MAIL1* and *RML1*. Root-to-

stem translocation of PSNPs may result from increased expression of aquaporin transporters PIP2;3, and NIP2;1. Furthermore, transmembrane diffusion of H_2O_2 in roots might be facilitated by upregulation of PIP2;3 as evident after DAB staining. Marked increase in MDAR expression might be inefficient to sustain AsA pool due to concomitant downregulation of APX and DHAR in stressed roots. In addition, the decrease in GR expression combined with a low GSH/GSSG ratio caused PSNP cells to recycle glutathione pools inefficiently, potentially making them more sensitive to PSNPs. Overall, the primary cause of the poor performance of black mustard seedlings under PSNP stress is an imbalance in cellular redox homeostasis caused by deregulation of the antioxidant defense system, which leads to oxidative stress.

OP5. UNDERSTANDING COMPLEXITY OF IMMUNE PATHWAY ACTIVATION UNDER CONDITIONS MIMICKING VIRAL INDUCED ASTHMA EXACERBATION IN MICE

Ayushi Sandhu[1], Amarjit S. Naura[1]
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ABSTRACT

Viral respiratory infections are the major cause of asthma exacerbations, often resulting in increased emergency visits and hospitalizations. The present work was designed to elucidate the complex interplay of immune mechanisms under the experimental settings mimicking such conditions in mice. Female BALB/c mice were sensitized and challenged with Ovalbumin (OVA). We utilized poly (I:C), a synthetic analog of viral dsRNA, to mimic viral infections which was intranasally administered. Mice were assessed for airway hyperresponsiveness (AHR), a marker of lung function. In addition, bronchoalveolar lavage fluid (BALF) analysis for inflammatory cells, qRT-PCR, western blotting, flow cytometry was performed to evaluate underlying molecular players. Intranasal instillation of poly (I:C) at a dose of 200µg in OVA sensitized & challenged mice induced a robust shift from eosinophilic to neutrophilic airway inflammation. Poly (I:C) led to downregulation of Th2 cytokines (IL-4, IL-5, and IL-13) with concurrent increase in pro-inflammatory cytokines (TNF-α, IL-6, KC, and MCP-1) indicating switch from adaptive to innate immune response. Poly (I:C) instillation caused increase in specific airway resistance, signifying decline in lung function. Further, poly (I:C) aggravated oxidative stress and over-activated MAPK/NF-κB signalling pathway, and Th17/Treg imbalance which might be playing critical role in worsening the conditions. Dexamethasone (corticosteroid) failed to reduce poly (I:C)-mediated asthma exacerbation, highlighting the requirement of adjunctive treatment along with standard therapy specifically targeting activated immune pathways which may help ameliorate poly (I:C)-induced asthma exacerbations. Overall, our study underscores the complexity of immune response during asthma exacerbations, suggesting new potential targets.

OP6. A RAPID, LOW-COST COLORIMETRIC ASSAY FOR THE SERODIAGNOSIS OF TYPHOIDAL SALMONELLOSIS USING FLAGELLIN-BASED SMART NANOBIOPROBES AND SILVER-UREASE INTERACTIONS

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ABSTRACT

Typhoidal salmonellosis is a systemic febrile disease due to Salmonella enterica serovar Typhi and is an important public health issue, especially in endemic countries where it causes considerable morbidity and mortality. Current diagnostic methods—such as blood culture and the Widal test—are limited by delayed results, poor specificity, and high cost, and often require complex laboratory infrastructure. Thus, Traditional diagnostics methods lack specificity, are costly, and require specialized equipment. In the present study, we report a new, quick, and inexpensive colorimetric assay for serodiagnosis of typhoidal salmonellosis. The assay utilizes bifunctional probes and silver-urease interactions to facilitate a visual readout. Flagellin (FliC), found as an important immunogenic target by immunoproteomics technique and LC-MS analysis, was chosen for peptide design. Through in silico strategies, we predicted certain S. Typhi flagellin-derived peptides that can bind to antibodies in the sera of infected patients. These peptides were conjugated to silver nanoparticles, creating a bifunctional probe that exhibits a specific color change when binding with target antibodies. A successful antibody binding event causes a color change from yellow to pink in 15 minutes. This assay is designed to be simple and efficient, requiring no expensive reagents or sophisticated instruments. This assay offers a quick, effective, and cost-efficient point-of-care diagnostic tool, best applicable in resource-limited environments.

OP7. MICROBIAL PRODUCTION OF XYLITOL FROM WHEAT STRAW HYDROLYSATE

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ABSTRACT

Xylitol, a high-value polyol with applications in food, pharmaceutical, and nutraceutical industries, can be sustainably produced through microbial bioconversion of lignocellulosic biomass. Wheat straw, an abundant agricultural residue rich in hemicellulosic xylan, represents a promising feedstock for xylitol production following pretreatment and hydrolysis. In this study, wheat straw hydrolysate was evaluated as a carbon source for microbial fermentation aimed at xylitol production. Pretreatment and enzymatic hydrolysis

released significant amounts of fermentable xylose, while detoxification strategies improved the fermentability of the hydrolysate by minimizing inhibitory by-products such as furfural and acetic acid. Yeast strains, particularly *Candida tropicalis*, demonstrated high xylose reductase activity, efficiently converting xylose into xylitol under oxygen-limited conditions. Process optimization, including pH, aeration rate, and nutrient supplementation, further enhanced conversion efficiency and xylitol yield. Under optimized fermentation conditions, a maximum xylitol yield of 0.68 g/g xylose consumed was obtained, with a final concentration of 42.5 g/L achieved after 72 hours of incubation. The overall productivity reached 0.59 g/L/h, reflecting the strong potential of wheat straw hydrolysate as a cost-effective and renewable substrate for microbial xylitol production. The results highlight this approach as a sustainable alternative to chemical synthesis and a key step in valorizing agricultural residues within a circular bioeconomy framework.

OP8. NOVEL SELSA-1 NANOPARTICLES AS SUPERIOR THERAPEUTIC MODALITIES AGAINST EXPERIMENTAL COLITIS THROUGH MODULATION OF GUT-BRAIN AXIS.

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ABSTRACT

Ulcerative colitis (UC), a chronic, relapsing form of inflammatory bowel disease (IBD), has many extraintestinal manifestations that involve significant disturbances along the gut-brain axis, causing anxiety, depression, and cognitive impairment. The present study was aimed at aimed to design and evaluate the therapeutic potential of nanoformulation of SelSA-1, a selenium (Se) analogue of FDA approved HDAC inhibitor Suberoylanilide Hydroxamic Acid (SAHA). Further, a comparative evaluation of these SelSA-1 nanoparticles (SelSA-1 NPs) vs parent compound SelSA-1 in terms of safety and therapeutic efficacy through evaluation of gut-brain axis in DNBS induced UC in BALB/c mice was done. The successful synthesis of SelSA-1 NPs by chemical reduction method using Ascorbic acid was confirmed by UV-Vis Spectroscopy, FE-SEM and HR-TEM results. Further characterization using DLS, elemental analysis and functional group modifications in FTIR confirmed the successful synthesis of NPs from SelSA-1 having spherical morphology and (50-150) nm size with ≤-30mV zeta-potential. *In-vitro* studies with these SelSA-1 NPs demonstrated enhanced safety profiles, better antioxidant, anti-inflammatory, and anti-bacterial activity than parent compound SelSA-1. Similarly, in the *in-vivo* studies using DNBS induced colitis, SelSA-1 NPs not only showed more prominent resolution of colonic inflammation, but also and associated neuropsychiatric comorbidities as depicted by the morphological changes (organ indices, disease activity index, Histology), restored biophysical (transepithelial resistance using impedance), haematological, biochemical, antioxidant, and neurobehavioral parameters. These findings highlighted the therapeutic potential of nanoformulations of such novel epigenetic regulators against acute and chronic inflammatory pathologies.

OP9. FINGER MILLET: A NATURAL SHIELD AGAINST POSTMENOPAUSAL OSTEOPOROSIS

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ABSTRACT

Introduction:- Osteoporosis is a systemic skeletal disorder prevalent in postmenopausal women, leading to bone loss and increased risk of fractures due to estrogen deficiency . This study investigates the potential of a finger millet-based diet in mitigating osteoporosis in ovariectomized rats, focusing on changes in bone turnover markers and gene expression profiles Methodology:- Female rats were divided into groups: sham-operated control, ovariectomized (OVX), OVX supplemented with finger millet (OVX-50), OVX with calcium supplementation (OVX-70), and OVX with zoledronic acid (OVX-ZA). Bone turnover markers and mRNA expression levels of OPN, RANK, RANKL, and NFκB were quantified using real-time PCR and biochemical assays to assess the efficacy of interventions. Results:- Ovariectomy significantly reduced serum calcium and phosphate levels while increasing bone turnover markers like TRAP and ALP compared to the sham group . Supplementation groups, especially OVX-50 and OVX-ZA, showed partial restoration of biochemical parameters and significant downregulation in genes linked to osteoclast activity, indicating reduced bone resorption. Statistical analyses confirmed marked improvements in bone health indicators in the intervention groups compared to OVX controls. Conclusion Finger millet supplementation in ovariectomized rats demonstrates a protective effect against osteoporosis by improving biochemical bone turnover markers and downregulating genes associated with bone resorption. These findings suggest dietary strategies involving finger millet could be effective in preventing postmenopausal osteoporosis.

OP10. PREVALENCE AND RISK FACTORS OF VERTICAL TRANSMISSION OF HIV-1 IN SUB-SAHARAN AFRICA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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ABSTRACT

Introduction: More than three-quarters of the global 1.37 million HIV-positive children aged 0– 14 live in sub-Saharan Africa, where mother-to-child transmission (MTCT) of HIV persists despite increased efforts to prevent vertical transmission of the virus. Methods:

From the beginning until the present, we searched six databases (Medline, Embase, PubMed, ScienceDirect, Web of Science, and Cochrane Library) to identify cohort, cross-sectional, and case-control studies assessing the risk factors and prevalence of MTCT of HIV in sub-Saharan Africa. The authors' reporting and article selection procedures were guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines. We estimated the overall pooled magnitude and risk factors for MTCT of HIV using a random-effects model meta-analysis. Heterogeneity was evaluated using the I2 statistic, and publication bias was checked using a funnel plot. The protocol was registered with registration ID CRD42025637989 in the PROSPERO database. Results: A total of 89 studies from 16 countries were included. The pooled prevalence of MTCT of HIV in sub-Saharan Africa was 7.0% (95% CI: 5.2–9.4%). Key risk factors associated with MTCT included home delivery (AOR = 1.57; 95% CI: 1.11–2.03), mixed feeding (AOR = 1.36; 95% CI: 1.11–1.66), absence of maternal PMTCT intervention (AOR = 1.91; 95% CI: 1.76–2.05), and lack of infant antiretroviral prophylaxis (AOR = 3.36; 95% CI: 1.61–5.10). Conclusion: Home delivery, mixed feeding and lack of infant ART prophylaxis are among the contributing factors to the current 7.0% MTCT of HIV rate, which is still higher than the WHO target (< 5%).

OP11. INTEGRATED ENZYMATIC AND FERMENTATION PROCESSES FOR VALORISATION OF BLACK RICE (*ORYZA SATIVA*)

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ABSTRACT

Black rice (*Oryza sativa*), characterized by its dark pigmentation and rich nutritional composition, offers considerable potential for value-added fermentation processes. In the present study, an integrated enzymatic and fermentation-based bioprocess was developed for vinegar production from black rice. Enzymatic saccharification of the starch-rich substrate into fermentable sugars was optimized using Response Surface Methodology (RSM) by varying enzyme concentration, temperature, and pH. These optimized conditions were validated and subsequently applied for ethanol fermentation. Vinegar was produced through the oxidation of ethanol using an indigenous acetic acid bacterium, *Acetobacter aceti* AC1. The final product, viz., black rice vinegar, was evaluated for total and volatile acidity and subjected to sensory analysis to assess its quality attributes. The study demonstrated the feasibility of utilizing black rice as a substrate for integrated enzymatic saccharification and fermentation, enabling sustainable production of high-value bioproducts.

Abstracts of Poster Presentations

Poster Presentation- Basic Medical Sciences		
PP1	Mr. Abhishek Sandhu	Lactoferrin-Functionalized Urease-Powered Nanomotors for Active Eradication of Antimicrobial-Resistant Enterotoxigenic Escherichia coli induced Gastroenteritis
PP2	Mrs. Jaishree	Reactivation of a Pseudogene through Chimeric NBS-LRR fusion for Disease resistance in plants
PP3	Ms. Jyoti	Induction of callus and cell suspension culture of *Nardostachys jatamansi* for production of useful metabolites
PP4	Mrs. Manisha Sharma	In silico Study Reveals Potent Antibacterial Targets of a Novel *A. conyzoides* Compound
PP5	Ms. Nisha Verma	Hepatorenal Protective Effects of *Asparagus racemosus* in DHEA-Induced PCOS in Female Rats
PP6	Ms. Nivedita Sharma	In Vitro Evaluation of the Anticancer Potential of Human Neutrophil Peptide-1 (HNP-1) Against MCF-7 Breast Cancer Cells
PP7	Mrs. Preeti Negi	Deciphering the Antifungal and Anti-Biofilm Mechanisms of Green-Synthesised Graphene-Silver Nanocomposite Against Multidrug-Resistant *Candida auris*
PP8	Dr. Rivi Verma	Chemspace Voyage: Exploring Plant Endophytes and Drug Scaffolds in the Biofilm Arena
PP9	Ms. Shital Rani	Computational Drug Discovery Approaches for Identifying Novel Spiro-Indenoquinoxaline-Pyrrolidines as Potential Therapeutics in Alzheimer’s Disease
PP10	Ms. Diksha Katoch	Detecting resistance beyond genes: epigenetic markers for echinocandin resistance revealed through in-silico profiling of *Candida* spp.
PP11	Mr. Karthikeyan Krishnan	Antibiotic Resistome characterization of Genetically Unrelated Biocide Tolerant Extremely Drug-Resistant *Acinetobacter baumannii*
PP12	Ms. Minakshi	Microbial Surfactant in Active Food Packaging
PP13	Ms. Priyanka	Valorisation of Rice Straw into a Valuable Pigment: Prodigiosin
PP14	Ms. Tanu Singh	Genome-wide identification and characterization of GATA transcription factors in *Avena sativa* L. and expression profiling under salinity stress.
PP15	Ms. Vajinder Kaur	Early miRNA alterations in Alzheimer’s disease: Integrating miRNA profiling and sulforaphane intervention to explore neuroprotective potential
PP16	Ms. Aadityaa Shekhar	Empowering Breast Cancer Care in India: Stem Cell and Tissue Engineering Advances for Regeneration, Reconstruction, and Awareness

PP17	Ms. Aditi	*Tinospora cordifolia* attenuates lead acetate induced hepatic damage in mice
PP18	Ms. Amesha	Isolation, characterization, and evaluation of lytic bacteriophage(s) against *Pseudomonas aeruginosa* induced skin wound infection
PP19	Ms. Arushi Dhiman	Screening of urease-producing bacteria from agricultural soil
PP20	Mr. Dashneet Singh	In Silico Identification of a Potential ALDH1A1 Inhibitor for Targeting Breast Cancer Stem Cells
PP21	Mr. Dhruv Raj	Investigation of invitro anti-cancer and apoptotic potential of orange-derived nanovesicles against breast cancer cells
PP22	Ms. Garima Parmar	Childhood Obesity: A Silent Catalyst for India's Growing Non-Communicable Disease Burden- Empowering Prevention Through Science and Technology
PP23	Ms. Gunjan Kandwal	Mesenchymal Stem Cell-Derived Extracellular Vesicles: Emerging Therapeutics for Neurodegenerative Diseases
PP24	Ms. Harnoor Kaur	Understanding Metabolic Syndrome and ITS Management Approaches
PP25	Mr. Hemanth Singh	Phage therapy: A new approach to combat antimicrobial resistance through Phage-based strategies.
PP26	Ms. Karishma	Bacterial cells as living cancer therapeutics: Molecular mechanisms and translational challenges
PP27	Ms. Komal Kaur	Investigating the effect of naringin on the adipogenic differentiation of murine mesenchymal stem cells (C3H10T1/2)
PP28	Ms. Malhaar Sidhu	Neuroprotective effects of metformin-preconditioned mesenchymal stem cell secretome and non-conditioned secretome on depression-induced neurotoxicity in neuro-2a cells.
PP29	Ms. Mehak Jain	MicroRNAs as Central Regulators of Multi-Organ Damage in Diabetes: An Integrative Computational Study
PP30	Ms. Ojal	Unravelling the *Staphylococcus aureus* Pan-Genome: Insights into Genetic Variants and Horizontal Gene Transfer
PP31	Ms. Srishti Thakur	Development of Antibacterial Thin Films Using Zinc-Embedded Smart Food Packaging Biofilms
PP32	Mr. Syed Abdullah Hasan	Biosensors: An emerging trend in cancer diagnosis
PP33	Ms. Tanya Jindal	In Silico discovery of natural compound inhibitors targeting bacterial urocanate reductase (urda) to prevent imidazole propionate-mediated insulin resistance in type 2 diabetes
PP34	Siddhesh Ramekar	Symptom analysis and regional disease monitoring system for medical supply chain management and outbreak prevention

PP35	Ms. Anupreet Kaur Sobti	Germination-induced biochemical, nutritional, and functional changes in oats (*Avena sativa*): implications for functional food development
PP36	Ms. Bharti	Green extraction approaches for silymarin from milk thistle (*Silybum marianum*) seeds and its prospects in nutraceutical formulations for non-alcoholic fatty liver disease (NAFLD) management
PP37	Ms. Chahat Chopra	DNA based single-nucleotide polymorphisms in Diabetic nephropathy among Asian populations
PP38	Mathewos Geneto Abiche	Anticancer activities of callus suspension cultures of *Withania somnifera* and *Bacopa monnieri*, and analysis of their compounds
PP39	Raman Kumar	Enzymatic assessment of FDC, VDH and vanillin toxicity in different strains of *Saccharomyces cerevisiae*
PP40	Dr. Ritu Pradhan	To study the effect of soaking duration on growth performance and shelf life of foxtail millet (*Setaria italica*) microgreens: a nutritional approach toward public health
PP41	Ms. Masni Malik	In silico evaluation of drug repurposing against the fungal pathogen *Candida albicans*
PP42	Simran Vohra	Bridging molecules and mankind: the role of biotechnology in healthcare
PP43	Shivang Kapoor	Integrative transcriptomic analysis reveals shared molecular signatures between diabetic kidney disease and diabetic peripheral neuropathy

ABSTRACTS OF POSTER PRESENTATIONS

PP1. LACTOFERRIN-FUNCTIONALIZED UREASE-POWERED NANOMOTORS FOR ACTIVE ERADICATION OF ANTIMICROBIAL-RESISTANT ENTEROTOXIGENIC ESCHERICHIA COLI INDUCED GASTROENTERITIS

Abhishek Sandhu[1], Sonia Chauhan[1], Simran Preet[1]

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ABSTRACT

The global escalation of antimicrobial resistance (AMR), particularly in enteric pathogens such as multidrug-resistant Enterotoxigenic *Escherichia coli* (ETEC), poses a severe therapeutic challenge due to the inability of conventional antibiotics to overcome intestinal mucus barriers and biofilms. To address this limitation, we developed an active nanomedical platform utilizing urease-powered nanomotors for targeted eradication of gastrointestinal infections. Two nanomotor systems were engineered—mesoporous silica nanomotors (SNMs) and hollow mesoporous polydopamine nanomotors (DNMs)—and functionalized with lactoferrin, a broad-spectrum antimicrobial and immunomodulatory glycoprotein. These nanomotors convert endogenous gastrointestinal urea into propulsion energy, enabling autonomous motion, enhanced mucus penetration, and active pathogen targeting. Comprehensive characterization confirmed their mesoporous architecture, efficient lactoferrin conjugation, high loading capacity, and retained enzymatic activity. Motility studies demonstrated rapid, directional swarming behavior, while mechanistic investigations revealed potent bacterial membrane interaction, iron chelation, and active biofilm disruption. In vitro antibacterial evaluation showed strong bactericidal effects against both planktonic and biofilm-associated ETEC, with DNMs exhibiting superior therapeutic performance due to higher propulsion efficiency and biomolecule loading. Encapsulation within pH-responsive delivery systems enabled targeted ileal release and protection from gastric degradation. In vivo assessment using an ETEC-induced murine gastroenteritis model confirmed effective gastrointestinal localization, reduced bacterial burden, restoration of mucosal architecture, and suppression of inflammatory and oxidative stress markers, with both systems exhibiting excellent biosafety and biocompatibility. This is the first comparative demonstration of lactoferrin-functionalized, enzyme-powered nanomotors for active treatment of AMR gastrointestinal infections. These findings establish a breakthrough platform for precision, fuel-driven nanotherapies with strong translational potential for combating drug-resistant enteric diseases.

PP2. REACTIVATION OF A PSEUDOGENE THROUGH CHIMERIC NBS-LRR FUSION FOR DISEASE RESISTANCE IN PLANTS

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ABSTRACT

Plant immunity relies on NBS-LRR resistance proteins, which detect pathogen effectors and trigger defense responses. However, many resistance genes in crops exist as pseudogenes-once functional but now disrupted and inactive. These pseudogenes can act as genetic reservoirs to form a new functional gene through reactivation using synthetic biology approach. The NBS domain provides ATP-binding and activate signalling cascade in plants, while the LRR domain restores pathogen-recognition potential. In cultivated crops loss of resistance gene function is a major bottleneck in achieving durable disease resistance. To overcome this limitation, we designed and successfully generated a chimeric NBS-LRR gene aimed at reactivating a pseudogene by fusing the functional NBS domain from powdery mildew (PM) resistance grape variety with inactive LRR domain from PR3-pseudogene of PM susceptible variety. A flexible GGSGG linker was incorporated to enhance inter domain stability and structural flexibility. Overlap PCR was used to make this Chimeric NBS-LRR gene. Successful fusion of both domains was confirmed by restriction digestion, yielding the expected insert size. This study provides a proof of concept for reactivating pseudogenes to create novel disease resistance proteins. Our work highlights the broader significance of synthetic resurrection of pseudogenes as a novel tool in crop improvement and sustainable agriculture.

PP3. INDUCTION OF CALLUS AND CELL SUSPENSION CULTURE OF *NARDOSTACHYS JATAMANSI* FOR PRODUCTION OF USEFUL METABOLITES

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ABSTRACT

Nardostachys jatamansi is a high-altitude, endemic medicinal plant of the Himalayas. Growing at 2500m above sea level, it is distributed in the form of herbaceous aromatic plant

on hills. The plant being rhizomatous in nature stores a large amount of secondary metabolites of different classes, Terpenoids, specifically, Sesquiterpenoids are one of the major classes among them with many reported benefits including their calming effects on CNS, anti-inflammatory, anti-diabetic etc. It also has application in perfumery, cosmetics and stimulates hair growth and provides lustre to hair strands. Due to its high importance, the plant is over exploited in natural habitat. Thus, it is a critically endangered now, facing the verge of extinction in the near future, hence there is a need to develop methods to protect the plant at the same time utilize the numerous benefits it offers to mankind. Plant tissue culture offers a mediation here with which we can sustainably exploit the plant resource. The present study is an effort to bridge the gap between the increasing demand for the metabolites and limited availability of plants. We have standardized the protocol for callus and suspension culture in the plant. Further, extracts have also been prepared from the suspension culture. Thin layer chromatography as well as LCMS data has supported the presence of those essential sesquiterpenoids in these extracts. Presence of these metabolites in the culture supports the possibility of producing these under aseptic in vitro conditions without the need of sacrificing the plant for their production.

PP4. IN SILICO STUDY REVEALS POTENT ANTIBACTERIAL TARGETS OF A NOVEL *A. CONYZOIDES* COMPOUND

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ABSTRACT

Antimicrobial resistance (AMR) poses a critical global health challenge, driving the need for safer and more effective natural alternatives. In this study, a novel bioactive compound, (2E,4E,11E,13E)-14-allyloxy-7,8-dimethyltetradeca-2,4,11,13-tetra-en-1-amine, was isolated from the leaves of *Ageratum conyzoides* and evaluated for its antibacterial potential through molecular docking and molecular dynamics (MD) simulations. The compound was docked against key Gram-negative (*Pseudomonas aeruginosa*) and Gram-positive (*Staphylococcus aureus*) bacterial targets, including DNA gyrase, peptide deformylase, LasR, ligase, dihydropteroate synthetase, topoisomerase, and transpeptidase. Docking analysis revealed strong binding affinities of the compound toward several targets. For *P. aeruginosa*, the compound exhibited the highest affinity for the LasR receptor (-8.06 kcal/mol), followed by peptide deformylase (-7.75 kcal/mol), DNA gyrase (-6.59 kcal/mol), and ligase (-6.21 kcal/mol). In *S. aureus*, the strongest interaction was observed with muramyl ligase E (-6.45 kcal/mol), compared to dihydropteroate synthetase (-5.61 kcal/mol), DNA gyrase (-0.84 kcal/mol), and transpeptidase (-4.67 kcal/mol). MD simulations demonstrated the structural stability of both protein-ligand complexes. The *P. aeruginosa* complex remained stable (RMSD 2.4-2.8 Å), whereas the *S. aureus* complex showed higher flexibility (4-7 Å) but maintained ligand accommodation. These findings suggest that the isolated compound from

A. conyzoides is a promising antibacterial candidate, particularly targeting LasR in *P. aeruginosa* and muramyl ligase E in *S. aureus*

PP5. HEPATORENAL PROTECTIVE EFFECTS OF *ASPARAGUS RACEMOSUS* IN DHEA-INDUCED PCOS IN FEMALE RATS

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ABSTRACT

Polycystic ovary syndrome (PCOS) is a prevalent endocrine disorder linked to metabolic complications, including liver and kidney dysfunction. *Asparagus racemosus* (Shatavari) is a traditional herb with antioxidant and anti-inflammatory properties. This study investigated its protective effects on hepatic and renal health in a DHEA-induced PCOS rat model. Female Wistar rats were divided into control, PCOS, and treatment groups. PCOS was induced via daily oral DHEA administration for 28 days, followed by oral *Asparagus racemosus* extract for 30 days. Biochemical markers (ALT, AST, creatinine, and BUN) were evaluated. PCOS rats showed elevated biochemical markers indicating hepatorenal stress. Treatment with *Asparagus racemosus* restored biochemical levels. These results suggest that *Asparagus racemosus* effectively mitigates liver and kidney dysfunction associated with PCOS, highlighting its potential as a natural therapeutic agent for managing metabolic complications in this disorder.

PP6. IN VITRO EVALUATION OF THE ANTICANCER POTENTIAL OF HUMAN NEUTROPHIL PEPTIDE-1 (HNP-1) AGAINST MCF-7 BREAST CANCER CELLS

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ABSTRACT

Breast cancer is the most prevalent malignancy in women in 140 to 180 countries worldwide, resulting in approximately 522,000 deaths every year and 6.4% of all cancer deaths. Despite significant progress in classical cancer treatments, the limitations of the approaches include notable side effects and nonselective targeting of most currently employed anticancer drugs, which hinder their therapeutic efficacy. In recent years, the targeted therapy has been exploring natural and safe alternatives to reduce the side effects associated with conventional anticancer drugs. Human Neutrophil Peptide-1 (HNP-1), a cationic antimicrobial peptide of the α-defensin family, has gained attention for its potential anticancer activity. The present study aimed to investigate the *in vitro* anticancer efficacy of HNP-1 against MCF-7 cells. Cell viability was evaluated using the MTT assay, which revealed a dose-dependent decrease in cell proliferation following HNP-1 treatment. Cytotoxic effects were further confirmed through the LDH release

assay. The DCF-DA assay indicated elevated intracellular reactive oxygen species (ROS) generation, suggesting oxidative stress-mediated cell death. The wound healing assay demonstrated a significant inhibition of cell migration, indicating anti-metastatic potential. Nuclear and morphological changes were assessed using Hoechst 33342, DAPI, and Rhodamine 123 staining, confirming apoptosis and mitochondrial membrane depolarization. Additionally, the Comet assay demonstrated increased DNA fragmentation in treated cells. Collectively, these findings suggest that HNP-1 exerts potent anticancer effects against MCF-7 cells by inducing apoptosis, promoting ROS generation, disrupting mitochondrial potential, and inhibiting migratory behavior. This study highlights the potential of HNP-1 as a promising peptide-based therapeutic agent for breast cancer management.

PP7. DECIPHERING THE ANTIFUNGAL AND ANTI-BIOFILM MECHANISMS OF GREEN-SYNTHESISED GRAPHENE-SILVER NANOCOMPOSITE AGAINST MULTIDRUG-RESISTANT *CANDIDA AURIS*

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ABSTRACT

Objective: This study aimed to evaluate the antifungal and anti-biofilm activities of graphene-silver nanocomposite (GO-AgNP) against multidrug-resistant *Candida auris*. Methods: The nanocomposite was synthesised using a green approach, and its effectiveness was assessed through minimum inhibitory concentration (MIC), minimum fungicidal concentration (MFC), and antibiofilm activity tests. Additionally, the impact on biofilm biomass and gene expression levels in *C. auris* was analysed in the presence and absence of sub-MIC concentrations of GO-AgNP. The mode of action was studied by examining cell permeability, adhesion, intracellular reactive oxygen species (ROS) production, extracellular enzymatic assays, and cell surface hydrophobicity. Results: The synthesised nanocomposite demonstrated significant antifungal activity against various *C. auris* strains, with dose-dependent intracellular ROS production observed at MIC and sub-MIC concentrations. Proteolytic activity varied among isolates, linked to the secretion of secreted aspartyl proteases (SAPs), with measurable precipitation zones on BSA medium. Differences in phospholipase activity were also noted, with strain-dependent responses on egg yolk agar, and haemolytic activity was observed on blood agar, indicated by a light halo around the treated colonies. Gene expression analysis of planktonic and sessile *C. auris* cells demonstrated significant downregulation of some key virulence and adhesion-associated genes. Conclusion: Green-synthesised graphene-silver nanocomposite represents a promising candidate for addressing recalcitrant *C. auris* infections. Its significant antibacterial and anti-adhesion capabilities, coupled with the ability to alter a variety of cellular processes, highlight its potential as a new therapeutic or nutraceutical agent against this critical global health concern.

PP8. CHEMSPACE VOYAGE: EXPLORING PLANT ENDOPHYTES AND DRUG SCAFFOLDS IN THE BIOFILM ARENA

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ABSTRACT

Microbial biofilms pose substantial challenges in clinical and environmental settings due to intrinsic resistance to conventional antimicrobials. Plant-derived endophytes have emerged as promising sources of novel antibiofilm and antimicrobial compounds, offering new strategies to address biofilm-associated infections. While a significant proportion of approved drugs originate from natural products or their derivatives, many plant endophyte metabolites expand the accessible chemical space for drug discovery. Here, we systematically compare the chemical space of plant-derived endophytes with that of ChEMBL-approved drugs in the context of biofilms inhibition. Integrating molecular descriptors, mutanofactins, substructure fingerprints visualized by PCA, t-SNE and UMAP, our analyses reveal substantial overlap between endophytes and drugs space indicating that endophytes can serve as viable, scalable sources for drug discovery, including repurposable or alternative antibiofilm candidates. The structural scaffold analysis further identifies regions of distinct underexplored pool of motifs, highlighting novel opportunities for therapeutic intervention. Ultimately, translating these chemical scaffolds into clinically viable agents will require targeted synthesis, screening and pharmacological profiling.

PP9. COMPUTATIONAL DRUG DISCOVERY APPROACHES FOR IDENTIFYING NOVEL SPIRO-INDENOQUINOXALINE-PYRROLIDINES AS POTENTIAL THERAPEUTICS IN ALZHEIMER'S DISEASE

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ABSTRACT

Alzheimer's disease (AD) is a multifactorial neurodegenerative disorder and the leading cause of dementia worldwide. It is characterised by progressive memory loss and cognitive decline. The pathological hallmarks of AD are extracellular amyloid plaques and intracellular

neurofibrillary tangles, causing synaptic dysfunction and neuronal death. Despite decades of research, available treatments are cholinesterase inhibitors and NMDA receptor antagonists which provide only temporary symptomatic relief; there remains an urgent need for novel, disease-modifying therapeutics. The development of small molecules capable of targeting disease pathology offers a promising avenue for disease modification. Small molecules can effectively cross the blood–brain barrier, interact with key pathological proteins, and modulate oxidative stress, neuroinflammation, and aggregation processes, making them highly attractive candidates for AD therapeutics. In this study, nine newly designed spiro-indenoquinoxaline-pyrrolidine derivatives were screened using comprehensive in silico approaches to explore their potential as anti-Alzheimer's agents. Computational tools, including ADMET analysis, molecular docking, and molecular dynamics (MD) simulations, were employed to evaluate the pharmacokinetic profiles, target binding affinities, and structural stability of ligand–protein complexes. Among the compounds tested, ADPR-d exhibited optimal drug-likeness properties, minimal predicted toxicity, and the strongest binding affinities toward key molecular targets implicated in AD pathology. Furthermore, MD simulations confirmed the stability of complexes. Preliminary in vitro assays, including aggregation assay, TEM, further validated these computational findings. The promising results of this study suggest that spiro-indenoquinoxaline-pyrrolidine scaffolds, particularly ADPR-d, may serve as valuable lead compounds for the development of new therapeutic strategies against Alzheimer's disease.

PP10. DETECTING RESISTANCE BEYOND GENES: EPIGENETIC MARKERS FOR ECHINOCANDIN RESISTANCE REVEALED THROUGH IN-SILICO PROFILING OF *CANDIDA* SPP.

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ABSTRACT

According to the World Health Organisation, the world is facing an accelerating battle against antimicrobial resistance (AMR), a public health emergency responsible for nearly 9% of deaths worldwide. While bacterial AMR is widely studied, antifungal resistance has emerged as a silent yet serious threat. In India, approximately 10% of *Candida albicans* isolates and higher proportions of non-albicans species are resistant to common antifungals, necessitating an urgent need for innovative detection methods. Recent research has highlighted the role of epigenetic modifications in antimicrobial resistance. In this study, an *in silico* epigenetic analysis of *FKS1* gene, the primary echinocandin target, was performed

across resistant and susceptible strains. Nucleotide sequences were analyzed for CpG methylation, detection of the promoter region, and prediction of transcription factor binding sites (TFBS). The resistant strains showed higher levels of CpG methylation overlapping TFBS, suggesting transcriptional repression, while the susceptible strains showed no methylation. Initially, strain-specific primers were designed; however, multiple sequence alignment of all five strains reveal a high CpG rich region. From this region, a single methylation-specific primer set was designed and validated by oligo analysis and *in silico* PCR simulations. The primers were able to amplify the methylated alleles in resistant strains, while no amplification was observed in susceptible strains. These findings suggest that CpG methylation within the *FKS1* gene might play a regulatory role in antifungal resistance, and demonstrate the feasibility of a universal methylation-specific PCR assay for early detection. The study highlights potential of using epigenetic biomarkers to improve antifungal resistance diagnostics.

PP11. ANTIBIOTIC RESISTOME CHARACTERIZATION OF GENETICALLY UNRELATED BIOCIDE TOLERANT EXTREMELY DRUG-RESISTANT *ACINETOBACTER BAUMANNII*

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ABSTRACT

Objectives - *Acinetobacter baumannii*, a multidrug-resistant (MDR) pathogen, has been designated a critical priority organism by the World Health Organization (WHO). This study aims to evaluate the evolving susceptibility profiles of clonally unrelated *Acinetobacter baumannii* isolates from clinical settings in relation to their antibiotic resistome and stress response behavior. Methods - Clonal relatedness was assessed through PCR-based phylogrouping and ERIC-PCR. PCR and Whole-genome sequencing (WGS) revealed antimicrobial resistome. Minimum Inhibitory Concentrations (MICs) were determined for various antimicrobial agents. Plasmid and OMP profiling were done using standard protocol. Results - ERIC-PCR-based phylogenetic analysis revealed distinct clonal lineages. Most of the isolates were resistant to multiple class of antibiotics, and tolerant to NaCl, oxidative and nitrosative stress conditions. Strikingly, they exhibited cross-resistance to dyes, detergents, EPI, and biocides. Biofilm-forming capacity was confirmed by crystal violet staining and confocal microscopy. Plasmid analysis revealed multiple plasmids (2–10 kb) per strain.

Alterations in OMP profiling were observed when compared to the reference ATCC strain. PCR and WGS analysis revealed the clonal groups and diversity of antibiotic-resistant determinants. Conclusion - *A. baumannii* isolates exhibited extensive multidrug and cross-resistance. Clonality assessments and WGS revealed the genetic relatedness and diversity of antimicrobial resistome in different isolates. Alterations in outer membrane architecture led to reduced permeability, and enhanced resistance. Plasmids played a significant role in the adaptability and transferable resistome of these strains. Collectively, these factors highlight the role of acquired and intrinsic resistance mechanisms that enhance *A. baumannii*'s ability to survive on abiotic surfaces in clinical settings.

PP12. MICROBIAL SURFACTANT IN ACTIVE FOOD PACKAGING

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ABSTRACT

Biosurfactants are surface-active biomolecules produced by microorganisms and have several advantages over the chemical surfactants, such as lower toxicity, higher biodegradability, better environmental compatibility, higher foaming, high selectivity, and specific activity under extreme conditions such as temperature, pH and salinity. The application of biosurfactants in food packaging holds immense potential, driven by the increasing demand for sustainable and eco-friendly alternatives, due to their antimicrobial activity, biocompatibility and role in improving food safety and shelf life and functional packaging solutions. Many chemicals and artificial synthesized compounds are used in food packaging, including plasticizers, preservatives and anti-static agents.Therefore, increasing consciousness among consumers demands for reducing the use of artificial or chemically synthesized compounds by replacing it for microbial biosurfactants. In food packaging, biosurfactants can be incorporated into packaging materials to inhibit the growth of pathogenic and spoilage microorganisms, thereby reducing foodborne illness and food waste. Their ability to form biofilms and modify surface properties also make them useful for developing active and intelligent packaging systems. Additionally, biosurfactants can act as natural preservatives, replacing synthetic additives and aligning with the growing consumer demand for clean-label and sustainable food products. Research, technological innovation and collaboration across sectors will be essential to unlock the full potential of biosurfactants to pave the way for their widespread adoption in food packaging industry.

Keywords: Biosurfactants, Sustainable Packaging.

PP13. VALORISATION OF RICE STRAW INTO A VALUABLE PIGMENT: PRODIGIOSIN

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ABSTRACT

Prodigiosin is a tripyrrole microbial pigment that is obtained from many bacteria, like *Serratia marcescens*. It could be a potential replacement for synthetic dyes and is available in a red colour. It has been reported to exhibit anti-fungal, anti-bacterial, anti-metastatic, anti-proliferative, and immunosuppressive properties. Therefore, it has a great demand in various industries, including food, cosmetics, and nutraceuticals, as a natural alternative to synthetic colorants. Despite its wide range of applications, prodigiosin confronts difficulties because of its costly production method, restricted availability, and low yield. The current study concentrated on growing naturally isolated *Serratia marcescens* CMS2 and optimising prodigiosin production at the laboratory scale before scaling up to the pilot stage in order to overcome this issue. In this work, xylose from rice straw was used as a cost-effective carbon source. Prodigiosin production was increased by an astounding 1.9 times when peanut de-oiled cake was utilised to enhance the cost-effective expansion. After optimising conditions for production pH (7), substrate concentration (1.5%), inoculum size (1.25%), and agitation rate (200 rpm), 0.5048 colour value units per mg of prodigiosin were obtained. Several analytical methods, such as UV-vis spectroscopy, UPLC chromatography, and TLC chromatography, are employed for characterisation following purification using column chromatography. A noticeable absorption peak was observed at 535 nm in the UV-visible spectra.

PP14. GENOME-WIDE IDENTIFICATION AND CHARACTERIZATION OF GATA TRANSCRIPTION FACTORS IN *AVENA SATIVA* L. AND EXPRESSION PROFILING UNDER SALINITY STRESS.

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ABSTRACT

GATA transcription factors (TFs) are type IV zinc-finger proteins that play crucial roles in regulating plant growth, development, and abiotic stress responses. Characterized by the

conserved DNA-binding domain (A/T)GATA(A/G) and a CX2CX18-20CX2C motif, these TFs were comprehensively analyzed in *Avena sativa* to understand their genomic organization and functional potential. A total of 27 *AsGATA* genes were identified using the GrainGenes database. Analysis of their conserved motifs, gene structures, physicochemical properties, chromosomal distribution, and cis-acting elements revealed that members of the same subfamily share similar features. Phylogenetic classification, based on comparison with *Arabidopsis thaliana* GATA proteins, grouped the *AsGATA* genes into four subfamilies. Subcellular localization predictions indicated predominant nuclear localization, consistent with their regulatory roles. Chromosomal mapping showed a random distribution of *AsGATA* genes across 21 chromosomes. Expression profiling using RNA-Seq data identified six *AsGATA* genes responsive to salt stress, highlighting their potential involvement in abiotic stress tolerance. These genes represent promising candidates for functional validation and breeding programs aimed at developing stress-resilient oat varieties. In addition, similar genome-wide identification and characterization analyses were performed for NAC and GRAS transcription factor families in *Avena sativa*, providing a comparative framework for understanding transcriptional regulation and stress adaptation mechanisms in oats.

PP15. EARLY MIRNA ALTERATIONS IN ALZHEIMER'S DISEASE: INTEGRATING MIRNA PROFILING AND SULFORAPHANE INTERVENTION TO EXPLORE NEUROPROTECTIVE POTENTIAL

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ABSTRACT

Alzheimer's disease (AD) is an age-linked neurodegenerative disorder and the leading cause of dementia, resulting memory deficits and cognitive decline. The precise molecular mechanisms underlying AD pathogenesis remain incompletely understood, though amyloid-beta (Aβ) aggregation and tau hyperphosphorylation are hallmark features. The traditional AD biomarkers require costly or invasive diagnostic methods, limiting their use for regular screening and early detection. MicroRNAs (*miRNA*s) have emerged as promising minimally invasive biomarkers due to their stability in body fluids and regulatory roles in neuronal pathways. Dysregulated *miRNA*s often contribute to pathological processes such as oxidative stress, neuroinflammation, and impaired protein clearance mechanisms. *Sulforaphane* (SFN), a naturally occurring isothiocyanate, has been widely studied for its neuroprotective and anti-inflammatory properties, and evidence from other disease models suggests it can modulate aberrant *miRNA* expression. This prompted us to explore the potential of SFN to counteract early AD-associated

miRNA alterations. To investigate early changes, we established an in vivo Aβ1–42-induced AD model in C57BL/6 mice via stereotactic hippocampal injection of Aβ1–42 oligomers. *miRNA* sequencing identified differentially expressed *miRNA*s, including miR-706, miR-677-3p, miR-598-3p, miR-146b-3p, miR-200a-3p, miR-200b-3p, miR-455-3p, miR-485-3p, miR-34a-3p, miR-121-3p and miR-128, implicating oxidative stress and circadian regulatory pathways. In parallel, in vitro studies using N2a cells demonstrated that SFN counteracts Aβ1–42-induced oxidative stress and restores cellular homeostasis. These results provide a rationale to investigate SFN's effect on dysregulated *miRNA*s in vivo. Collectively, our findings highlight the translational potential of integrating *miRNA* profiling with natural compounds like SFN for early detection and therapeutic intervention in AD.

PP16. EMPOWERING BREAST CANCER CARE IN INDIA: STEM CELL AND TISSUE ENGINEERING ADVANCES FOR REGENERATION, RECONSTRUCTION, AND AWARENESS

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ABSTRACT

Breast cancer in India combines rising incidence with younger age at onset and frequent late presentation, which together depress survival. It accounts for 28.2 percent of all female cancers and an estimated 216,108 new cases each year. Five year survival is 66.4% in India compared with about 80-90% in developed nations. Only 9.8 percent of women aged 15 to 49 report a breast examination, reflecting gaps in awareness, stigma, economic barriers, and limited healthcare facilities. This review links these public health realities with advances in stem cell biology and regenerative strategies in Indian context. Breast cancer stem cells (BCSC) drive initiation, progression, metastasis, and resistance. CD44, CD24, and ALDH1 carry prognostic value, and dysregulated Wnt, Notch, and Hedgehog signalling offers therapeutic entry points. Indian cohorts report about 29 percent prevalence of pathogenic BRCA variants among affected patients, which argues for customized genetic testing approaches. We recommend translation of stem cell insights through standardized clinical pathways, population specific trials that use BCSC markers as stratifiers, expansion of affordable early detection with clear referral routes, and equitable genomic services. Align policy and financing to secure access to diagnostics, systemic therapy, reconstruction including adipose derived options, and structured survivorship support can establish a transformative breast cancer care model in India that dramatically improves survival outcomes for millions of women.

PP17. *TINOSPORA CORDIFOLIA* ATTENUATES LEAD ACETATE INDUCED HEPATIC DAMAGE IN MICE

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ABSTRACT

The extensive use of lead (Pb) and its associated health risks necessitates the search for safe and effective strategies to mitigate its harmful effects. Keeping in view the beneficial effects of *Tinospora cordifolia* (*T. cordifolia*) in reducing damage caused by several heavy metals, the present study was designed to evaluate the modulatory effects of *T. cordifolia* against lead acetate induced hepatic damage in mice. For the experimental investigations, Balb/c mice were randomly divided into four groups: Group I (Control), Group II [lead acetate (Pb), 60mg/kg b.w., daily for 8 weeks], Group III [T. cordifolia (TC) extract, 200mg/kg b.w., on alternate days for 10 weeks] and Group IV [(Pb + TC) as explained for Group II and Group III respectively]. Lead administration caused damage to hepatic tissue as observed by altered histoarchitecture, tissue function markers, increased oxidative stress marker and serum LDH activity. Hepatic damage was also indicated by increased micronucleus formation and higher apoptotic index. *T. cordifolia* administration to lead acetate exposed animals was able to exhibit beneficial effects as revealed by the improvement in histoarchitecture, cell damage and organ function markers, decrease in lipid peroxidation, micronucleus formation and apoptotic index. These findings suggest that *T. cordifolia* extract mitigated the adverse effects of lead acetate exposure, however studies exploring the mechanisms at play need to be carried out.

PP18. ISOLATION, CHARACTERIZATION, AND EVALUATION OF LYTIC BACTERIOPHAGE(S) AGAINST *PSEUDOMONAS AERUGINOSA* INDUCED SKIN WOUND INFECTION

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ABSTRACT

Pseudomonas aeruginosa poses a significant threat in skin wound infections due to its high virulence and growing antimicrobial resistance, necessitating the exploration of alternative therapeutic strategies. Although antimicrobial peptides, nanoparticles, and probiotics have been explored to overcome antibiotic resistance, their efficacy remains inconsistent due to stability issues, cytotoxicity, and limited host compatibility. In this context, bacteriophages offer a promising, highly specific, and self-replicating biological alternative for bacterial control.

Bacteriophages, with their ability to specifically lyse bacterial cells, offer a promising solution. This study focuses on the isolation, characterization, and therapeutic evaluation of bacteriophages from environmental water samples against *P. aeruginosa*-induced skin wound infections in BALB/c mice. Phage ATP1 exhibited strong lytic activity produced clear plaques. Transmission electron microscopy revealed an icosahedral head with a contractile tail, classifying the phage within the *Myoviridae* family. The *in vivo* efficacy of ATP1 was assessed in a mice wound infection model, where phage treatment resulted in a significant reduction of bacterial load, accelerated wound contraction, and enhanced tissue regeneration compared to infected controls. Histopathological analysis confirmed reduced inflammation, improved re-epithelialization, and restoration of normal dermal architecture in phage-treated groups. In conclusion, this research highlights the successful isolation and thorough characterization of lytic bacteriophages from environmental sources, underscoring their potential as potent antimicrobial agents against *P. aeruginosa*. The anticipated positive therapeutic outcomes in the wound infection model strongly support the application of bacteriophages as an effective and targeted strategy for combating *P. aeruginosa* skin wound infections.

PP19. SCREENING OF UREASE-PRODUCING BACTERIA FROM AGRICULTURAL SOIL

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ABSTRACT

Microbial urease, an enzyme that hydrolyses urea into ammonia and carbon dioxide, plays a fundamental role in the global nitrogen cycle. Beyond its ecological significance, urease holds considerable biotechnological potential for sustainable agricultural and industrial applications. This study focused on the isolation and screening of urease-producing bacterial strains from urea-rich agricultural soils collected from Bathinda, Punjab. Using qualitative urease activity assay, four urease-producing bacterial isolates were screened and selected on Christensen's urea agar, as evidenced by characteristic pink-to-red halos indicating ammonia production. Gram staining revealed all isolates to be Gram-negative bacteria with varied morphological characteristics, suggesting taxonomic diversity within the sampled environment. Secondary screening using the phenol-hypochlorite assay for quantitative ammonia estimation identified Isolate 4 as the most potent urease producer, demonstrating superior activity of 3.10 µM min^{-1} mL^{-1} and ammonia production of 95 µM, significantly outperforming other isolates. The selected isolate exhibited maximum growth and urease production at 37C. It also showed remarkable urea tolerance and maximum urease production at 7% concentration. However further optimization and characterisation will help in demonstrating the biotechnological and industrial promise of the isolated strain for applications in biofertilizer development, environmental bioremediation, and eco-friendly agricultural practices in future.

PP20. IN SILICO IDENTIFICATION OF A POTENTIAL ALDH1A1 INHIBITOR FOR TARGETING BREAST CANCER STEM CELLS

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ABSTRACT

Breast cancer remains a major global challenge, where cancer stem cells (CSCs) contribute to tumor initiation, recurrence, and therapeutic resistance. The enzyme ALDH1A1 is a key CSC marker in breast cancer and plays a vital role in maintaining stemness and promoting chemoresistance. In this study, a molecular docking–based virtual screening approach was employed to identify small-molecule inhibitors targeting the catalytic pocket of ALDH1A1. Among the screened molecules, a lead compound demonstrated strong binding affinity and formed multiple stabilizing interactions with catalytically important residues. Structural analysis revealed hydrogen-bonding and hydrophobic contacts that indicate effective occupation of the substrate-binding pocket, potentially interfering with NAD^+ cofactor access and enzymatic activity. These findings highlight the compound as a promising candidate for further in vitro and in vivo validation. This work provides valuable structural insights for the rational design of ALDH1A1 inhibitors aimed at suppressing CSC-mediated breast cancer progression and improving therapeutic outcomes.

PP21. INVESTIGATION OF INVITRO ANTI-CANCER AND APOPTOTIC POTENTIAL OF ORANGE-DERIVED NANOVESICLES AGAINST BREAST CANCER CELLS

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ABSTRACT

Breast cancer is a prevalent and life-threatening disease affecting women globally. Despite advances in cancer treatment, there is a pressing need for effective and low-toxicity anticancer agents. Recent research has highlighted the potential of nanosized extracellular vesicles derived from edible plants in modulating cell function and facilitating biomolecules transport between cells. Mounting evidences suggests the anticancer potential of nanovesicles derived various edible plants against different types of cancer. However, the potential of nanovesicles derived from orange in treating breast cancer remains unexplored. In this study, we aimed to investigate the therapeutic effects of orange derived

nanovesicles (OrDNVs) on breast cancer cell lines (MDA-MB-231 and MDA-MB-468). To accomplish our goal, we isolated nanovesicles from orange using the differential centrifugation method and characterized their size and integrity by employing DLS and FESEM. Subsequently, we evaluated the therapeutic effects of these OrDNVs on breast cancer cells. Furthermore, flow cytometry analyses and DAPI staining demonstrated that the anti-proliferative effect of OrDNVs was attributed to the induction of apoptosis in cancer cells. Additionally, western blotting analysis showed that the apoptotic effect of OrDNVs on breast cancer cell was mainly mediated modulation by bcl-2, bax, and caspase-3

PP22. CHILDHOOD OBESITY: A SILENT CATALYST FOR INDIA'S GROWING NON-COMMUNICABLE DISEASE BURDEN-EMPOWERING PREVENTION THROUGH SCIENCE AND TECHNOLOGY

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ABSTRACT

According to the World Health Organization (WHO), India now has more obese children than undernourished ones, a worrying shift reflecting the nation's changing health landscape. Childhood obesity is an emerging epidemic silently fueling India's NCD crisis, accelerating the onset of diabetes, hypertension, and cardiovascular diseases. This nutritional transition from undernutrition to overnutrition poses a significant threat to India's public health system and future generations. With a focus on the role of science and technology in prevention, this study attempts to investigate the factors that contribute to *childhood obesity* and its connection to India's rising NCD burden. Adopting a life-course approach, it examines how early-life factors- maternal nutrition, infant feeding, lifestyle habits, and digital exposure contribute to obesity risk. Environmental and behavioural characteristics, such as fast-food marketing, reduced physical activity, and sedentary lifestyles, are also examined. Furthermore, the study highlights technological interventions, including AI-based growth monitoring, mHealth apps, digital nutrition education, and school-based e-health initiatives, that empower awareness and promote behaviour change. Childhood obesity is a preventable root cause of India's future health crisis. To halt this hidden epidemic and ensure a healthy future generation, it is crucial to integrate scientific advancements with sustainable lifestyle changes.

Keywords: *childhood obesity*, *non-communicable diseases*, nutrition transition, *digital health interventions*, *public health prevention*.

PP23. MESENCHYMAL STEM CELL-DERIVED EXTRACELLULAR VESICLES: EMERGING THERAPEUTICS FOR NEURODEGENERATIVE DISEASES

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ABSTRACT

Neurodegenerative diseases are fatal and progressively disabling disorders of the central nervous system (CNS). Neurodegenerative diseases involve not only progressive loss of neurons but also complex interactions among neurons, glia, and vascular elements that drive chronic neuroinflammation and degeneration. Conventional therapeutic approaches primarily provide symptomatic relief and fail to halt or reverse neuronal loss. Mesenchymal stem cells (MSCs) have emerged as promising candidates for neuroregeneration due to their ability to modulate immune responses, promote angiogenesis, and secrete neurotrophic factors. However, increasing evidence indicates that the therapeutic effects of MSCs are largely mediated by their extracellular vesicles (EVs), which serve as carriers of bioactive molecules such as proteins, lipids, mRNAs, and microRNAs. These MSC-derived EVs (MSC-EVs) retain many of the parent cells' regenerative and immunomodulatory properties while offering significant safety and pharmacokinetic advantages, including their ability to cross the blood–brain barrier and avoid the risks associated with cell transplantation. In the context of neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease, amyotrophic lateral sclerosis, and multiple sclerosis, MSC-EVs have shown potential to modulate neuroinflammation, reduce oxidative stress, and promote neuronal survival and synaptic repair. This review discusses the current understanding of EV biology, highlights the therapeutic mechanisms of MSC-EVs in neurodegenerative disease models, and explores strategies to enhance their efficacy.

PP24. UNDERSTANDING METABOLIC SYNDROME AND ITS MANAGEMENT APPROACHES

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ABSTRACT

India is experiencing a transition from communicable diseases to non-communicable diseases. Top cause of mortality worldwide is *cardiovascular diseases* and *metabolic syndrome* is a serious risk factor for *cardiovascular diseases*. Metabolic syndrome is characterized by central obesity, high blood pressure, high blood sugar, abnormal cholesterol, and *insulin resistance*. It is on rise from last two decades and possess a major public health challenge, the cause of *metabolic syndrome* is attributed to western way of life spreading all over the world. The study aims to review current interventions and sheds light on importance of reducing health risks occurring from it. There is significant evidence on its association with mortality hence increasing disease burden on overall community. Once diagnosed it is extremely important to respond readily through healthier lifestyle and pharmacological intervention. Preventing *metabolic syndrome* may also prevent several complicated multifactorial diseases including *cardiovascular diseases*, *diabetes*, obesity, cancer, and other diseases whose causative mechanisms are only partially known.

Keywords: *metabolic syndrome, cardiovascular diseases, diabetes, insulin resistance*

PP25. PHAGE THERAPY: A NEW APPROACH TO COMBAT ANTIMICROBIAL RESISTANCE THROUGH PHAGE-BASED STRATEGIES.

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ABSTRACT

The emergence of AMR (Antimicrobial Drug Resistance) as a prominent global public health challenge worldwide in 21st century, primarily due to uncontrolled use of antibiotics in human medicine, veterinary, and agricultural practices, has necessitated urgent measures to address its growing threat. As the development of new antibiotics remains slow and challenging, bacteriophage-based approaches have gained considerable attention as promising alternatives to combat AMR. Since phages are very host-specific and reduce off target killing, the present study includes use of phage therapy and various phage-based strategies and their efficacy against multidrug resistance organisms (MRDOs), such as *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa,* Enterobacter sp. The phage therapy and phage-based strategies include lysis of drug resistance bacteria, phage-encoded endolysins, bioengineering of phages and endolysins. Thus, the bacteriophage-based strategies offer a dual advantage, effectively preventing the spread of infectious diseases while mitigating antimicrobial resistance.

PP26. BACTERIAL CELLS AS LIVING CANCER THERAPEUTICS: MOLECULAR MECHANISMS AND TRANSLATIONAL CHALLENGES

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ABSTRACT

Even though there has been a significant development in cancer therapeutics, the need for target specific therapies with minimal off target damage remains at large. The re-emergence of live

bacteria as cancer therapeutics seems very promising since bacterial system provide features that can be exploited to engineer precise tumor targeting and immune modulating therapies. This review highlights the recent advances in the live cell cancer therapeutics, focusing on the molecular mechanisms underlying bacterial oncolysis, immune-activation and drug delivery. Recent studies were critically analyzed based on bacterial species, mechanism of action and clinical success. Studies suggest that live bacteria help in tumor suppression and regression through direct oncolysis, hypoxia-targeted colonization, and activation of innate and adaptive immunity. Genetic modifications in bacterial genomes have enhanced the quality of bacterial vectors in terms of safety, tumor specificity, and drug delivery efficiency. In conclusion, live bacterial cells as cancer therapy is highly versatile and promising but challenges during clinical translations need to be addressed.

PP27. INVESTIGATING THE EFFECT OF NARINGIN ON THE ADIPOGENIC DIFFERENTIATION OF MURINE MESENCHYMAL STEM CELLS (C3H10T1/2)

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ABSTRACT

Obesity is a global health concern associated with type 2 diabetes, cardiovascular disease, and other metabolic disorders. Adipogenesis, the differentiation of mesenchymal stem cells into mature adipocytes plays a central role in adipose tissue expansion. Natural compounds such as flavonoids have gained attention for their ability to modulate this process safely. Naringin, a citrus-derived flavonoid, has shown promising anti -adipogenic activity, but its effects on stem cell models remain underexplored. This study aimed to investigate the impact of naringin on adipogenic differentiation in murine mesenchymal stem cells (C3H10T1/2). Cells were cultured, induced with adipogenic differentiation medium and treated with optimized doses of naringin (5-20 µM). Cell viability was evaluated using the MTT assay. Morphological changes, lipid droplet accumulation, and triglyceride content were assessed through phase-contrast microscopy, Oil Red O staining, and quantitative triglyceride estimation respectively. Naringin significantly inhibited adipogenic differentiation in a dose-dependent manner without exerting cytotoxic effects at effective concentrations. Compared to untreated controls, Naringin-treated groups exhibited reduced morphological transformation into adipocytes, attenuated lipid droplet accumulation and a marked reduction in triglyceride levels (~38% at 20 µM, $p<0.05$). These findings highlight the ability of naringin to suppress early adipogenic events in mesenchymal stem cells, positioning it as a promising candidate for further exploration as a potential anti-obesity therapeutic agent.

PP28. NEUROPROTECTIVE EFFECTS OF METFORMIN-PRECONDITIONED MESENCHYMAL STEM CELL SECRETOME AND NON-CONDITIONED SECRETOME ON DEPRESSION-INDUCED NEUROTOXICITY IN NEURO-2A CELLS.

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ABSTRACT

Neuropsychiatric disorders are termed to be the disturbances of brain function, producing a combination of neurological signs and psychiatric symptoms, such as Major Depressive Disorder (MDD), Generalized Anxiety Disorder (GAD), Schizophrenia, Alzheimer's Disease (AD), etc. Current treatment available revolves around the prescription of drugs (SSRIs, SNRIs, MAOIs, etc.) which are having low remission rates and delayed onset, with no personalized treatment available. To cater to these limitations, the use of stem cells such as Mesenchymal Stem Cells (MSCs), Induced Pluripotent Stem Cells (iPSCs), Neural Stem Cells (NSCs) and their secretions, particularly of MSCs, are currently being studied for more effective treatment and for understanding the pathophysiology of these disorders. Therefore, an *in vitro* investigation was conducted to assess the neuroprotective efficacy of mesenchymal stem cell (MSC) secretomes—both non-conditioned and metformin-preconditioned—on Neuro-2A cells exposed to depression-like stressors (oxidative, osmotic, and surgical). It was demonstrated that preconditioning MSCs with metformin improved the protective efficiency of their secretome by increasing cell survival and decreasing reactive oxygen species. The MTT assay, ROS analysis, and protein quantification (Bradford assay) were used, contributing to pave the way for the development of safer, cell-free therapies for neuropsychiatric disorders.

PP29. MICRORNAS AS CENTRAL REGULATORS OF MULTI-ORGAN DAMAGE IN DIABETES: AN INTEGRATIVE COMPUTATIONAL STUDY

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ABSTRACT

Diabetes mellitus is a complex metabolic disorder associated with multiple organ-specific complications, including diabetic nephropathy, diabetic ischemic heart disease, and diabetic skeletal muscle dysfunction. MicroRNAs (miRNAs), as key post-transcriptional regulators of gene expression, play a crucial role in modulating molecular pathways underlying these complications. The present study aimed to unravel the common miRNAs involved in these

diabetic pathologies and their corresponding target genes using a comprehensive in silico approach. Publicly available datasets from the Gene Expression Omnibus (GEO) were analyzed to identify differentially expressed miRNAs (DEMs) in each condition. Common miRNAs shared across all three complications were determined using the Venny tool. The potential target genes of these shared miRNAs were predicted through the miRDB database. Gene Ontology (GO) and pathway enrichment analyses were performed to elucidate the biological processes and signaling networks regulated by these miRNA–mRNA interactions. Protein–protein interaction (PPI) networks were constructed and analyzed in Cytoscape to identify hub genes with key regulatory roles. This integrative analysis provides valuable insights into unified molecular mechanisms and potential therapeutic targets for managing diabetes-associated multi-organ complications.

PP30. UNRAVELLING THE *STAPHYLOCOCCUS AUREUS* PAN-GENOME: INSIGHTS INTO GENETIC VARIANTS AND HORIZONTAL GENE TRANSFER

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ABSTRACT

Staphylococcus aureus is a Gram-positive, multidrug-resistant ESKAPE pathogen responsible for diseases ranging from asymptomatic colonisation to life-threatening infections. Due to its clinical importance, the WHO has classified S. aureus among the high-priority pathogens requiring urgent antibiotic development. Its genomic plasticity and ability to acquire resistance genes make it a persistent healthcare challenge. This study examined genomic diversity, variation, and HGT in 20 S. aureus strains using a pan-genome approach. The reference genome was obtained from NCBI, and NGS data was retrieved using the SRA Toolkit. Quality assessment was performed with FastQC, followed by sequence alignment using Bowtie2 and processing through SAMtools. Variants were identified with GATK and annotated via SnpEff. KEGG was used for functional annotation and pathway mapping, while genome assembly and annotation were conducted using SPAdes and Prokka. Roary was utilised to classify core and accessory genes, while HgTector detected homologous genes in S. aureus and S. epidermidis, suggesting HGT. Functional gene analyses were performed using the DEG and UniProt. Key findings include destabilising mutations in essential genes such as DNA polymerase III subunit beta and the identification of the *yugI* gene (General Stress Protein 13), acquired via HGT from S. epidermidis, linked to oxidative stress resistance and biofilm formation. These insights highlight how genome-driven surveillance can inform precision antibiotics and innovative molecular strategies for improved infectious disease management.

PP31. DEVELOPMENT OF ANTIBACTERIAL THIN FILMS USING ZINC-EMBEDDED SMART FOOD PACKAGING BIOFILMS

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ABSTRACT

The rising demand for sustainable packaging has driven the development of advanced, biodegradable materials with multifunctional properties. This study presents the fabrication and characterisation of smart food packaging biofilms using chitosan biofilms embedded with zinc nanoparticles, synthesised via a green synthesis method. The primary objective was to engineer a material that combined biodegradability with enhanced functional performance. Comprehensive material characterisation was conducted, with X-ray diffraction (XRD) analysis confirming critical structural parameters, including the crystallinity index of the biopolymer, the phase composition of the zinc species, and the average crystallite size and lattice parameters of the nanoparticles, which verified their successful integration. Zinc Oxide is known for its absorption of UV radiation and its antimicrobial and anticancer properties. Chitosan is a natural, biodegradable polymer, and with glycerol acting as a plasticizer, the composite films will exhibit exceptional UV-blocking capabilities, superior thermal stability, and a homogeneous surface morphology. Further analysis of the composite film will reveal the results, indicating that the developed zinc-embedded chitosan biofilms represent a high-performance, environmentally friendly alternative to conventional plastic packaging, with significant potential for extending food shelf life through their synergistic protective properties.

PP32. BIOSENSORS: AN EMERGING TREND IN CANCER DIAGNOSIS

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ABSTRACT

Cancer is one of the most life-threatening diseases and a leading cause of mortality worldwide, responsible for nearly 10 million deaths in 2020 (WHO). Early and accurate detection of cancer is a crucial step for improving patient outcomes and survival rates. Recent advancements in biosensor technology have shown a great promise in enabling non-invasive, portable, point-of-care (POC), user-friendly, and cost-effective cancer screening and clinical diagnostics. Biosensors are analytical devices designed to detect specific biomarkers- such as

proteins, DNA, or RNA; by converting biological interactions into measurable signals through a transducer and an electronic processing unit, which together produce a detectable and quantifiable results. The major types of transducers used in biosensors are electrochemical, optical, and mass-based, each differing in their way to convert biological responses into measurable signals. These biomarkers play a vital role in early detection as well as in monitoring disease progression and evaluating the effectiveness of therapeutic interventions, including chemotherapy. Despite significant progress in laboratory settings, major challenges persist, including ensuring long-term stability, reproducibility in complex biological matrices (such as serum or plasma), cost-effective large-scale production, and clinical validation for real-world applications. Continued innovation and interdisciplinary research are essential to translate biosensor-based cancer diagnostics from laboratory research to practical clinical implementation.

PP33. IN SILICO DISCOVERY OF NATURAL COMPOUND INHIBITORS TARGETING BACTERIAL UROCANATE REDUCTASE (URDA) TO PREVENT IMIDAZOLE PROPIONATE-MEDIATED INSULIN RESISTANCE IN TYPE 2 DIABETES

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ABSTRACT

Type 2 Diabetes Mellitus (T2DM) is a multifactorial metabolic disorder often exacerbated by gut microbiota–derived metabolites such as imidazole propionate, which impairs insulin signaling and glucose metabolism. Urocanate reductase (UrdA), a bacterial enzyme responsible for imidazole propionate formation, has recently emerged as a potential therapeutic target for mitigating microbial contributions to insulin resistance. The present study aimed to identify potential natural compound inhibitors of UrdA through a comprehensive in silico approach. The three-dimensional structure of UrdA was retrieved and prepared for molecular docking, followed by virtual screening of natural compound libraries to predict binding affinity and interaction profiles. The top-ranked compounds exhibiting strong binding energies and key interactions with the catalytic residues were further evaluated through ADMET (Absorption, Distribution, Metabolism, Excretion, and Toxicity) analysis to assess their pharmacokinetic and safety properties. Several candidate molecules demonstrated favorable docking scores and drug-likeness characteristics, suggesting their potential as safe and effective UrdA inhibitors. This in silico strategy provides valuable insights into targeting bacterial metabolic enzymes to prevent imidazole propionate–induced insulin resistance, thereby offering a promising avenue for adjunctive therapeutic interventions in T2DM management.

PP34. SYMPTOM ANALYSIS AND REGIONAL DISEASE MONITORING SYSTEM FOR MEDICAL SUPPLY CHAIN MANAGEMENT AND OUTBREAK PREVENTION

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ABSTRACT

The efficient distribution of medical supplies is a critical component of modern healthcare systems, ensuring the timely and unbiased delivery of essential medicines. However, persistent challenges such as inefficient inventory management, limited supply chain transparency, and the perishability of temperature-sensitive pharmaceuticals impede effective logistics. These inefficiencies are further aggravated by fragmented data infrastructures and delayed information exchange among manufacturers, distributors, and healthcare facilities, resulting in regional shortages, redundant stockpiling, and compromised patient safety. The situation is particularly critical in rural and semi-urban regions of India, where healthcare facilities and medicine distribution are limited. This research presents an integrated framework and prototype system for smart-device and computer-based platforms that converge disease surveillance with intelligent medicine distribution. Developed using an object-oriented programming architecture and a structured database management system, the model performs real-time symptom analysis and generates the top three probable diseases to support physicians in early-stage diagnostics. Upon confirmation of the disease by the doctor, disease and patient data are persisted within a region-specific database in real time, assisting health authorities to track epidemiological trends, identify emerging diseases, and dynamically optimize medicine supply chains. The system also facilitates dispatching doctors from a primary hospital to outbreak regions to study causes and implement targeted interventions. For example, when recurrent gastrointestinal cases are detected within a district, the system alerts Primary Government healthcare facilities to deploy medical teams for early intervention. By assimilating real-time epidemiological analytics with logistics intelligence, the system enhances diagnostic precision and resource allocation efficiency.

PP35. GERMINATION-INDUCED BIOCHEMICAL, NUTRITIONAL, AND FUNCTIONAL CHANGES IN OATS (*AVENA SATIVA*): IMPLICATIONS FOR FUNCTIONAL FOOD DEVELOPMENT

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ABSTRACT

Background: Oats (*Avena sativa*) are globally recognized for their rich nutrient profile and unique bioactive compounds such as β-glucan and avenanthramides. Germination, a sustainable bioprocessing technique, has emerged as an effective approach to enhance the nutritional and functional attributes of cereals. However, the germination-driven transformations in oats remain comparatively underexplored. Objective: This review aims to compile and analyse current evidence on the biochemical, nutritional, and functional modifications that occur during oat germination and to highlight their potential applications in the development of functional foods. Methods: Relevant literature from databases including PubMed, Scopus, and Google Scholar was reviewed to identify recent studies (2010–2025) investigating changes in macronutrients, bioactive compounds, enzymatic activity, and functional properties of germinated oats. Results: Germination induces degradation of anti-nutritional factors such as phytic acid, increases the bioavailability of minerals and amino acids, and enhances levels of phenolic compounds and antioxidants. Functional improvements include better digestibility, enhanced water absorption, and modified starch properties, making germinated oats suitable for incorporation into beverages, bakery, and health-oriented formulations. Conclusion: Germination serves as a cost-effective and natural strategy to augment the nutritional and functional quality of oats, offering promising avenues for the formulation of next-generation functional and therapeutic foods.

Keywords: Oats (*Avena sativa*), Germination, Nutritional enhancement, Functional properties, Bioactive compounds, β-glucan, Antioxidant activity, Functional foods.

PP36. GREEN EXTRACTION APPROACHES FOR SILYMARIN FROM MILK THISTLE (*SILYBUM MARIANUM*) SEEDS AND ITS PROSPECTS IN NUTRACEUTICAL FORMULATIONS FOR NON-ALCOHOLIC FATTY LIVER DISEASE (NAFLD) MANAGEMENT

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ABSTRACT

Non-alcoholic fatty liver disease (NAFLD) is emerging as one of the most common chronic liver disorders worldwide which is closely related with obesity, metabolic syndrome and lifestyle related factors. Current therapeutic strategies for combating NAFLD are limited, highlighting the need of phytochemicals in preventive and supportive care. *Silybum marianum* (Milk Thistle) is a well-known medicinal plant containing bioactive compound, silymarin, a complex of flavonolignans, with well-established antioxidant and hepatoprotective potential. NAFLD is primarily caused by hepatic fat accumulation linked to insulin resistance, oxidative stress and inflammatory responses. Existing preclinical and clinical evidence demonstrates that silymarin effectively alleviates oxidative stress, reduces insulin resistance and attenuates fibrogenic pathways, thereby promising a considerable approach in management of NAFLD. However, conventional extraction techniques are often based on toxic solvents and energy-intensive conditions, raising concerns about sustainability and food-grade compatibility. In this context, recent literature highlights the potential of green extraction technologies, which are

increasingly explored to ensure the efficient recovery of bioactive compounds while retaining their structural and functional integrity. Furthermore, due to constraints such as its low solubility, limited bioavailability and poor palatability, it remains a challenge to effectively translate silymarin into consumer-acceptable formats. The present work consolidates secondary evidence on the therapeutic role of silymarin in NAFLD and outlines a conceptual framework for its sustainable extraction, laying the foundation for nutraceutical strategies in NAFLD management and preventive healthcare.

PP37. DNA BASED SINGLE-NUCLEOTIDE POLYMORPHISMS IN DIABETIC NEPHROPATHY AMONG ASIAN POPULATIONS

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ABSTRACT

Diabetic nephropathy (DN) is a chronic disease that develops from prolonged effect of diabetes mellitus. It is influenced by both genetic and environmental factors. Identifying single-nucleotide polymorphisms (SNPs) associated with DN is crucial for early screening and risk prediction. In this study, recent genetic and population data was analyzed to compare DN specific SNPs found in various Asian ethnicities. The analysis highlights key SNP variants, such as collagen type IV alpha 1 chain (COL4A1), FERM domain containing 3 (FRMD3), hypoxia-inducible factor 1 alpha subunit (HIF1A), and transcription factor 7 like 2 (TCF7L2), which are consistently linked to pathways involved in endothelial dysfunction, glucose metabolism, and fibrosis. These findings were obtained by analyzing combination of literature review, cross-population comparative analysis, and data integration approaches. The identified SNPs suggests potential utility as genetic biomarkers for DN prediction and personalized treatment, though further validation in larger and more diverse cohorts is required to ensure clinical applicability.

PP38. ANTICANCER ACTIVITIES OF CALLUS SUSPENSION CULTURES OF *WITHANIA SOMNIFERA* AND *BACOPA MONNIERI*, AND ANALYSIS OF THEIR COMPOUNDS

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ABSTRACT

Cancer is a critical public health problem and the second leading cause of death, next to cardiovascular disease. Several phyto-derived natural products have been shown to have

significant therapeutic potential against various ailments, including cancer, by targeting key molecular pathways, including the PI3K-AKT-mTOR and p53 pathways. Callus suspension culture is a cutting-edge approach in drug discovery. In this study, we successfully generated callus suspension cultures of *Withania somnifera* and *Bacopa monnieri* and evaluated their anticancer potential using lung (A549, NCI-H460) and colon cancer cell lines (HT-29, HCT-116). This study revealed that our test sample showed growth inhibition for 96 h by 39.45% and 36.35%, respectively, for the lung (A549) cell line. While the highest anticancer potential was observed in the HCT-116 cancer cell line treated with 1:5 dilutions of a callus suspension culture of *Withania somnifera* and *Bacopa monnieri* for 96 hours, with an increase of 48% and 47%, respectively, further cell death confirmation was verified by the flow cytometry analysis and the confocal fluorescence microscopy analysis. Furthermore, the GC-MS analysis of this study revealed the presence of bioactive compounds in the most responsive callus suspension culture, which are likely responsible for its anticancer potential. Overall, the present study demonstrated that callus suspension cultures of *Withania somnifera* and *Bacopa monnieri* showed a promising anti-cancer potential in lung and colon cancer cell lines. Further studies are warranted to isolate the specific active compounds and identify the molecular mechanism by which the callus suspension cultures exert their anticancer effects.

PP39. ENZYMATIC ASSESSMENT OF FDC, VDH AND VANILLIN TOXICITY IN DIFFERENT STRAINS OF *SACCHAROMYCES CEREVISIAE*

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ABSTRACT

Vanillin or 4-hydroxy 3-methoxy benzaldehyde is a biological flavouring compound. It is also used in many other industries like pharmaceutical, perfume making etc. Natural vanillin is obtained from an orchid plant such as *Vanilla planifolia, Vanilla tahitensis*. According to “Mordor Intelligence Report” the bio vanillin market size stands at USD 315.88 million in 2025 and is on course to reach USD 405.01 million by 2030 at a 5.1% CAGR. But due to its lower production and higher cost of recovery from orchid beans, some biotechnological chemical based methods have been suggested for the large scale production of vanillin. In the present study, different strains of *Saccharomyces cerevisiae* were screened for their ferulic acid decarboxylase (FDC) and vanillin dehydrogenase (VDH) activities to assess their ability to degrade ferulic acid and vanillin respectively and

also checked the vanillin toxicity effect on strains. The purpose behind this study was to determine their suitability for the production of vanillin from ferulic acid through genetic engineering approaches, so that the developed recombinant strain could be used for the in situ vanillin production in various food based substrates.

PP40. TO STUDY THE EFFECT OF SOAKING DURATION ON GROWTH PERFORMANCE AND SHELF LIFE OF FOXTAIL MILLET (*SETARIA ITALICA*) MICROGREENS: A NUTRITIONAL APPROACH TOWARD PUBLIC HEALTH

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ABSTRACT

Microgreens are nutrient-dense young seedlings that contain significantly higher levels of vitamins, minerals, and antioxidants than their mature counterparts. They play a key role in promoting public health through dietary diversification. Foxtail millet (Setaria italica), an underutilized indigenous minor millet rich in protein, dietary fiber, iron, magnesium, and polyphenols, its consumption offers significant health-promoting benefits and potential for disease prevention. Cultivating foxtail millet as microgreens can enhance dietary diversity, improve micronutrient intake, and increase accessibility of nutrient-rich foods at the household level. The present study investigated the effect of different soaking durations (6, 12, and 24 hours) on germination, growth performance, and shelf life of foxtail millet microgreens. The seeds were soaked for 6, 12, and 24 hours in distilled water and grown on sterilized cocopeat trays. Growth parameters such as germination rate, shoot and root length, and were observed. Shelf life and visual quality were assessed under room temperature, refrigeration, and freezing conditions. Results indicated that 24-hour soaking duration resulted in early and uniform germination with maximum shoot (6 cm) and root (2.5 cm) growth by Day 11. Whereas, refrigerated storage-maintained freshness and nutritional quality for up to six days. These findings suggest that Foxtail millet microgreens can be easily cultivated at the household level and can be incorporated into diet as an affordable, nutrient-rich super food that can strengthen nutritional security, support disease prevention, and contribute as a public health intervention for health promotion and combat micronutrient deficiency.

PP41. IN SILICO EVALUATION OF DRUG REPURPOSING AGAINST THE FUNGAL PATHOGEN *CANDIDA ALBICANS*

Mansi Malik[1], Rachna Singh[1], Parvinder Kaur[2]
[1] Department of Microbial Biotechnology, Panjab University, Chandigarh, [2] Amar Saheed Baba Ajit Singh Jujhar Singh Memorial College, Bella, Ropar

ABSTRACT

Candida albicans is a WHO high-priority fungal pathogen with growing antifungal resistance and limited treatment options, highlighting the need for alternative therapeutic strategies. Using existing FDA-approved drugs in new ways, drug repurposing provides a simple and cost-effective method to discover potential antifungal candidates. The aim of this study was to evaluate non-antifungal FDA-approved drugs that could potentially inhibit key proteins of C. albicans. Two key fungal proteins were targeted in this study: lanosterol 14α-demethylase (CYP51), needed for ergosterol synthesis and membrane integrity, and heat shock protein 90 (Hsp90), a molecular chaperone involved in stress response and antifungal resistance. Molecular docking was used for computational screening, followed by validation of binding sites, pose assessment, and interaction analysis using Biovia Discovery Studio. From the 22 non-antifungal drugs screened, 13 were shortlisted based on their docking scores, drug- likeness, and ADME/Tox properties. Using the SwissADME Boiled Egg model, pharmacokinetic factors like gastrointestinal absorption and blood–brain barrier penetration were assessed. Reference antifungal drugs were included to validate the accuracy and reliability of the docking process. Among the shortlisted compounds, telmisartan and linagliptin showed strong binding, while mesalamine bound key active-site residues and had the best safety and pharmacokinetic profile, even with moderate docking scores. Notably, mesalamine stands out as a promising candidate for further experimental validation against resistant strains of C. albicans.

PP42. BRIDGING MOLECULES AND MANKIND : THE ROLE OF BIOTECHNOLOGY IN HEALTHCARE

Simran Vohra[1]
[1] Department of Biotechnology, Panjab University, Chandigarh

ABSTRACT

Science has always been humanity's most powerful act of hope - a way of saying we can do better, heal deeper and dream further. Today with tools like recombinant DNA technology and CRISPR-Cas9 biotechnology turns that hope into healing. From curing rare genetic conditions to preventing pandemics before they begin, biotechnology empowers humanity to rise above biological limits. What started as curiosity has slowly transformed into

compassion shaped by molecules. CRISPR-Cas9 has transformed medicine from reactive treatment to proactive healing, opening doors to personalized healthcare. Through recombinant DNA methods, vaccines and therapeutic proteins have become accessible worldwide making preventive medicine a global reality. This exploration celebrates biotechnology as more than a discipline, it is a bridge between molecules and mankind, between knowledge and kindness. In empowering healthcare for all, science rediscovers its most profound purpose- to serve humanity, one discovery at a time.

PP43. INTEGRATIVE TRANSCRIPTOMIC ANALYSIS REVEALS SHARED MOLECULAR SIGNATURES BETWEEN DIABETIC KIDNEY DISEASE AND DIABETIC PERIPHERAL NEUROPATHY

Shivang Kapoor[1], Rohit Bansal[1], Preeti Kumari[1], Archana Bhatnagar[1]
[1] *Panjab Univeristy, Chandigarh, India*

ABSTRACT

Diabetic Kidney Disease (DKD) and Diabetic Peripheral Neuropathy (DPN) are among the most prevalent and debilitating complications of diabetes mellitus, sharing overlapping molecular mechanisms driven by hyperglycemia-induced oxidative stress and inflammation. The present study aimed to unravel the common differentially expressed genes (DEGs) between DKD and DPN using transcriptomic datasets retrieved from the Gene Expression Omnibus (GEO) database. After normalization and differential expression analysis of selected datasets, the overlapping DEGs were identified using the Venny tool. Gene Ontology (GO) enrichment analysis was performed to explore the biological processes, molecular functions, and cellular components associated with the common DEGs. Protein–Protein Interaction (PPI) networks were constructed using the STRING database and visualized in Cytoscape to understand the molecular interactions underlying disease convergence. The CytoHubba plugin was employed to identify key hub genes potentially driving the shared pathogenic mechanisms of DKD and DPN. The identified hub genes may serve as potential biomarkers or therapeutic targets linking renal and neural complications in diabetes. This integrative bioinformatics approach provides new insights into the shared molecular landscape of diabetic complications, paving the way for multi-targeted therapeutic strategies.

CHEMICAL SCIENCES

- **Chemistry**

Sectional President
Prof Navneet Kaur

Sectional Secretary
Dr Varinder Kaur

CHASCON 2025

NATIONAL CONFERENCE ON

"*Empowering Humanity: Science, Technology, and Healthcare for All*

November 06 - 08, 2025

Section: Chemical Sciences

Program

November 07, 2025

Venue: Seminar Hall, Department of Chemistry, Panjab University, Chandigarh

Sectional President	Sectional Secretary
Name – Prof. Navneet Kaur Mobile - 9463518290	Name – Dr. Varinder Kaur Mobile - 9815065809

Time	**Program**
09:00-09:45	Display of posters by participants **Venue:** Ground Floor Corridor, Department of Chemistry, Panjab University, Chandigarh
09:45-10:00	Inauguration of Sectional Program ***Venue:*** Seminar Hall, Department of Chemistry, Panjab University, Chandigarh
10:00-10:45	**Session Chair:** Prof. Amarjit Kaur **Speaker:** Dr. Kamaldeep Paul, Professor, Thapar Institute of Engineering & Technology, Patiala ***Title "***Harnessing Directing Groups in Transition Metal-Catalyzed C–H Activation: Pathways to Bioactive Heterocycles"
10:45-11:30	**Session Chair:** Prof. Amarjit Kaur **Speaker:** Dr. Aman Sharma, Professor, Internal Medicine, PGIMER Chandigarh ***Title "***Rheumatology in day to day practice"
11:30-12:00	Tea Break
12:00-13:00	Oral Presentation ***Venue:*** Seminar Hall, Department of Chemistry, Panjab University, Chandigarh Poster Presentation **Venue:** Ground Floor Corridor, Department of Chemistry, Panjab University, Chandigarh
13:00-14:00	Lunch
14:00-17:00	Oral Presentation **Venue:** Seminar Hall, Department of Chemistry, Panjab University, Chandigarh Poster Presentation **Venue:** Ground Floor Corridor, Department of Chemistry, Panjab University, Chandigarh **Tea break from 15:30-16:00**

Abstracts of Invited Talks

HARNESSING DIRECTING GROUPS IN TRANSITION METAL-CATALYZED C–H ACTIVATION: PATHWAYS TO BIOACTIVE HETEROCYCLES

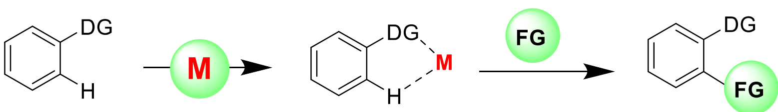
Dr. Kamaldeep Paul
Thapar Institute of Engineering & Technology

ABSTRACT

Nitrogen-containing heterocyclic scaffolds occupy a central role in organic chemistry owing to their exceptional significance in both photophysical and pharmaceutical domains. Their pervasive presence in natural products, therapeutic agents, and advanced functional materials has inspired extensive research efforts toward their efficient synthesis and structural diversification. Despite substantial progress in heterocyclic chemistry, the continuous demand for novel frameworks and innovative synthetic methodologies persists—driven by their critical importance in drug discovery, materials science, and fluorescent probe development.

Among modern synthetic strategies, transition metal-catalyzed C–H functionalization guided by directing groups has emerged as a particularly powerful and sustainable approach. This methodology enables the regioselective transformation of inert C–H bonds into diverse functional moieties, thereby streamlining the construction and late-stage modification of nitrogen-containing heterocycles. Such strategies not only broaden the chemical space of heterocyclic architectures but also pave the way for the design of novel molecules with enhanced biological activity and tailored material properties.

In particular, late-stage C–H activation has become an invaluable tool for the precise functionalization of complex heterocyclic cores such as coumarins, benzimidazoles, naphthalimides, and 1H-phenanthro[9,10-d]imidazoles. These scaffolds have demonstrated remarkable potential in medicinal chemistry, optoelectronic devices, and fluorescence-based sensing systems. The continual advancement of transition metal-catalyzed, directing-group-assisted C–H functionalization is therefore instrumental in expanding the heterocyclic repertoire, fostering the development of next-generation bioactive molecules and multifunctional materials with improved efficiency, selectivity, and sustainability.



RHEUMATOLOGY IN DAY-TO-DAY PRACTICE

Dr. Aman Sharma, Professor,
Internal Medicine, PGIMER Chandigarh

ABSTRACT

Rheumatology is a dynamic and evolving speciality that deals with the diagnosis and management of diseases affecting the joints, bones, muscles, and connective tissues. In day-to-day clinical practice, rheumatologists manage a broad spectrum of disorders, ranging from common degenerative conditions like osteoarthritis to complex autoimmune diseases such as rheumatoid arthritis, systemic lupus erythematosus, scleroderma, and vasculitis. A typical day in a rheumatology clinic involves evaluating patients with complaints of joint pain, swelling, stiffness, muscle weakness, or unexplained fatigue. Detailed history taking and a thorough musculoskeletal examination are essential for accurate diagnosis. Laboratory investigations such as ESR, CRP, rheumatoid factor, anti-CCP, ANA, and specific autoantibody panels provide valuable diagnostic clues. Imaging modalities like X-rays, musculoskeletal ultrasound, and MRI help assess joint inflammation and structural damage. Rheumatology practice emphasizes early diagnosis and timely initiation of treatment to prevent irreversible damage. The introduction of disease-modifying antirheumatic drugs (DMARDs) and biologic agents has revolutionized patient outcomes, reducing disability and improving quality of life. Regular follow-up and monitoring are critical to evaluate treatment response and identify drug-related adverse effects. Patient education is a cornerstone of rheumatologic care. Patients are counseled about the chronic nature of their diseases, the importance of medication adherence, and the need for lifestyle modifications. Exercise, physiotherapy, weight management, and a balanced diet play an important role in maintaining joint function and preventing complications. Multidisciplinary care is often required, involving collaboration with physiotherapists, occupational therapists, orthopedicians, dermatologists, and nephrologists, depending on disease involvement. The use of joint injections and ultrasound-guided procedures also forms part of routine rheumatology practice. In day-to-day practice, rheumatologists also manage acute flares of gout, reactive arthritis, and autoimmune connective tissue diseases. Pain management, fatigue assessment, and psychological support are integral components of comprehensive care. With ongoing research, the field continues to advance, introducing new diagnostic biomarkers and targeted therapies that offer personalized treatment approaches. The use of telemedicine and digital tools has further enhanced patient monitoring and follow-up. Rheumatology demands a high level of clinical judgment, patience, and empathy. Many rheumatic conditions are chronic, requiring long-term doctor–patient relationships built on trust and communication. By combining scientific knowledge with compassionate care, rheumatologists play a crucial role in restoring mobility, reducing pain, and improving the overall quality of life for patients. Thus, rheumatology in day-to-day practice is not just about treating joint pain—it is about understanding systemic diseases, managing chronic conditions holistically, and empowering patients to lead productive, fulfilling lives despite their illnesses.

Abstracts of Oral Presentations

Oral Presentation- Chemical Sciences		
OP1	Dr. Jyoti Agarwal	Turning Sound into Synthesis: Ultrasound-Assisted Creation of Efficient Organocatalysts for Carbon–Carbon Bond Construction
OP2	Dr. Varinder Kaur	Engineering Sg-CN with Nickel(II) Atrane for Efficient Photocatalytic Nitrogen Fixation
OP3	Dr. Prabhjot Singh	Molecular self-assembly from equilibrium order to non-equilibrium dynamics
OP4	Professor Prasad V Bharatam	Quantum Chemistry in Drug Discovery
OP5	Mr. Aman Chauhan	Biopolymeric Complexation Approach for Restoring the Photocatalytic Performance of 2-Dimensional Thin Films
OP6	Ms. Archana Negi	Fine tuning the band structure of graphitic carbon nitride using natural deep eutectic solvents for enhanced photocatalytic performance
OP7	Ms. Jyoti Rohilla	Pd@BTL–Cd core–shell nanoparticles as plasmonic photocatalysts for the reductive amination of furfural in water
OP8	Ms. Neha Garg	Responsive carbon dot-embedded hybrid microgels for tryptophan sensing.
OP9	Ms. Poonam Kumari Sharma	Oral Presentation Unravelling Non-Peptidic Analogues as Phe–Phe Mimetics: Insights into Synthesis, Self-Assembly, Structural Analysis and Optical Properties
OP10	Mr. Rohit Sharma	Designing Pyridine-Based Covalent Organic Frameworks/Monoclinic Tungsten Trioxide Composites as an Efficient Strategy for High-Performance Supercapacitors
OP11	Mr. Sanchit Kalra	An Electrochemically-Driven Cationic Polymer-Ag Embedded Chitosan/Polyvinyl Alcohol Matrix with In Situ O_2 -to-H_2O_2 Conversion for Efficient ROS- Mediated Pathogen Inactivation and Wastewater Purification
OP12	Ms. Sonam	Exploring Transition Metal (Ti, V, and Mn)-Decorated CrS_2 Monolayer as an Efficient Scavenger for SF6 Decomposition Remnants: Insights from AIMD and DFT Simulations
OP13	Ms. Neha	HPLC-Based Estimation of Capsaicin Content in Selected Capsicum annuum Varieties
OP14	Ms. Palvi Andotra	Calcination -Assisted Reduction Enhances the Photocatalytic Activity of P25 in Selective Oxidation of HMF to DFF
OP15	Ms. Supan	Reductive Amination of Furfural to Furfurylamine using Ru supported Zeolites

ABSTRACTS OF ORAL PRESENTATIONS

OP1. TURNING SOUND INTO SYNTHESIS: ULTRASOUND-ASSISTED CREATION OF EFFICIENT ORGANOCATALYSTS FOR CARBON–CARBON BOND CONSTRUCTION

Dr. Jyoti Agarwal[1]
[1] *Panjab University*

ABSTRACT

Despite many striking features, organocatalysts are seldom used in industry because of their high catalyst loading, difficulty in separation, non-recyclability and so forth. Even for the reduction of global chemical waste, these factors are imperative and need to be addressed rigorously. In this context, use of polymeric catalysts and/or catalyst immobilization can be marked as efficient approaches to produce easily separable, reusable, and aqueous catalytic systems with a high level of stereoselectivity. In this direction, our group has developed an efficient non-covalent approach using ultrasonication energy to generate the chiral heterogenous organocatalytic systems for asymmetric catalytic applications. This approach relies on non-covalent interactions such as ionic forces, hydrophobic effects, ion-pairing, van der Waals forces, hydrogen bonding and π–π stacking. For this purpose, Cyclodextrins (CDs), with a hydrophilic outer surface and a hydrophobic internal cavity, were chosen as hosts and small chiral organic molecules such as D-glucosamine and amino acid derivatives were selected as guests. Then, these inclusion complexes were successfully explored as catalysts for several C-C bond forming reactions such as the Aldol reaction, Michael addition, Diel's alder reaction and Mortia Bayllis Hilman reactions providing the excellent yields of the corresponding products with high enantioselectivities and/or diastereo-selectivities.

OP2. ENGINEERING SG-CN WITH NICKEL(II) ATRANE FOR EFFICIENT PHOTOCATALYTIC NITROGEN FIXATION

Dr. Varinder Kaur[1]
[1] *Panjab University Chandigarh*

ABSTRACT

Artificial nitrogen fixation under mild conditions remains one of the major challenges for the scientific community. In this study, we demonstrate the photocatalytic reduction of dinitrogen (N_2) to ammonia using a catalyst engineered through the integration of Ni(II) atrane with sulfonated graphitic carbon nitride (Sg-CN). The Ni(II) atrane was synthesized from a tripodal ligand (TPL) derived from iminodiacetic acid and styrene oxide, and subsequently anchored

onto Sg-CN sheets to form a heterojunction composite, Ni-TPL/Sg-CN. The intermediates (TPL and Ni(II) atrane) as well as the final composite were comprehensively characterized by SCXRD, FTIR, TGA, BET, FESEM, HRTEM, and XPS. Incorporation of Ni-TPL into Sg-CN reduced the overall band gap compared to the pristine precursors, facilitating improved charge transport and suppressing electron–hole recombination at the interface. Owing to the presence of nitrogen vacancies, the Ni-TPL/Sg-CN composite exhibited excellent photocatalytic performance, achieving an ammonia yield of 241 µmol g^{-1} within one hour under visible-light irradiation. Notably, the catalyst retained its activity and structural stability for at least six consecutive cycles. This work highlights a promising and efficient strategy for achieving sustainable nitrogen fixation under mild conditions.

OP3. MOLECULAR SELF-ASSEMBLY FROM EQUILIBRIUM ORDER TO NON-EQUILIBRIUM DYNAMICS

Prabhjot Singh[1], Jan Paczesny[2], Nishima Wangoo[3], Rohit Kumar Sharma[4]

[1] Department of Chemistry, Akal University, Talwandi Sabo, Bathinda, 151302, Punjab, [2] Institute of Physical Chemistry, Polish Academy of Sciences, Kasprzaka 44 52, 01 224 Warsaw, Poland, [3] Department of Applied Sciences, University Institute of Engineering and Technology, Panjab University, Sector 25, Chandigarh 160014, India, [4] Department of Chemistry and Centre of Advanced Studies in Chemistry, Panjab University, Sector 14, Chandigarh 160014, India

ABSTRACT

Molecular self-assembly of bioinspired motifs, such as DNA, nucleotides, lipids, and peptides, has garnered significant attention due to their ability to form ordered and functional architectures at the nanoscale and microscale. The optimisation and engineering of these architects have opened promising applications in biotechnology, healthcare and functional materials. In this regard, we have studied the nanoscale amyloid-like structures, which contain β-sheet secondary structure formed by amino acids, and subsequently assembled them into nanofibers and macroscopic hydrogels. Through this, we investigated the molecular-level mechanism that begins with dimer nucleation stabilised by non-covalent interactions. Further, we investigated the comprehensive self-assembly of all naturally occurring amino acids, which led us to determine the effect of co-assembly on modulating the toxicity caused by phenylalanine fibrils. On the other hand, peptide-based molecular assemblies have also yielded nanospheres and hydrogels with potential applications in drug delivery due to their inherent biocompatibility. Moving forward, we aim to explore fuel-driven dissipative self-assembly networks to unravel complex assembly behaviours. Thus, understanding how intricate dynamic structures emerge from simple molecular motifs may provide new strategies for designing self-healing, responsive and adaptive materials, as well as bringing us closer to understanding the chemical principles underlying the origin of life.

OP4. QUANTUM CHEMISTRY IN DRUG DISCOVERY

Prasad V. Bharatam[1]
[1] *NIPER, S.A.S. Nagar, Punjab*

ABSTRACT

Quantum chemical methods have broad applications across drug discovery, development, and disposition, playing a crucial role in various domains of pharmaceutical sciences. Our laboratory has been utilizing these methods under the umbrella of Pharmacoinformatics for the past 24 years. Recently, we have designed and developed several antibiotic and anti-cancer compounds after performing molecular design using quantum chemical methods. One such compound, TTMB, demonstrated antibiotic activity by inhibiting the polymerization of FtsZ. Another compound, IMBI, exhibited anti-cancer properties by binding to the colchicine site of tubulin and inhibiting its polymerization. Both compounds were rationally designed using quantum chemical methodologies.

OP5. BIOPOLYMERIC COMPLEXATION APPROACH FOR RESTORING THE PHOTOCATALYTIC PERFORMANCE OF 2-DIMENSIONAL THIN FILMS

Aman Chauhan[1], Ganga Ram Chaudhary[1]
[1] *Department of Chemistry, Panjab University, Chandigarh*

ABSTRACT

The performance loss in photocatalytic films due to alleviated surface exposure of catalysts post-immobilization is a persisting challenge. Herein, immobilization surfaces have been strategically engineered using unique biopolymeric complexation of chitosan and starch (CH/ST). The hybrid CH/ST films exhibited restoration of photocatalytic efficiency against ciprofloxacin due to enhanced surface porosity, which enhanced the adsorption efficacy and eventually counterbalanced the effect of reduced surface area of CdS@CuS-based model catalysts. Various critical aspects pertaining to activity restoration were holistically explored and validated, based on which a detailed mechanistic outlook was proposed.

OP6. FINE TUNING THE BAND STRUCTURE OF GRAPHITIC CARBON NITRIDE USING NATURAL DEEP EUTECTIC SOLVENTS FOR ENHANCED PHOTOCATALYTIC PERFORMANCE

Archana Negi[1], Aman Chauhan[1], Ganga Ram Chaudhary[1]
[1] *Department of Chemistry and Centre for Advanced Studies in Chemistry Panjab University*

ABSTRACT

Graphitic carbon nitride (g-CN) has registered itself as a remarkable photocatalyst due to its excellent photonic efficiency. However, its high recombination rates and poor morphological attributes reduce its photocatalytic efficiency. In this work, we have explored the role of natural deep eutectic solvents (NaDESs) in resolving these challenges. An array of NaDESs with acidic, basic, and neutral characters was designed and employed to modify g-CN. Morphological analysis of the developed systems revealed best surface topology for A-NaDES/g-CN. Particularly, acidic NaDES also enhanced negative charge on the surface of g-CN, which was critical in shaping its activity against selected cationic contaminants. Moreover, A-NaDES/g-CN showcased the widest band gap hinting at its superior charge separation properties. The concurrent impact of aggravated negative potential and wide band induced superior adsorption capability in A-NaDES/g-CN compared to other systems, making it best performing system against both the contaminants. Furthermore, other intricate aspects pertaining to direct role of NaDESs in activity enhancement were also explored and a mechanistic outlook was also proposed.

OP7. PD@BTL–CD CORE–SHELL NANOPARTICLES AS PLASMONIC PHOTOCATALYSTS FOR THE REDUCTIVE AMINATION OF FURFURAL IN WATER

Jyoti Rohilla[1], Sahil Thakur[1], Sahil Sharma[2], Varinder Kaur[1], Raghubir Singh[2]
[1] *Panjab University Chandigarh,* [2] *DAV College sector 10 Chandigarh*

ABSTRACT

This work reports the step-wise fabrication of a core–shell plasmonic nanocomposite Pd@BTL–Cd consisting of a BTL–Cd shell and a palladium nanoparticle core. BTL–Cd is the [Cd(BTL)·CdCl2] complex where the heptadentate framework of the bis-compartmental ligand encapsulated two Cd(II) centres in separate pockets. Pd@BTL–Cd has been found to be highly efficient for the photocatalytic conversion of furfural (a biomass-derived aldehyde) to furfuryl amine via reductive amination in aqueous ammonia at room temperature. The improved photocatalytic performance of the nanocomposite and its functioning in visible regions in contrast to parental species are attributed to the synergistic functioning of the core and the shell. The inclusion of the Cd–BTL nanoshell lowers the overall band gap of the material while the Pd nanocore generates in situ hydrogen species during photocatalysis. The optimization of catalytic conditions revealed that 10 mg of the fabricated photocatalyst can offer 99% conversion and a high turnover number in 4 h. The efficacy of the catalyst can be retained for up to 5 cycles with high selectivity for the formation of furfuryl amine (98%) in the presence of visible light (λ = 445 nm). Pd@BTL–Cd is also catalytically effective for the reductive amination of other aldehydes.

OP8. RESPONSIVE CARBON DOT-EMBEDDED HYBRID MICROGELS FOR TRYPTOPHAN SENSING.

Neha Garg[1], Savita Chaudhary[1]
[1] *Department of Chemistry, Panjab University, Chandigarh*

ABSTRACT

In this study, we report the successful preparation of a highly fluorescent hybrid microgels for selective Tryptophan (Trp) sensing through the in-situ incorporation of biocompatible CQDs into poly(N-isopropylacrylamide) (PNIPAM). By passivating CQDs with PNIPAM, their size and morphology were carefully controlled, which enabled highly selective and precise recognition of Trp. The hybrid microgel exhibited a broad linear detection range for Trp (10-500 μM) and an outstandingly low limit of detection of 0.1 μM, underscoring its potential as a highly effective probe. Biocompatibility studies were carried out to investigate the effectiveness of the probe. The developed sensor was successfully applied to real sample analysis, demonstrating accurate and reliable detection in different water and food samples.

OP9. ORAL PRESENTATION UNRAVELLING NON-PEPTIDIC ANALOGUES AS PHE–PHE MIMETICS: INSIGHTS INTO SYNTHESIS, SELF-ASSEMBLY, STRUCTURAL ANALYSIS AND OPTICAL PROPERTIES

Deepika Sharma[1], Soumen K.Dubey[1], Poonam K. Sharma[1], Nishima[2], Rohit Kumar Sharma[1]
[1] *Panjab University,* [2] *UIET Panjab University*

ABSTRACT

Diphenylalanine (FF) is a model for peptide self-assembly, motivating the development of stable non-peptidic mimics. We synthesized fourteen aromatic derivatives of L-phenylalanine (A1–A7) and L-phenylglycine (G1–G7) to study structure–property relationships. Aromatic substitutions and terminal modifications controlled supramolecular packing: rigid derivatives formed rods, flexible ones fibrils, and modified termini promoted plate-like and microplate morphologies. X-ray diffraction and Hirshfeld analysis confirmed distinct arrangements, including β-sheet packing and μ2-bridging. The phenylacetyl-protected derivative A2 showed quantum confinement-like optical properties at 284 nm, closely mimicking FF. These results

establish a versatile, non-peptidic platform for engineering bioinspired nanostructures for materials, biomedical, and optoelectronic applications.

OP10. DESIGNING PYRIDINE-BASED COVALENT ORGANIC FRAMEWORKS/MONOCLINIC TUNGSTEN TRIOXIDE COMPOSITES AS AN EFFICIENT STRATEGY FOR HIGH-PERFORMANCE SUPERCAPACITORS

Rohit Sharma[1], Shweta Rana[1]
[1] *Panjab University, Chandigarh*

ABSTRACT

Covalent Organic Frameworks (COFs) offer highly ordered, porous networks ideal for energy storage. Here, we report, for the first time, a synergistic composite of a novel SR-COF and monoclinic tungsten trioxide, exhibiting enhanced pseudocapacitive charge storage. The SR-COF was synthesized via condensation of 2,6-diaminopyridine and 1,3,5-benzenetricarbaldehyde through imine linkages, forming a porous and 2D corrugated sheet morphology with randomly distributed microporous spherical voids, providing an efficient framework for energy storage. Synergistic integration with m-WOâ‚ƒ effectively mitigates the intrinsic limitations of pristine COFs, resulting in enhanced charge storage capability. Electrochemical evaluation of the solid-state symmetric device, employing graphite flakes as a current collector and PVA-1M H2SO4 gel as an electrolyte, demonstrated a high energy density of 146.7 Wh kg-1at a power density of 2000 W kg-1 at 2 Ag-1. The device retained 83.2% of its capacitance with a coulombic efficiency of 102.9% after 10,000 cycles at 30 Ag-1, underscoring its excellent durability and potential for next-generation high-performance supercapacitor applications.

OP11. AN ELECTROCHEMICALLY-DRIVEN CATIONIC POLYMER-AG EMBEDDED CHITOSAN/POLYVINYL ALCOHOL MATRIX WITH IN SITU O2 -TO-H2O2 CONVERSION FOR EFFICIENT ROS- MEDIATED PATHOGEN INACTIVATION AND WASTEWATER PURIFICATION

Sanchit Kalra[1], Navneet Kaur[1], Narinder Singh[2]
[1] *Panjab University*, [2] *IIT Ropar*

ABSTRACT

Commercial wastewater disinfection technologies are ineffective at accomplishing rapid and energy-efficient pathogen removal, particularly against high loads of E. coli. In this context, we have developed an engineered material of 1-(carboxymethyl) pyridin-1-ium

functionalized polyethyleneimine (PD5) and Ag nanoparticles, integrated into a chitosan/polyvinyl alcohol (CHPV) matrix. Electron modulation of Ag by PD5 via σ/π-d band interactions, together with CHPV synergy, enhances electrocatalytic activity and reactive oxygen species (ROS) generation. The optimised PD5-Ag/CHPV-4 demonstrated a large electrochemically active surface area (83 cm2), low Tafel slope (131 mV dec-1), and minimal Ag leaching (<5 ppb). Moreover, it achieved complete E. coli inactivation within 8 min through a “Latch-Kill-Detach” mechanism and retained 94.7% efficacy after 200 cycles. It effectively disinfected complex simulated water in just 20 min, highlighting its practical applicability as an energy-efficient electro-disinfection platform for safe water reuse. Keywords: Functional nanocomposites, sewage effluent, wastewater treatment, cationic polymer, sustainable antimicrobial technology, nanomaterial-microbe interaction.

OP12. EXPLORING TRANSITION METAL (TI, V, AND MN)-DECORATED CRS2 MONOLAYER AS AN EFFICIENT SCAVENGER FOR SF6 DECOMPOSITION REMNANTS: INSIGHTS FROM AIMD AND DFT SIMULATIONS

SONAM[1], NEETU GOEL[1]
[1] *DEPARTMENT OF CHEMISTRY, PANJAB UNIVERSITY, CHANDIGARH*

ABSTRACT

Detecting SF6 decomposition gases in gas-insulated switchgear (GIS) is vital to ensure operational safety and mitigate environmental risks. The current study employs the van der Waals (vdW)-corrected density functional theory to investigate the adsorption of four major decomposition products of SF_6 gas, namely, H_2S, SO_2, SO_2F_2, and SOF_2, on pristine and transition metal (Ti, V, Mn)-decorated CrS_2 monolayers. The transition metal (TM) decoration was introduced to enhance the gas adsorption efficiency of the CrS_2 monolayer. All decorated monolayers exhibited thermodynamic stability with negative binding energies; the most favorable decorative site was located directly above the chromium atom. The findings demonstrate that the Mn-CrS2 monolayer showed the strongest binding with an Eb value of -5.546 eV and a charge transfer -0.231e. The adsorption process shifted from weak physisorption to strong chemisorption, with adsorption energies increasing up to -3.258 eV for Ti, -3.21 eV for V, and -2.645 eV for Mn. The fundamental insights into the gas-adsorbent interactions were gleaned by analyzing charge density difference maps, energy band structures, and partial density of states plots. Among the investigated systems, the Mn-CrS_2 monolayer displayed ideal recovery time values; at ambient temperature, the sensing response of the Mn-CrS_2 monolayer to SOF_2 reaches a high value of 256.318. Considering adsorption energy, sensitivity, and recovery time, the Mn-CrS_2 monolayer is proposed as an effective, recyclable, and ecologically friendly candidate for sensing SF6 decomposition products in electrical equipment.

OP13. HPLC-BASED ESTIMATION OF CAPSAICIN CONTENT IN SELECTED CAPSICUM ANNUUM VARIETIES

Neha[1], Anupma Sharma[2], Alok Jha[1], Kajal[1], Bhavini Sharma[1], Saurav Kumar[2]
[1] *CSIR CSIO*, [2] *CSIR CSIO and AcSIR*

ABSTRACT

Capsaicin is an alkaloid compound that belongs to the Capsaicinoid family.It is primarily found in *Capsicum annuum* species such as chilli and bell peppers. Both species have different tastes. Bell peppers possess a mild and sweet flavour, whereas chilli peppers are known for their pungency, which arises due to the presence of capsaicin. This bioactive compound stimulates heat-sensitive receptors, producing a burning sensation and contributing to the spicy flavour profile. In this study, different chilli varieties such as Byadgi-1, Potti Mirchi, Teja, and 341 Delux, were analysed to determine their capsaicin content using a High-Performance Liquid Chromatography (HPLC) technique. Samples were extracted using an acetonitrile-based solvent system under controlled temperature and time conditions to ensure maximum recovery. In this study, a standard calibration curve was developed to illustrate the capsaicin levels across different chilli varieties ranging from low to high concentration. This difference shows the genetic and biochemical diversity influencing pungency and bioactivity in chilli cultivars. Besides this sensory impute, capsaicin is also known for its therapeutic benefits, including potential roles in hypertension control, weight management, and cancer prevention due to its antioxidant properties. The study highlights the effectiveness of HPLC for precise quantification of capsaicin and provides a scientific basis for varietal selection in food processing and pharmaceutical applications.

OP14. CALCINATION -ASSISTED REDUCTION ENHANCES THE PHOTOCATALYTIC ACTIVITY OF P25 IN SELECTIVE OXIDATION OF HMF TO DFF

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ABSTRACT

Biomass can be converted into a variety of valuable compounds and is a very plentiful and renewable source of natural organic carbon. An eco-friendly method is the photocatalytic conversion of 5-hydroxyfurfural (HMF) produced from biomass to value-added 2,5-diformyfuran (DFF). Pharmaceuticals and antifungal drugs are among the many chemicals that can be made with DFF. In this study, the photocatalytic activity of P25, P25_200, and

P25_200_R catalysts was examined for the selective oxidation of 5-hydroxymethylfurfural (HMF) to 2,5-diformyfuran (DFF). According to the data, modified P25 (P25_200_R) exhibits the greatest catalytic performance, converting 62% of HMF and yielding 49% of DFF in a 30-minute reaction period. Because of the reduction of P25, which results in the creation of oxygen vacancies (Vo), HMF conversion with modified P25 is nearly twice that of untreated P25 catalyst. Vo modifies semiconductor's band structures and serve as catalytic reaction active sites as well. Here, we have examined the effects of reduction treatment on Vo and the reaction pathway for the HMF to DFF selective oxidation. To determine how reduction affects P25 activity, the modified catalyst was evaluated using N2-sorption isotherms, scanning electron microscopy (SEM), X-ray powder diffraction (XRD), Raman, NH3-TPD, CO2-TPD, O2-TPD, XPS, and UV DRS.

OP15. REDUCTIVE AMINATION OF FURFURAL TO FURFURYLAMINE USING RU SUPPORTED ZEOLITES

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ABSTRACT

Lignocellulosic biomass (LCB), as a carbon-rich and carbon-neutral source, has garnered significant interest for producing energy, fuel, and, most importantly, compounds that cannot be obtained from any other source. LCB is made up of three key components: cellulose, hemicellulose, and lignin, which can be used to make a variety of platform chemicals, including 5-hydroxymethyl furfural (5-HMF), furfural (FF), levulinic acid, butanol, and 2,3-butanediol. FF generated from the hemicellulose component of biomass has a substantial market size due to its wide range of applications, and it may also be used to synthesize other value-added compounds such as furfurylamine, tetrahydrofuran, furfural alcohol, and furoic acid.[1] The catalytic reductive amination of FF is used to synthesize furfurylamine (FAM), which has applications in the polymer, medical, agricultural, and pharmaceutical sectors. Various materials have been investigated for the reductive amination of FF to FAM, revealing the importance of distinct acidic sites in this transition. However, the particular roles of Lewis and Brønsted acid sites have yet to be discussed. The current study aims to selectively synthesize FAM by changing the zeolite support, which has both Lewis and Brønsted acid sites. In the presence of NH3 as a nitrogen source, the metal supported on modified zeolite demonstrated more catalytic activity in terms of FAM synthesis (>80%) than the metal supported on parent zeolite. Several characterization techniques, including BET, NH3-TPD, CO2-TPD, HR-TEM, and NH3-DRIFTS, are used to understand the structural changes in the modified zeolite and the role of active sites on the catalyst surface.

Abstracts of Poster Presentations

Poster Presentation- Chemical Sciences		
PP1	Dr. Aman Bhalla	Stereoselective Synthesis and Characterization of C4-Furan Substituted β-Lactams
PP2	Dr. Ankur Ganesh Pandey	Furopyrazines as Antibacterial Agents
PP3	Dr. Khuswinder Kaur	Ultrasonication induced synthesis of TPGS stabilized clove oil nanoemulsions and their synergistic effect against breast cancer cells and harmful bacteria
PP4	Dr. Renu Thapar	Synthesis of novel halohydrin appended β-lactam derivatives
PP5	Dr. Rohit Kumar Sharma	Au Nanocluster/CdTe Quantum Dot-Based Hybrids for Energy Transfer-Driven Fluorescence Enhancement and Charge Transport
PP6	Dr. Savita Chaudhary	Turning Biomass waste into Sustainable bioplastics
PP7	Dr. Shweta Rana	Extended Conjugation-Induced Charge Storage Enhancement in 1, 5-Diaminoanthraquinone MOF-Carbon Electrodes for Supercapacitor Applications
PP8	Dr. Subash Ch Sahoo	Temperature-Controlled Two Distinct Naphthalene Diimides: Selective detection of Hg2+ ions, Photochromism and Anti-counterfeiting Properties
PP9	Dr. Aarti Sharma	Novel diastereomeric isoxazole/dihydroisoxazole linked β-lactams using Chloramine-T
PP10	Dr. Raghubir Singh	Compartmental Ligands with Cu(II) and Zn(II): Diverse Structures and Unique Copper-Induced Ligand Transformations
PP11	Ms. Anu Radha	Synthesis of bis-organosilane as fluorogenic “turn off” and chromogenic naked eye sensor for Ni(II) and as a potent antioxidant
PP12	Ms. Asha	Transforming Carbon Emissions into Value: GO@Ionic Liquid/Cu Electrocatalyst for CO_2 Reduction
PP13	Ms. Bhavana Rani	Alkyne allied Schiff-base Synthesis for the Tin (II) detection via UV-Visible and Fluorescence Sensor along wih their Cytotoxicity assessment and Anti-Breast Cancer activity against 17beta-HSD1 using Molecular Docking.
PP14	Mr. Deepak	Sustainable nanohybrid polyurethane coatings: Combining clay and cannabis-derived lipid nanoparticles for better performance
PP15	Mr. Deepak Kumar	“Turn-off” fluorescent probe based on anthraquinone grafted with nanocellulose for the sensitive recognition of mercury, bilirubin and fast green dye in aqueous medium.
PP16	Ms. Deepika Sharma	Microscale Liquid Crystal Droplet-Embedded Hydrogel Film for Ultrasensitive Optical Detection of Bacterial Endotoxins
PP17	Ms. Devina Sharma	Synthesis of thiodianiline modified silane for the sensitive

		detection of Co (II): Unveiling its antioxidant activity and potency against abiotic stress
PP18	Ms. Divya Tagra	Development of Copper Ferrite Nanoparticle-Based Protocol for the Synthesis of Aryl Norbornene Systems
PP19	Ms. Harshbir Kaur	Synthesis and characterisation of triazole allied organosilane as a sensor for Cu (II) ion: Real sample analysis and anti-bacterial activity via in-silico study
PP20	Ms. Harshita	Peptide- and Drug-Functionalized Fluorescent Quantum Dots for Enhanced Cell Internalization and Bacterial Debilitation
PP21	Ms. Kamini Sharma	Unveiling EdU detection: Surfactant-free synthesis of Pb nanocomposites for spectroscopic probing in human serum
PP22	Ms. Kanchan Kumari	Solvating Sustainability: Structural Tuning of Metallosurfactants in binary salts
PP23	Ms. Kanika Thakur	Exploring the Photo-Fenton Activity of Magnetically Recoverable Lignin–Nickel Ferrite Nanocomposites for Degradation of Synthetic Textile Dyes
PP24	Ms. Komal	Formulation of Naphthol-derived 1,2,3-triazole: a 'Turn-on' chemosensor for Zr(IV) with Extensive Biological Implications
PP25	Mr. Maanvendra Tiwari	Eco-Friendly Fabrication of N-Doped Carbon Nanoparticles Utilizing Sugarcane Biomass
PP26	Ms. Mamta Guleria	$MgCl_2$ Mediated Activation of C-5 Alkyl Coumalates in Aqueous Medium for the Synthesis of [2.2.2]-Bicyclic Lactones via DAINV Reaction
PP27	Mrs. Manisha	Engineering Quasi-Spherical Cu-Doped Vanadium Ferrite As An High-Performance Efficient Electrocatalyst For Water Splitting In Alkaline Media
PP28	Mr. Manraj Singh	2-aminofluorene-based imine compounds: Single crystal structure, vanadium(III) detection and anticancer activity
PP29	Mrs. Meena	Superoxide Ion-Assisted Radical Cascade Reaction: Synthesis of 3-nitro-4-aryl-2H-chromen-2-ones from Aryl Alkynoate Esters under Methylene Blue Visible Light Photocatalysis
PP30	Ms. Minakshi	Floral waste-derived biochar functionalized with SDS: A bifunctional material for integrated adsorptive removal and fluorescent detection of deleterious pollutants
PP31	Mr. Mithun	Organosilane: its potential as a chemosensor for the detection of vanadium (iii), dft insight, molecular docking, and md simulation study
PP32	Ms. Mona	Enhanced Anodic Stripping Voltammetric Detection of Cd(II) Using a Glassy Carbon Electrode Modified with N, N-Dimethyl-1-Aminoanthraquinone Decorated Nickel Ferrite and

		Graphene Oxide Sheets
PP33	Mrs. Muskan Garg	Dynamic and Adaptive Behaviour of Polyborodimethylsiloxane: A Promising Smart Polymer System
PP34	Ms. Nisha Jain	Construction of 1,8-naphthalimide modified nickel nanoclusters based nanohybrid platform for the detection of fast green and picric acid
PP35	Ms. Parul	A multifunctional schiff base: investigating its zirconium sensing and antiproliferative effects
PP36	Mrs. Poonam	Silatrane for Al(III) Detection: Integrating Photophysical Characterization, Biological Evaluation, and Molecular Docking Studies.
PP37	Mr. Prabaljeet Singh	Terbium-Based Luminescent Metal–Organic Framework as a Highly Sensitive Fluorescent Probe for Erythrosine Detection in Food Samples
PP38	Ms. Preetinder Kaur	Zeolitic Imidazole materials for supercapacitor application.
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PP40	Mrs. Puspa	Dual role of a novel thiazolidine–silane hybrid in environmental monitoring of Ni(II) and its diverse in vitro and in vivo therapeutic applications
PP41	Mr. Sahil Thakur	Design and Synthesis of a Salen-Type Compartmental Ligand as a versatile scaffold for Manganese(II)-Zinc(II) bimetallic complex: Visible-light-mediated Homocoupling of Aryl Amines
PP42	Ms. Simranjeet Kaur	Engineering multifunctional S-scheme Sn-MOF/$NiFe_2O_4$ heterostructure for abolition of contaminants: In-silico ecotoxicity assessment and DFT-assisted mechanism elucidation
PP43	Ms. Simranjt Kaur	Harnessing the photo-Fenton activity of magnetically recoverable sulfur-doped g-C_3N_4@$CoFe_2O_4$ Z-scheme heterojunctions for efficient tetracycline degradation
PP44	Ms. Tsering Diskit	pH dependent chromogenic and smart phone assisted detection of Fe(III) by acid sensitive benzimidazole 1,2,3- triazole hybrids: in vitro Anticancer property evaluation and in silico inhibition of breast cancer estrogen receptor mutant L536S
PP45	Mr. Vikash	Exploration and removal of multiple metal ions using mixed-linker-architected Zn-MOF in aqueous media
PP46	Mr. Vinay Kaushik	Synthesis, Characterization and Photophysical properties of Schiff base of 4-Bromonaphthylamine
PP47	Mr. Vinit Yadav	Investigating 1,2,3-Bistriazole-Functionalized Sn (II) Chemosensors for COX-2 Detection

PP48	Mr. Ajay Singh	TBAF-Catalysed Conversion of Carbamates to Unsymmetrical Ureas: A Sustainable Phosgene-Free Approach
PP49	Ms. Anjali Sharma	Synthesis of copper oxide nanoparticles by green method using Hibiscus rosa-sinensis leaves extract, characterisation and antibacterial potential
PP50	Ms. Kajal	Extraction & purification of Phytochemicals from Water Hyacinth
PP51	Ms. Lipat Kaur	Straightforward Synthesis of Quinoline Sulfonamides via Aminosulfonylation Using a Bench-Stable SO2 Surrogate
PP52	Ms. Mehak Sood	Imidazo[1,2-a]pyridine Benzoheterobicyclic Hybrid as Anti-cancer agents Targeting Tubulin
PP53	Ms. Poonam Verma	Physicochemical Pollution Assessment of Yamuna River: Implications for Sustainable Use
PP54	Mr. Adarsh Raj	Nanomaterial Intervention Enhnaves Stress Reslience in Hibiscus rosa-sinesis Leaves
PP55	Ms. Annu	Molecular docking & ADMET- Based prediction of neurotoxic effects of common synthetic food preservatives
PP56	Ms. Gaganpreet Kaur	Bile Acid-Based Amphiphilic Molecules: Promising Antimicrobials against Drug-Resistant Pathogens
PP57	Ms. Pragti Arora	Synthesis and catalytic application of Fe_3O_4 (magnetite) nanoparticles for enhancing the Fenton use of peroxide
PP58	Ms. Manpreet Kaur	Molecular Docking and ADMET-Based Comparative Analysis of the Immunomodulatory Potential of Green Tea and Black Tea Phytochemicals
PP59	Ms. Manveen Kaur Saggu	Murraya koenigii leaves essential oil mediated green synthesis of magnesium oxide nanoparticles; their antibacterial and antioxidant potential

ABSTRACTS OF POSTER PRESENTATIONS

PP1. STEREOSELECTIVE SYNTHESIS AND CHARACTERIZATION OF C4-FURAN SUBSTITUTED Β-LACTAMS

Aman Bhalla[1]
[1] *Department of Chemistry, Panjab University*

ABSTRACT

β-Lactam antibiotics persist as a profoundly employed category of antibacterial agents within the scientific realm. The perpetual demand for novel pharmaceuticals exhibiting enhanced antibacterial properties and the escalating prevalence of resistant microorganisms provided the impetus to undertake the synthesis of extensively functionalized β-lactams. Furthermore, the utilization of the β-lactam framework in the production of various β-lactam antibiotics has been acknowledged, owing to its strain energy derived from the presence of a four-membered ring. Therefore, appended with different functionalities at various position of the ring, β-lactams served as the easily accessible and versatile substrates for the organic materials. Considering the above importance of β-lactams, we hereby propose a facile approach for the fabrication of diverse β-lactam hybrids incorporating a furan moiety as the pharmacophore entity. Furan substituted β-lactams were synthesized by treating different substituted ethanoic acid with furan substituted Schiff's bases in the presence of POCl3 and Et3N in refluxing toluene with excellent yields. The characterization of these newly synthesized compounds has been accomplished through the utilization of diverse spectroscopic methodologies, including FT-IR, 1H and 13C NMR, elemental analysis, mass spectrometry, and X-ray crystallography. The elucidation and analysis of the findings from these investigations will be presented and discussed.

PP2. FUROPYRAZINES AS ANTIBACTERIAL AGENTS

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ABSTRACT

The misuse and overuse of antibiotics have led to the rise of multidrug-resistant pathogens, making bacterial infections harder to treat and increasing the risk of severe complications. [1] Bacterial resistance to antibiotics has exacerbated the need for new drug development. Thieno and furopyrazolo[3,4-b]pyrazines, have been evaluated against various microbes, showing promising activity. [2] However, structurally analogous compounds, furopyrazines have not yet been studied for their activity as antibacterials although they are known to show bioactivity as anti-cancer compounds and sirtuin inhibitiors. A series of substituted furopyrazines baring various pendant were designed and synthesised. The synthesized compounds were subjected to in vivo and in silico evaluation to study their efficacy as

antibacterials against commonly occurring B. subtilis and E. coli. A furopyrazine was found to inhibit bacterial growth however, at a high concentration. This initial study indicates furopyrazines as suitable moieties for further development as antibacterial agents. [3]

PP3. ULTRASONICATION INDUCED SYNTHESIS OF TPGS STABILIZED CLOVE OIL NANOEMULSIONS AND THEIR SYNERGISTIC EFFECT AGAINST BREAST CANCER CELLS AND HARMFUL BACTERIA

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ABSTRACT

The present work reports the fabrication of TPGS assisted clove oil in water nanoemulsion for the delivery of polyphenolic nutraceuticals i.e. curcumin and resveratrol and the analysis of their synergetic healing potential. The fabrication procedure was undertaken by the use of high energy ultrasonic cavitation technique. The morphological and rheological properties of the fabricated systems were analyzed and optimized using numerous techniques. The current study throws light on the influence of surfactant type and composition on the mixing stability of oil phase. Both curcumin and resveratrol were effectively loaded in the nanoemulsion, and their loading efficiencies were found to be 99.87 and 99.38%, respectively. The study was undertaken with the aim of exploring the versatile therapeutic potential by elevating the established antimicrobial activity of curcumin and resveratrol and testing their prospects against breast cancer cell lines. The results demonstrated the antimicrobial activity of nanoemulsion (without nutraceuticals) itself against gram-positive and gram-negative bacteria owing to the clove oil which would be an asset in accomplishing better results. In combination with curcumin and resveratrol, it exhibited enhanced effect against different bacterial strains thus showcasing an increase in its efficacy. Furthermore, the anti-tumor activity of prepared formulations has been tested on MDA MB −231 and Hep G2 breast cancer cell lines to broaden the horizons of biological applications of the formulated system.

PP4. SYNTHESIS OF NOVEL HALOHYDRIN APPENDED Β-LACTAM DERIVATIVES

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ABSTRACT

β-Lactams are gifted molecules endowed with natural antibiotic properties and have been modified chemically by performing various substitutions and tethering to other functional

groups or heterocycles from time to time for the production of countless number of molecules possessing remarkable pharmacological properties. This alteration by generating a reactive centre on the β-lactam unit, which can be further transformed into significant chemical functionalities, is considered as a potential tool. The halohydrins are such a reactive synthon which have been exploited extensively by synthetic chemists for the development of significant organic structures including some natural products and agrochemicals. Considering the importance and need of having novel β-lactam derivatives and potential of halohydrin functionality, we have conducted studies to synthesise novel halohydrin linked β-lactam compounds using 3-allyl-3-phenylsulfonyl/sulfinyl-β-lactams as the synthons. The optimized reaction conditions for desired conversion have been obtained. Both chloro and bromo substituted products have been synthesised. The details will be presented.

PP5. AU NANOCLUSTER/CDTE QUANTUM DOT-BASED HYBRIDS FOR ENERGY TRANSFER-DRIVEN FLUORESCENCE ENHANCEMENT AND CHARGE TRANSPORT

Rohit Kumar Sharma[1]

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ABSTRACT

The design of hybrid fluorescent nanostructures that combine distinct classes of nanomaterials holds immense potential, yet controlling interfacial interactions and energy transfer at the nanoscale remains a critical challenge. In this work, we present the rational design and synthesis of a novel fluorescent hybrid system, achieved by the conjugation of ultrasmall metallic nanoclusters with semiconductor quantum dots. Initially, thiol-stabilized semiconductor quantum dots (QDs) were synthesized using a short-chain ligand, 3-mercaptopropionic acid (3-MPA), under aqueous conditions, ensuring high photoluminescence and colloidal stability. Subsequently, ultrasmall gold nanoclusters (AuNCs) were synthesized using glutathione (GSH) as a stabilizing ligand, producing highly fluorescent and biocompatible metallic clusters. These foundational nanomaterials were then conjugated to fabricate hybrids, by electrostatic and ligand-mediated interactions designed to harness synergistic interfacial interactions. Comprehensive characterization via HR-TEM, PXRD, EDX, FT-IR, XPS, zeta potential, TGA, and fluorescence spectroscopy confirmed the successful formation of the hybrid, along with modified optical and surface properties. Notably, energy transfer studies indicated enhanced AuNCs emission upon QD excitation, suggesting efficient inter-nanocomponent communication. This work demonstrates a versatile strategy to integrate two fluorescent domains into a single nanoplatform, opening new avenues in bioimaging, sensing, and optoelectronic applications.

PP6. TURNING BIOMASS WASTE INTO SUSTAINABLE BIOPLASTICS

Dr. Savita Chaudhary[1]
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ABSTRACT

The increasing human population coupled with technological advancements and over consumption of petroleum-based plastics has deteriorated the natural ecosystem and possessed serious impact on the flora and fauna. The non-biodegradable nature of plastics causes the accumulation in oceans, landfills, and terrestrial environments and led to widespread ecological disruption. Thus, the development of bioplastics/biopolymers offers a promising and sustainable alternative to mitigate the environmental impact of conventional plastics. Out of different sources, Cellulose is considered as the most promising biopolymer produced by many organisms and obtainable from wide range of agricultural wastes. Cellulose is biodegradable, non-toxic, non-food, biocompatible, material for generating bioplastics. This review main objective to compile the different synthetic approaches used to fabricate cellulose and its different range of derivatives for the development of bioplastic. The current review further highlights the optimization factors affecting the properties of cellulose based bioplastic. The compilation in this review further supports the future prospects in the cellulose based bioplastic applications in packaging, medical, and electronic industries. The review further concluded the plausible remonstrance in reproducibility, scale-up fabrication, and future research prospective for strengthening their potential usages.

PP7. EXTENDED CONJUGATION-INDUCED CHARGE STORAGE ENHANCEMENT IN 1, 5-DIAMINOANTHRAQUINONE MOF-CARBON ELECTRODES FOR SUPERCAPACITOR APPLICATIONS

Shweta Rana[1], Rohit Sharmaa[1]
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ABSTRACT

Metal organic frameworks (MOFs) are high-performance supercapacitor cores mastered in acting as ion sponges by facilitating rapid ion transport and storage. Herein,a novel derivative of 1, 5-diaminoanthraquinone i.e. DDAQ has been synthesized by coupling with p-amino benzoic acid followed by HATU coupling to design a porous zinc based MOF (Zn-DDAQ@MOF). This is followed by a synergy created between Zn-DDAQ@MOF, recognized for its high porosity and large surface area, and activated carbon (AC) derived from orange peel, valued for its excellent electrical conductivity. The integration of these materials has led to the development of a novel composite, termed Zn-DDAQ@MOF@AC, which demonstrates

significant potential as an electrode material for supercapacitors (EDLCs) in symmetric configurations. Comprehensive structural and electrochemical characterizations were conducted to assess the properties of the Zn-DDAQ@MOF@AC fabricated material. The distinctive flower-shaped morphology of Zn-DDAQ@MOF on the surface of AC promotes better ion transport and redox activity, significantly boosting the performance of the fabricated supercapacitor. The composite electrode material was used in constructing symmetric supercapacitor, using graphitic flakes offering the device specific capacitance of 346.04 Fg-1 at 1.0 Ag-1,excellent energy density of 48 WhKg-1 with power density of 499.36 WKg-1 along with a steady 96.15% retention of initial capacitance value (89.28% coulombic efficiency) after 10,000 cycles. The high energy efficiency, long life spans and rapid charging capabilities of the fabricated device have potential to reduce our reliance on nonrenewable sources and thus contributing to the designing of a cleaner energy systems in future.

PP8. TEMPERATURE-CONTROLLED TWO DISTINCT NAPHTHALENE DIIMIDES: SELECTIVE DETECTION OF HG2+ IONS, PHOTOCHROMISM AND ANTI-COUNTERFEITING PROPERTIES

Subash Chandra Sahoo[1], Loveleen Kaur[2], Kawal Preet[2], Deepak B. Salunke[3]
[1] Assistant Professor, [2] PhD student, [3] Associate Professor

ABSTRACT

Naphthalene diimides (NDIs), known electron-deficient π-systems, are widely studied in supramolecular and materials chemistry for applications such as photovoltaics and flexible semiconductors. Their optical properties can be tuned by substituents on the naphthalene core. In this work, two NDIs (NDI-1 and NDI-2) were synthesized under different temperatures, combining the electron-deficient core with electron-rich systems to yield luminescent materials. Characterization was performed using FT-IR, TGA, DSC, PXRD, SCXRD, and UV-Vis spectroscopy. NDI-1 and NDI-2 showed high thermal stability with decomposition at 464 °C and 468 °C, respectively. NDI-1 crystallized in the monoclinic C2/c space group with water and DMF as solvents of crystallization, representing a new structure, while NDI-2 matched a known form. The synthesized molecular probes (NDIs) were employed to assess their sensing responses toward a variety of metal ions (including s-block, transition, and p-block metal ions, typically in the form of their chloride or nitrate salts). Their sensing behavior was tracked using UV–Vis absorption and fluorescence spectroscopy. Remarkably, the probes (NDI-1 and NDI-2) showed selective detection of Hg²â • º ions in the presence of other metal salts, and each probe displayed two absorption maxima at around 360 nm and 385 nm. Both compounds exhibited solvatochromism, with NDI-1 showing purple in DMSO, deep red in NMP, and lighter hues in less polar solvents. NDI-2 displayed a strong effect only in DMSO and NMP. As molecular probes, both selectively detected Hg²â • º ions via UV-Vis and fluorescence, showing absorption bands at 360 nm and 385 nm. Photochromic

PP9. NOVEL DIASTEREOMERIC ISOXAZOLE/DIHYDROISOXAZOLE LINKED Β-LACTAMS USING CHLORAMINE-T

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ABSTRACT

The β-lactam antibiotics have presented themselves as important drug molecules for antimicrobial therapy for decades, thus saving millions of lives. β-Lactams also hold significant potential as versatile building blocks or synthons in organic chemistry. Their structural properties enable the construction of more complex biologically active molecules such as aromatic amino acid derivatives, peptides, polyamines, polyamino alcohols, amino sugars and polyamino ethers. This activity is largely driven by the inherent ring strain of the four-membered cyclic amide, along with the N1, C3 and C4 substituents attached to the ring. The C3 group, in particular, is essential for antibacterial activity as it enhances the mimicry of the β-lactam to the natural PBP substrate, D-alanyl-D-alanine. Considering the importance of the functional moiety at C3, various novel β-lactams containing varied appendages have been discovered so far. In the work presented, we report the efficient synthesis of isoxazole/dihydroisoxazole tethered-β-lactams using Chloramine-T (CAT) mediated facile 1,3 dipolar cycloaddition of 3-propargyloxy/allylic-β-lactams. This reagent not only provided simplified approach to isoxazole linked β-lactams but also provided novel dihydroisoxazole linked β-lactams. The details will be presented.

PP10. COMPARTMENTAL LIGANDS WITH CU(II) AND ZN(II): DIVERSE STRUCTURES AND UNIQUE COPPER-INDUCED LIGAND TRANSFORMATIONS

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ABSTRACT

The synthetic protocol, structural and spectroscopic aspects of two compartmental ligands, CL1 and CL2 (where CL1=(E)-2-(((2-((2-hydroxyethyl)amino)ethyl)imino)(phenyl)methyl)-5-methoxyphenol; and CL2=(E)-2-(1-((2-((2-hydroxyethyl)amino)ethyl)imino)ethyl)-4-methylphenol), and their Cu(II) and Zn(II) compexes have been reported. Single crystal X-ray diffraction, FT-IR spectroscopy, and ESI-MS reveals that the complexes Zn-CL1, Cu-CL1, and Cu-CL2 adopted tetranuclear, dinuclear, and mononuclear architecture respectively. Besides, the crystal structures of Cu-CL1 and Cu-CL2 reveal oxidative dehydrogenation of the ligands in the presence of an external base, resulting in the transformation of ligands to form iminic moieties. The basic skeleton of the ligand remains intact in the case of Cu-CL1; however, it completely disintegrates to produce a Salen-type ligand in Cu-CL2. The combined experimental and spectroscopic studies indicate that copper-mediated ligand transformations in the two proceed through mechanistically distinct pathways. This study demonstrates a novel aspect of the metal centre-mediated ligand transformations in compartmental ligands.

PP11. SYNTHESIS OF BIS-ORGANOSILANE AS FLUOROGENIC "TURN OFF" AND CHROMOGENIC NAKED EYE SENSOR FOR NI(II) AND AS A POTENT ANTIOXIDANT

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ABSTRACT

This manuscript describes the synthesis of a bis-organosilane triazole derivative (compound 4) via click chemistry. The newly obtained compound was thoroughly characterized using mass spectrometry and NMR (^1H, ^{13}C) spectroscopy. Its sensing performance and selectivity were evaluated through UV–visible and fluorescence analyses, demonstrating high efficiency toward Ni(II) ions with minimal interference from other metal ions. The determined limits of detection (LOD) were 268 nM and 41.41 µM, respectively. Compound 4 also exhibits distinct naked-eye detection ability, reversibility, and competitive recognition for Ni(II), effectively functioning as an INHIBIT-type molecular logic gate. Furthermore, its catalytic and antioxidant properties were systematically investigated.

PP12. TRANSFORMING CARBON EMISSIONS INTO VALUE: GO@IONIC LIQUID/CU ELECTROCATALYST FOR CO_2 REDUCTION

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ABSTRACT

The electrochemical reduction of carbon dioxide (CO_2 RR) into valuable fuels and chemicals is a promising strategy for mitigating greenhouse gas emissions and promoting sustainable energy conversion. In this study, a novel catalyst system based on graphene oxide (GO) functionalized with a pyridine-based ionic liquid (IL) and further complexed with copper salt was developed to enhance CO_2 reduction efficiency and product selectivity. Structural and morphological analyses (FTIR, Raman, XPS, XRD, FE-SEM, and TEM) confirmed successful functionalization and complexation. The pyridine functional group in the ionic liquid provides strong CO_2 adsorption sites and facilitates electron transfer, while the Cu2+ centers promote active sites for CO_2 activation and conversion. The GO nanomaterial ensures high surface area, excellent conductivity, and uniform dispersion of the Cu–IL complex. Electrochemical characterization was performed using cyclic voltammetry (CV) and linear sweep voltammetry (LSV), revealing a significant increase in current and a positive shift in onset potential compared to pristine GO and ionic liquid composites. The modified electrode shows superior Faradaic efficiency toward CO, ethanol, and acetate formation, indicating synergistic interactions between Cu, pyridine-IL, and GO.
Keywords: COâ,, reduction, graphene oxide, pyridine ionic liquid, copper complex, electrocatalysis, sustainable energy.

PP13. ALKYNE ALLIED SCHIFF-BASE SYNTHESIS FOR THE TIN (II) DETECTION VIA UV-VISIBLE AND FLUORESCENCE SENSOR ALONG WIH THEIR CYTOTOXICITY ASSESSMENT AND ANTI-BREAST CANCER ACTIVITY AGAINST 17BETA-HSD1 USING MOLECULAR DOCKING.

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ABSTRACT

Breast cancer continues to be a devastating disease worldwide, highlighting the critical need for new and effective treatments. Schiff bases are increasingly being used as powerful medications for a number of disorders. The current investigation concentrates on the synthesis and characterization of an alkynes allied Schiff bases 4(a-c) through spectroscopic techniques i.e IR, NMR (1H and 13C) and Mass Spectrometry. The 3-D structures of Schiff bases 4(a-c) were elucidated through Single-Crystal X-Ray diffraction technique. Herein, we report the photophysical, biological and computational study of newly synthesised Schiff-bases. The synthesised compounds were investigated for their cationic chemosensing activities that showed the high selectivity of Schiff base 4b towards Sn2+ ion over other metallic cations. The LOD values for Sn2+ from absorption and emission spectroscopy were found to be 0.7333 x 10-6 M and 0.1675 x 10-7 M respectively, and the binding affinity was confirmed by the association constant values of 0.3244 x 106 M-1 and 0.0902 x 107 M-1 as depicted in the B-H plot and Stern-Volmer plot respectively. The 1:1 Stoichiometry was confirmed through the Job's plot, and binding modes between ligand 4b and Sn2+ were investigated using 1H NMR and FTIR spectroscopic techniques. Schiff bases investigated biologically exhibited potent cytotoxicity, characterized by favorable EC50 values (μM). In order to further explore the biological aspects of these compounds, molecular docking was carried out. The resulting binding energy of -8.38 kcal/mol suggested potential interactions, leading to the investigation of their anti-breast cancer effects.

PP14. SUSTAINABLE NANOHYBRID POLYURETHANE COATINGS: COMBINING CLAY AND CANNABIS-DERIVED LIPID NANOPARTICLES FOR BETTER PERFORMANCE

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ABSTRACT

Polyurethane (PU) coatings are widely used to protect surfaces because they are strong, flexible, and versatile. However, they can degrade when exposed to harsh conditions. In this work, we explore a sustainable approach to make PU coatings more robust by blending Cloisite-30B clay with solid lipid nanoparticles derived from Cannabis sativa. This combination creates a nanohybrid system where the polymer, clay, and bio-derived nanoparticles work together, potentially improving the coating's structure and durability.

Conceptual studies suggest that the nanofillers are well-dispersed and interact strongly with the polymer matrix. Overall, this strategy offers a green and innovative way to develop next-generation PU coatings that harness renewable materials and nanotechnology, without sharing detailed experimental results.

PP15. "TURN-OFF" FLUORESCENT PROBE BASED ON ANTHRAQUINONE GRAFTED WITH NANOCELLULOSE FOR THE SENSITIVE RECOGNITION OF MERCURY, BILIRUBIN AND FAST GREEN DYE IN AQUEOUS MEDIUM.

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ABSTRACT

A new fluorescent probe, anthraquinone-grafted nanocellulose (AGN), was created by attaching an anthraquinone derivative to nanocellulose. Comprehensive analysis using FTIR, XPS, SEM, and other techniques confirmed its structure and properties. The material's abundant hydroxyl, nitrogen, and oxygen groups allow it to effectively bind to mercury ions (Hg^{2+}). AGN uses a "turn-off" fluorescence method to sensitively and rapidly detect Hg^{2+}, bilirubin, and fast green dye, demonstrating its potential for environmental and biomedical monitoring. Notably, its detection limit for Hg^{2+} in plants is 0.09 µM, far below the WHO's safety threshold.

PP16. MICROSCALE LIQUID CRYSTAL DROPLET-EMBEDDED HYDROGEL FILM FOR ULTRASENSITIVE OPTICAL DETECTION OF BACTERIAL ENDOTOXINS

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ABSTRACT

This study presents a novel approach that involves development of micrometer-sized liquid crystal (LC) droplet-embedded chitosan (CS) hydrogel film, referred to as the CSLC gel-film, for ultrasensitive and selective detection of bacterial lipopolysaccharide (endotoxin). The hydrogel matrix effectively restricted the mobility of the embedded LC droplets, preventing coalescence and sedimentation, while maintaining a long-term structural integrity. The fiber-like structure of the hydrogel network facilitated the transport of aqueous analytes, allowing endotoxins to reach to the LC-water interface and induce a bipolar-to-radial configurational transition. The sensing performances of the CSLC hydrogel film were systematically evaluated for LPS extracted from Escherichia coli (E. coli.), Pseudomonas aeruginosa (P. aeruginosa), and Salmonella typhosa at different pH conditions using a polarized optical microscope (POM). Notably, the prepared gel-film exhibited an exceptional selectivity for LPS, despite the presence of commonly known interferents, including surfactants, chelating

agents, divalent cations, and structurally similar biomolecules. The gel-film was capable of detecting endotoxins directly from live bacterial sources, as evidenced by its response to living E. coli. cells. Overall, our results highlight the potential of CSLC hydrogel film as a simple, cost-effective, and scalable platform for the rapid and reliable detection of bacterial endotoxins in biomedical and environmental settings.

PP17. SYNTHESIS OF THIODIANILINE MODIFIED SILANE FOR THE SENSITIVE DETECTION OF CO (II): UNVEILING ITS ANTIOXIDANT ACTIVITY AND POTENCY AGAINST ABIOTIC STRESS

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ABSTRACT

Heavy metal poses a serious threat to ecological and human health. Prolonged exposure to certain heavy metals are known to lead adverse and even fatal effects on humans. In the present article, 4,4 ′-thiodianiline derived silane (Compound 5) has been synthesized. 1H NMR, 13C NMR and mass spectrometry has been used to characterize the synthesized compound 5. 5 serves as a chemosensor for the sensitive and selective recognition of Co (II) with a very low limit of detection, exhibiting minimal interference from other metal ions. The binding of compound 5 with Co(II) was evidenced by a distinct downfield shift of triazole protons from 7.68 to 7.85 ppm in the 1H NMR spectrum, highlighting strong coordination at the triazole site. These findings were further supported by DFT calculations, reinforcing the proposed binding mode. The ability of compound 5 to neutralize free radicals was evidenced by a noticeable color change upon the addition of DPPH, indicating its promising antioxidant potential, with an IC_{50} value of 1.45 µM. 5 has demonstrated its efficacy in sustaining soyabean growth under conditions of severe salinity and exposure to heavy metal, thereby illustrating a significant scientific progress in environmental and pharmaceutical domains indicating promising applications.

PP18. DEVELOPMENT OF COPPER FERRITE NANOPARTICLE-BASED PROTOCOL FOR THE SYNTHESIS OF ARYL NORBORNENE SYSTEMS

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ABSTRACT

The unreactive aromatic chalcones were efficiently converted into activated dienophiles for a Diels-Alder reaction with cyclopentadiene/isoprene by the copper ferrite nanoparticles. Ethanol, an environmentally benign solvent, provided the best results in terms of reaction rate

and product yields when 5 mol% catalytic loading was used. The substrate scope was further explored for other chalcone derivatives, and all the reactions proceeded smoothly to provide the corresponding DA adducts in good diastereoselectivities with the endo-preference and high yields. Overall, the procedure described a low-cost, commercially accessible metal ferrite nanoparticle catalyst in an environment friendly solvent for the synthesis of aromatic norbornene systems.

PP19. SYNTHESIS AND CHARACTERISATION OF TRIAZOLE ALLIED ORGANOSILANE AS A SENSOR FOR CU (II) ION: REAL SAMPLE ANALYSIS AND ANTI-BACTERIAL ACTIVITY VIA IN-SILICO STUDY

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ABSTRACT

A new triazole allied organosilane has been synthesised for detecting Cu (II) by photophysical study such as fluorescence and UV–visible spectroscopy. Compound 6 was thoroughly characterised using several spectroscopic methods including NMR spectroscopy (1D and 2D), mass spectrometry, FTIR spectroscopy and elemental analysis. Complexation between 6 and Cu (II) was confirmed through Job's plot which showed 1:1 ligand/metal complex formation. The LOD (limit of detection) values for Cu (II) emerged as 3.1309 x 10-6 M (absorption spectroscopy) and 0.58 x 10-6 M (emission spectroscopy), and binding affinity was confirmed by the association constant values of 2.4378 x 106 M− 1 and 0.12 x 106 M− 1 calculated from B-H plot and Stern-Volmer plot respectively. The compound 6′s real sample analysis (with recovery rate greater than 94 %) results demonstrate that it can detect Cu (II) ions in a variety of water samples, boosting its practical utility. The synthesised compound was then evaluated for its potential as an anti-bacterial agent via molecular docking. The binding energy of 6 with protein 1ITX resulted in − 9.52 kcal/mol proving it to be a good anti-bacterial agent.

PP20. PEPTIDE- AND DRUG-FUNCTIONALIZED FLUORESCENT QUANTUM DOTS FOR ENHANCED CELL INTERNALIZATION AND BACTERIAL DEBILITATION

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ABSTRACT

This report illustrates a strategy for designing a nanoconjugate derived vector that efficiently delivers antimicrobial drug directly into bacterial cells. The nanoconjugate

comprises of negatively charged CDTe@CdS quantum dots (QDs) with its surface functionalized using cationic BP-100 (KKLFKKILKYL-amide), a known cell-penetrating peptide (CPP), via electrostatic approach. The interactions between QD and CPP in QD-functionalized CPPs (QD−CPP) have been well analyzed using fluorescence spectroscopy, gel electrophoresis, and ζ-potential analysis. The QD−CPP conjugate was internalized into Gram negative (Escherichia coli) as well as Gram positive (Staphylococcus aureus) bacterial strains with confocal studies exhibiting a strong signal in tested microorganisms. Further, to check the applicability of QD−CPP conjugate as a delivery vector for generating an effective therapeutics, ampicillin molecules were conjugated on QD−CPP surface to generate QD−CPP−Amp conjugate. The CPP and drug molecules on the surface of QDs were well quantified using high-performance liquid chromatography (HPLC) data. It was observed that the internalization and bacterial debilitation of the QD−CPP−Amp conjugate is 2- to 4-fold effective as compared to that of bare ampicillin. The morphological changes to the bacterial cells upon the treatment with QD−CPP−Amp conjugates were noted with no cytotoxic effect on tested mammalian cell lines. The results inferred that the proposed QD−CPP vector provides a targeted and proficient approach for cellular internalization of cargo (drug) in bacterial cells with effective tracking through florescent QDs.

PP21. UNVEILING EDU DETECTION: SURFACTANT-FREE SYNTHESIS OF PB NANOCOMPOSITES FOR SPECTROSCOPIC PROBING IN HUMAN SERUM

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ABSTRACT

Toxicity of lead ions has been increasing day by day in the environment, plants, and animals. Presence of lead in the river waters due to industrial waste has been increasing with increasing development. To tackle the problem, we have fabricated dihydropyrimidinedione (DHPM)-based C-dots, which can detect Pb^{2+} ions with a detection limit of 2 nM, which is less than the Environmental Protection System (EPS). The detection of Pb^{2+} has been done using UV-visible spectrophotometer and fluorescence spectrometer. The complex formed between C-dots and Pb^{2+} was further reduced to yield core-shell nanocomposites, which were fully characterized using various analytical techniques. The formed Pb nanocomposites were stable and can be further used in the wide range of pH, salt and temperature. These Pb nanocomposites were used for the detection of cytotoxic ethynyldeoxyuridine in human serum with a detection limit of 4 nM, in the linear range of 1–160 nM with a standard deviation of ±5 and a recovery percentage of 102%.

PP22. SOLVATING SUSTAINABILITY: STRUCTURAL TUNING OF METALLOSURFACTANTS IN BINARY SALTS

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ABSTRACT

Binary salt mixtures have emerged as a promising class of green solvents owing to their tunable physicochemical properties, ease of preparation, and environmental compatibility. These mixtures are typically formed by combining two salts in a specific molar ratio to yield composition with a melting point much lower than that of the individual constituents. Such unique characteristics make binary salt mixtures an excellent alternative to conventional organic solvents for studying self-assembly and interfacial phenomena in complex chemical systems. Metallosurfactants, which are metal–organic hybrid structures formed by incorporating metal ions into parent surfactant molecules, exhibit unique micellization and aggregation characteristics. Due to these properties, they are extensively employed in drug delivery, antibacterial, and anticancer applications. A comparative analysis between binary salt mixtures and aqueous systems revealed substantial variations in critical micelle concentration (CMC), micellar morphology, and aggregation thermodynamics. These findings demonstrate the potential of binary salt mixtures as sustainable platforms for modulating metallosurfactant aggregation behavior, thereby contributing to the advancement of green chemistry and soft matter research.

PP23. EXPLORING THE PHOTO-FENTON ACTIVITY OF MAGNETICALLY RECOVERABLE LIGNIN–NICKEL FERRITE NANOCOMPOSITES FOR DEGRADATION OF SYNTHETIC TEXTILE DYES

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ABSTRACT

A photo-Fenton system was developed by modifying nickel ferrite (NiFe) nanoparticles with a carbonaceous lignin moiety to form NiFe–xC nanocomposites via a hydrothermal route. The prepared composites exhibited visible-light-responsive photocatalytic behavior suitable for dye degradation applications. Structural, morphological, magnetic, and optical characterizations were performed using XRD, FTIR, VSM, FE-SEM, BET, DRS, and PL analyses. The photocatalytic activity of the NiFe–xC nanocomposites was evaluated through the degradation of Remazol Brilliant Yellow dye. The lignin incorporation significantly enhanced the photo-Fenton efficiency compared with pristine NiFe while maintaining strong magnetic recoverability for easy separation. Among the samples, NiFe–0.5C showed the best performance, achieving 95% dye degradation within 90 min of visible-light irradiation, following pseudo-first-order kinetics with a rate constant of 35.9 × 10-3 min^{-1}. The effects of

pH, catalyst dosage, oxidant concentration, pollutant concentration, and radical scavengers were systematically investigated. Radical quenching experiments confirmed the participation of reactive oxygen species, and a H2O2-assisted photo-Fenton mechanism was proposed. Recyclability and real wastewater treatment studies further demonstrated the practical potential of the composites. Photoluminescence results revealed that lignin reduced charge carrier recombination, enabling more efficient photoinduced charge utilization during degradation. These findings establish NiFe–xC nanocomposites as efficient, magnetically recoverable photo-Fenton catalysts for the sustainable treatment of dye-contaminated wastewater.

PP24. FORMULATION OF NAPHTHOL-DERIVED 1,2,3-TRIAZOLE: A 'TURN-ON' CHEMOSENSOR FOR ZR(IV) WITH EXTENSIVE BIOLOGICAL IMPLICATIONS

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ABSTRACT

Prolonged exposure to transition metals poses serious risks to both human health and the environment, which has driven interest in developing selective chemosensors. In this study, a naphthol-derived 1,2,3-triazole (NPTZ) was synthesized via click chemistry and characterized by NMR, FT-IR, mass spectrometry, and thermogravimetric analysis (TGA). Photophysical studies revealed excellent chemosensitivity and selectivity of NPTZ toward Zr(IV) ions, with negligible interference from other metal cations. The compound exhibited low detection limits of 26 nM (absorption) and 478.6 nM (emission). A stable 1:1 NPTZ–Zr(IV) coordination complex was confirmed using Job's plot analysis. Moreover, NPTZ demonstrated promising biological activity, showing significant anti-cancer and anti-microbial potential. Molecular docking studies further supported these results, with binding energies of –8.84 kcal/mol (PDB ID: 2R3I) and –7.73 kcal/mol (PDB ID: 4OZ5), indicating strong interaction and high inhibition constants.

PP25. ECO-FRIENDLY FABRICATION OF N-DOPED CARBON NANOPARTICLES UTILIZING SUGARCANE BIOMASS

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ABSTRACT

This study presents a "waste-to-wealth" strategy, transforming sugarcane bagasse into nitrogen-doped fluorescent carbon nanoparticles (N-CNPs). We developed a facile, eco-friendly, and economical one-pot hydrothermal synthesis at a low temperature (100°C), using ethylenediamine (EDA) as both the nitrogen source and passivating agent. The resulting N-CNPs exhibited highly enhanced fluorescence, quantum yield, and fluorescence lifetime. As a

proof-of-concept for anti-counterfeiting, the N-CNP solution was used as an invisible ink. Messages and QR codes printed with the ink were invisible under daylight but revealed strong fluorescence under UV light. Characterization confirmed this material as an economical, highly photostable, and green alternative for security inks.

PP26. MGCL2 MEDIATED ACTIVATION OF C-5 ALKYL COUMALATES IN AQUEOUS MEDIUM FOR THE SYNTHESIS OF [2.2.2]-BICYCLIC LACTONES VIA DAINV REACTION

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ABSTRACT

This work represents a straightforward protocol for converting the renewable, bio-based and non-hazardous feedstock i.e., methyl coumalate into essential synthetic motifs. In this protocol, magnesium chloride (MgCl2) salt efficiently activated the less reactive C-5 alkyl coumalates for DAINV reaction with electron rich vinyl ethers as dienophiles to produce the [2.2.2]-bicyclic lactones. Water being a green solvent produced the best results among all the tested solvents in terms of the rate of reaction and yield of the product. The substrate scope was explored by varying alkyl coumalates and vinyl ethers which afforded the corresponding products in high yields (up to 95%) and good diastereoselectivities (up to >99%) with endo-preference.

PP27. ENGINEERING QUASI-SPHERICAL CU-DOPED VANADIUM FERRITE AS AN HIGH-PERFORMANCE EFFICIENT ELECTROCATALYST FOR WATER SPLITTING IN ALKALINE MEDIA

Manisha[1]
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ABSTRACT

This work presents the synthesis of novel quasi-spherical nanoparticles of copper doped vanadium ferrite (Cu1-xVxFe2O4) using a facile hydrothermal technique followed by the calcination. This comparative analysis of different amount of copper doping in vanadium ferrite is investigated through spectroscopic (FTIR, XRD, RAMAN, XPS and FESEM) and electrochemical (CV and EIS) techniques. This study illustrates the beneficial effect of increasing Cu doping on the synthesized quasi spherical VFe2O4, which enhances the conductivity, charge transfer capability, and number of active sites on the catalyst surface and thus holds significant potential in the field of electrocatalysis. Owing to this configuration, the optimal Cu0.75V0.25Fe2O4 catalyst exhibits remarkable activity toward the hydrogen evolution reaction, with a low overpotential of 290 mV and a Tafel slope of 121 mV/dec at 10 mA/cm2 in basic media (1M KOH) studied by linear sweep voltammetry polarization curves. The excellent catalytic proficiency comparable to that of platinum on carbon along with excellent stability and durability up to 20 h, provides valuable insights into the design of transition metal based catalysts with enhanced performance for renewable energy technologies to tackle the ongoing environmental issues.

PP28. 2-AMINOFLUORENE-BASED IMINE COMPOUNDS: SINGLE CRYSTAL STRUCTURE, VANADIUM(III) DETECTION AND ANTICANCER ACTIVITY

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ABSTRACT

The present paper reports the successful synthesis of three new 2-aminofluorene-appended Schiff's bases: FORMFLU, ANTFLU and BrFLU. The newly synthesized compounds were characterized by single crystal XRD, FT-IR, NMR (1H and 13C) spectroscopy, TGA, and mass spectrometry. Crystallographic studies revealed that FORMFLU and BrFLU both have Monoclinic crystal system while ANTFLU has an orthorhombic lattice framework. All the compounds showed notable to commendable anticancer efficacy against Hela cervical cancer cell line. Computational molecular docking studies were conducted to elucidate the binding interactions mechanisms between ligands and proteins. The selective bonding of azomethine (-Cdouble bondN-) of FORMFLU chemosensor by Vanadium(III) ions was carried out using UV–Vis. technique. FORMFLU chemosensor showed magnificent selectivity and sensitivity towards vanadium-III ions with a detection limit of 2.44 µM. The results presented herein demonstrate the significant potential of FORMFLU chemosensors for the detection of Vanadium(III) ions in environmental, agricultural, and biological analysis systems.

PP29. SUPEROXIDE ION-ASSISTED RADICAL CASCADE REACTION: SYNTHESIS OF 3-NITRO-4-ARYL-2H-CHROMEN-2-ONES FROM ARYL ALKYNOATE ESTERS UNDER METHYLENE BLUE VISIBLE LIGHT PHOTOCATALYSIS

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ABSTRACT

Due to increasing pollution and waste from chemical processes, chemists turned their attention to selective synthesis using green catalysts, reagents, and solvents, as well as catalyst-free and solvent-free methods. This study showcased a blue LED as a sustainable tool for the selective synthesis of thiolated, sulfoxinated, and sulfonated benzoxazines, achieving moderate to good yields from various N-(2-vinylphenyl)amides and thiols. Control experiments helped propose a plausible reaction mechanism. Compared to existing methods, the reported approach was mild, environmentally friendly, cost-effective, and used molecular oxygen (Oâ‚‚) as the oxidant—without generating harmful by-products or requiring additives, catalysts, or metal ions. Unlike earlier studies, which lacked a general synthetic route, this method enabled the formation of all three types of thio-substituted benzoxazines. These compounds are valuable in pharmaceuticals and in functional materials like adhesives and plastics.

PP30. FLORAL WASTE-DERIVED BIOCHAR FUNCTIONALIZED WITH SDS: A BIFUNCTIONAL MATERIAL FOR INTEGRATED ADSORPTIVE REMOVAL AND FLUORESCENT DETECTION OF DELETERIOUS POLLUTANTS

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ABSTRACT

Addressing the ongoing concerns regarding water pollution, the work aims to efficiently remove obnoxious pollutants present in several water bodies utilizing the highly promising and sustainable biosorbents. Biomass based porous biosorbent was constructed and subsequently, forming the composite with an anionic surfactant, sodium dodecyl sulfate via ultrasonication. The influence of surfactant loading on the morphology, surface area and other adsorptive properties of the composite were thoroughly investigated. The fabricated composites were successfully characterized via XPS, P-XRD, FE-SEM, FT-IR, TGA, Zeta potential, HR-TEM and BET techniques. The potential of fabricated material was scrutinized as adsorbent for the removal of minocycline (85.2%), doxycycline (87.26%) and safranin O (87.66%). The kinetics data and adsorption isotherms well fitted with the pseudo second order kinetic equation and Freundlich's isotherm model respectively, with a maximum adsorption capacity of 42.55 mg g-1 for minocycline, 87.70 mg g-1 for doxycycline and 15.52 mg g-1 for Safranin O. Apart from adsorption, the dual-functionalized material was employed for selective fluorescence sensing towards minocycline and Hg2+ with reliable selectivity and anti-interference characteristics. Additionally, the limit of detection (LOD) values were found to be impressively low with 0.88 µM for MC and 10.04 µM for Hg2+. Real water analysis and reproducibility displayed the adaptability of the proposed material for environmental remediation.

PP31. ORGANOSILANE: ITS POTENTIAL AS A CHEMOSENSOR FOR THE DETECTION OF VANADIUM (III), DFT INSIGHT, MOLECULAR DOCKING, AND MD SIMULATION STUDY

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ABSTRACT

In this research, a new series of organosilane (5) was successfully synthesized via a Cu(I)-catalyzed click reaction and well characterized through FT-IR, 1H and 13C NMR, and mass spectrometry. The UV-Visible and fluorescence spectroscopic analysis of 5 revealed its remarkable selectivity toward V (III) in the presence of other metal cations. Detection limits (LOD) of V (III) were measured as 2.9 × 10-7 M and 4.4 × 10-8 M using absorption and emission spectroscopy, respectively. DFT calculations performed via Gaussian 09 software provided insight into the binding interactions between 5 and V (III). The molecular docking and MD simulation studies indicated a strong binding affinity (-6.95 kcal/mol) and stable interactions of 5 with the active sites of vanadium apochloroperoxidase protein, highlighting its potential biological relevance.

PP32. ENHANCED ANODIC STRIPPING VOLTAMMETRIC DETECTION OF CD(II) USING A GLASSY CARBON ELECTRODE MODIFIED WITH N, N-DIMETHYL-1-AMINOANTHRAQUINONE DECORATED NICKEL FERRITE AND GRAPHENE OXIDE SHEETS

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ABSTRACT

The study demonstrates the fabrication of DNG via a sonochemical route from an anthraquinone-based compound (N,N-dimethyl-1-amino-anthraquinone) intricately combined with nickel ferrite-embedded graphene oxide and tailored for the electrochemical sensing of hazardous Cd^{2+} ions. Structural (Raman, XRD) and morphological (FE-SEM and HRTEM) studies confirm the successful fabrication of nanocomposite. Herein, an anthraquinone derivative (DAAQ) serves as a key functional group, offering abundant binding sites further amplified by the synergistic interaction between NF (distinguished by its substantial surface area) and GO (renowned for its exceptional electrical conductivity). The charge transfer resistance, electrochemically active surface area, and electron transport pathways at the electrode-electrolyte interface were all better understood by CV and EIS analysis. The sensing platform demonstrated SWASV determination of Cd2+ within the concentration range of 0.1 to 8 µM with a quantification limit of 8.0 nM and an outstanding detection limit of 2.5 nM. High sensitivity (5.78 mA µM-1) and remarkable reproducibility (RSD ~ 2.39%) of stable DNG electrodes for targeted analytes highlights its potential to reveal new avenues in electroanalytical applications.

PP33. DYNAMIC AND ADAPTIVE BEHAVIOUR OF POLYBORODIMETHYLSILOXANE: A PROMISING SMART POLYMER SYSTEM

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ABSTRACT

Polyborodimethylsiloxane (PBDMS) is an emerging smart material distinguished by its dynamic chemical structure and multifunctional behaviour. Formed through reversible boron–oxygen (B–O) bonds, PBDMS exhibits intrinsic self-healing ability, enabling recovery from mechanical damage without external assistance. Its stress-responsive nature further enhances its adaptability, making it suitable for advanced material applications. As a non-Newtonian fluid and a shear stiffening gel (SSG), PBDMS represents a novel class of supramolecular polymers derived from polydimethylsiloxane (PDMS). Its structure originates from the substitution of oxygen (O) in PDMS by boron (B) from boric acid. In this study, PBDMS was synthesized via condensation of PDMS and boric acid. Fourier transform

infrared spectroscopy (FTIR) confirmed the formation of Si–O–B linkages, indicating successful synthesis. The shear stiffening behavior was evaluated using rheological analysis through dynamic frequency sweep testing to measure the storage (G′) and loss (G″) moduli over a range of angular frequencies. The results demonstrated pronounced viscoelastic behaviour with a distinct solid–liquid transition point, where the storage modulus increased by nearly two orders of magnitude under shear. Overall, this work highlights the synthesis, structural confirmation, and rheological performance of PBDMS, emphasizing its potential as a self-healing, stress-adaptive, and shear-stiffening material for future engineering and protective applications.

PP34. CONSTRUCTION OF 1,8-NAPHTHALIMIDE MODIFIED NICKEL NANOCLUSTERS BASED NANOHYBRID PLATFORM FOR THE DETECTION OF FAST GREEN AND PICRIC ACID

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ABSTRACT

A FRET-based nanoprobe, NiNCs@HS1, was developed in this work by decorating the surface of polyvinylpyrrolidone (PVP)-stabilized nickel nanoclusters (NiNCs) with a 1,8-naphthalimide-derived Schiff base ligand. The structural and chemical characteristics of the nanoprobe were comprehensively investigated using various analytical techniques, including DLS, HRTEM, EDX, elemental mapping, SAED, PXRD, FT-IR, ESI-TOF MS, ICP-MS, TGA, XPS, and optical spectroscopic analyses. The sensor exhibited a fluorescence turn-off response upon interaction with fast green FCF and picric acid, with limits of detection (LOD) of 0.30 μM and 0.97 μM, respectively. Furthermore, NiNCs@HS1 demonstrated excellent performance in detecting fast green FCF and picric acid in real samples such as candy, soft drinks, tap water, and drinking water, achieving recoveries ranging from 90.91% to 106.38%. Owing to its high sensitivity, selectivity, and rapid response, the NiNCs@HS1 nanoprobe shows great potential for the development of portable sensing platforms for on-site detection of fast green FCF and picric acid.

PP35. A MULTIFUNCTIONAL SCHIFF BASE: INVESTIGATING ITS ZIRCONIUM SENSING AND ANTIPROLIFERATIVE EFFECTS

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ABSTRACT

The current investigation is focused on the synthesis of Schiff base 5, which was characterized via X-ray crystallographic study, 1H NMR spectroscopy, 13C NMR spectroscopy, FT-IR spectroscopy, mass spectrometry (LCMS) and thermal gravimetric analysis (TGA). Compound 5 has been identified as an effective and highly selective Zr(IV) sensor using UV-Visible spectroscopy with a limit of detection (LOD) 3.7 × 10–7 M. Compound 5 exhibited the most significant anticancer activity, reducing cell viability by upto 67.67 % compared to untreated control cells. Experiments on Cajanus cajan (pigeon pea) seeds revealed its efficacy as a good plant growth regulator. Molecular docking studies further supported its therapeutic potential by revealing strong interactions with both an anticancer target protein and a plant gibberellin protein, indicating its dual role as potential anticancer agent and a plant growth regulator. The findings from the study provides the foundation for future research into zirconium sensing and anticancer applications, potentially leading to the development of new sensors and anticancer drugs.

PP36. SILATRANE FOR AL(III) DETECTION: INTEGRATING PHOTOPHYSICAL CHARACTERIZATION, BIOLOGICAL EVALUATION, AND MOLECULAR DOCKING STUDIES.

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ABSTRACT

This poster presents the synthesis of silatrane synthesized using transesterification approach. The synthesized silatrane exhibited the marvellous sensitivity and selectivity towards Al (III) in contrast to other tested metal ions, using UV-Visible and Fluorescence spectroscopy. 1H NMR, FT-IR and HR-MS study revealed the binding behaviour of silatrane with Al (III). Compound 6 demonstrated significant anticancer and antioxidant activities, further supported by its favourable molecular docking interactions with the DNA duplex structure 1BNA.

PP37. TERBIUM-BASED LUMINESCENT METAL–ORGANIC FRAMEWORK AS A HIGHLY SENSITIVE FLUORESCENT PROBE FOR ERYTHROSINE DETECTION IN FOOD SAMPLES

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ABSTRACT

Metal–organic frameworks (MOFs), are a class of crystalline porous materials constructed from metal ions or clusters bridged by organic linkers, that have transformed the landscape of materials chemistry through their structural diversity, enormous internal surface area, and tunable pore environments. This transformative potential was formally recognized with the 2025 Nobel Prize in Chemistry, which highlighted the pioneering role of MOFs in advancing gas storage, catalysis, drug delivery, and molecular sensing. Among the wide range of MOFs,

luminescent MOFs have recently garnered substantial attention for their ability to act as sensitive fluorescent probes. Their distinct advantages, including strong emission intensity, and high photostability, make them particularly promising for sensing applications. Within this domain, lanthanide-based MOFs, especially those incorporating terbium (Tb^{3+}) ions, are noteworthy for their sharp green emission bands, long excited-state lifetimes, and minimal self-quenching. Such features enable high signal-to-noise ratios and reproducibility in fluorescence-based detection systems, making Tb-MOFs excellent candidates for biological, and food-related sensing. In the present work, a terbium-based MOF (Tb-MOF) was synthesized and evaluated for the trace-level detection of erythrosine, a synthetic food dye commonly found in consumer products such as watermelon. The Tb-MOFs exhibited a highly selective fluorescence quenching response toward erythrosine, attributed to hydrogen-bonding interactions between the dye molecules and the MOFs coordinated framework. This interaction led to a measurable and concentration-dependent decrease in luminescence intensity, enabling ultra-sensitive detection with a remarkably low detection limit. The results demonstrate the potential of Tb-MOFs as selective fluorescence sensors for monitoring trace contaminants in real-world food samples.

PP38. ZEOLITIC IMIDAZOLE MATERIALS FOR SUPERCAPACITOR APPLICATION.

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ABSTRACT

Zeolitic Imidazolate Frameworks (ZIFs), a subclass of metal–organic frameworks, have emerged as promising electrode materials for high-performance supercapacitors due to their tunable porosity, high surface area, and chemical versatility. However, pristine ZIFs often suffer from poor electrical conductivity and limited electrochemical stability. To overcome these limitations, recent research has focused on the strategies such as metal doping, conductive polymer integration, and heteroatom modification to enhance charge transport and ion diffusion. Also, the ZIF derivatives can be obtained through thermal conversion of ZIFs into metal oxides, sulfides, selenides, phosphides, or carbon-based composites have shown improvements in specific capacitance, rate capability, and cycling stability. The synergistic effects arising from composite formation with carbon based materials such as carbon nanotubes and graphene further contribute to improved electrical conductivity. This abstract summarizes recent advancements in ZIF-derived materials by making their composites with carbon materials and further their selenization enhances the electrochemical performance of the electrode material of supercapacitor technologies.

PP39. A LUMINESCENT ZN-MOF FOR THE DETECTION OF EXPLOSIVES AND DEVELOPMENT OF FINGERPRINTS

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ABSTRACT

A luminescent 3D metal–organic framework [Zn(NDA)(AMP)] = PUC1 (where, NDA = naphthalene-2,6-dicarboxylic acid and AMP = 4-aminomethyl pyridine) was synthesized under solvothermal conditions. The synthesized MOF was fully characterized by SCXRD, FTIR, TGA, PXRD, SEM, BET, etc. PUC1 exhibited a strong emission peak at 371 nm when excited at 290 nm PUC1 revealed highly sensitive and selective detection of PETN and Tetryl with high quenching constant values of 0.1 × 106 and 0.12 × 105 M−1 and low detection limits of 0.315 and 0.404 μM respectively. The strong luminescent properties of PUC1 lead to its successful application in the development of latent fingermarks on different non-porous surfaces using the powder dusting method. The accuracy and applicability of the synthesized material were determined by developing fingerprints by using secretions from eccrine and apocrine glands on a glass slide and various other surfaces, followed by dusting the surfaces.

PP40. DUAL ROLE OF A NOVEL THIAZOLIDINE–SILANE HYBRID IN ENVIRONMENTAL MONITORING OF NI(II) AND ITS DIVERSE IN VITRO AND IN VIVO THERAPEUTIC APPLICATIONS

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ABSTRACT

In this article, we synthesized and characterized thiazolidine-appended silane, TZDVS (thiazolidine vanillin silane), as an efficient UV-visible chemo-sensor for the detection of Ni(II). TZDVS was characterized using various spectroscopic techniques, including NMR (^{1}H, ^{13}C), FT-IR spectroscopy, and mass spectrometry. The limit of detection (LOD) for Ni(II) was determined to be 6.7×10^{-9} M, with an association constant (Ka) of 0.0630×10^{6} M^{-1}. Job's plot analysis indicated a 1:1 metal-to-ligand binding stoichiometry. Density functional theory (DFT) analysis provided theoretical insights into the complexation of TZDVS with Ni(II), while FT-IR confirmed the formation of the TZDVS-Ni(II) complex experimentally. Thermal gravimetric analysis (TGA) confirmed the high thermal stability of TZDVS. Moreover, TZDVS exhibited notable anticancer (against HeLa cells) and

antibacterial properties (against Staphylococcus aureus and Bacillus subtilis). Molecular docking studies with the protein (PDB ID: 3RCD) revealed a favorable binding score of -7.13 kcal mol^{-1}, and real sample analysis disclosed its high potency to detect Ni (II) ions.

PP41. DESIGN AND SYNTHESIS OF A SALEN-TYPE COMPARTMENTAL LIGAND AS A VERSATILE SCAFFOLD FOR MANGANESE(II)-ZINC(II) BIMETALLIC COMPLEX: VISIBLE-LIGHT-MEDIATED HOMOCOUPLING OF ARYL AMINES

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ABSTRACT

Photocatalytic oxidation coupling of amines represents a green and cost-effective method for the synthesis of highly value-added imines under visible light irradiation. A compartmental ligand was synthesized via a condensation reaction to prepare heterobimetallic complex of Manganese and Zinc. The ligand features distinct coordination sites, enabling the selective incorporation of both metal ions within a single molecular framework. Structural characterization using single-crystal X-ray diffraction confirmed a well-defined metal-ligand architecture with distinct coordination environments for Mn(II) and Zn(II). Spectroscopic and spectrometric analyses, including FTIR, ESI-MS, and XPS, further validated the metal coordination interactions within the complex. Additionally, thermal stability and phase purity of the bulk material were examined by TGA and PXRD to assess its structural integrity. The synthesized complex revealed promising visible-light catalytic activity in the solvent-free homocoupling of primary amines to imines, demonstrating the potential in catalytic applications as an efficient and recyclable heterogeneous catalyst under mild conditions.

PP42. ENGINEERING MULTIFUNCTIONAL S-SCHEME SN-MOF/NIFE2O4 HETEROSTRUCTURE FOR ABOLITION OF CONTAMINANTS: IN-SILICO ECOTOXICITY ASSESSMENT AND DFT-ASSISTED MECHANISM ELUCIDATION

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ABSTRACT

Amalgamation of advantages of the adsorption and photocatalytic degradation process encouraged the designing of multifunctional S-scheme Tin-dicarboxylate metal-organic

framework (Sn-MOF)/Nickel ferrite (NF) heterostructures (SBNF-x, x=10, 20 and 30). The fabricated heterostructures are applied for the adsorptive-photodegradation of Methylene Blue (MB) from an aqueous medium. SBNF-20 demonstrated the maximum MB removal (~98%), complying with pseudo-first-order kinetics. The rate constant value for SBNF-20 is discovered to be 38.0- and 5.5-times pristine Sn-MOF and NF, respectively. Moreover, density functional theory (DFT) analysis is employed to obtain the global and local reactivity descriptors. The global reactivity descriptors showed MB as the most reactive dye for the initial adsorption phenomenon. Meanwhile, Fukui functions and Liquid chromatography-mass spectroscopy (LC-MS) technique revealed the possible degradation pathways. The ecotoxicity profile of generated reaction intermediates are assessed using in silico toxicity analysis. The practical applicability of the sensor is confirmed by real sample analysis. The recyclability test corroborated the reusability and stability of SBNF-20. Thus, the findings of the designed multifunctional system have great potential prospects for wastewater treatment.

PP43. HARNESSING THE PHOTO-FENTON ACTIVITY OF MAGNETICALLY RECOVERABLE SULFUR-DOPED G-C3N4@COFE2O4 Z-SCHEME HETEROJUNCTIONS FOR EFFICIENT TETRACYCLINE DEGRADATION

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ABSTRACT

The growing contamination of water bodies with antibiotics has emerged as a serious environmental issue. To tackle this, it is essential to design photocatalysts with strong visible-light activity and suitable redox properties. In this study, magnetically separable sulfur-doped g-C3N4@CoFe2O4 (SCNCoFe) Z-scheme heterostructures were successfully synthesized through a straightforward calcination method, allowing CoFe2O4 nanoparticles to grow on SCN nanosheets. These heterostructures demonstrated remarkable photocatalytic efficiency in degrading tetracycline (TC) and minocycline (MC) under visible light, with the SCNCoFe-20 sample achieving about 94% degradation for both antibiotics within 120 seconds of illumination. The total organic carbon (TOC) removal results further confirmed the effective mineralization and practical potential of this approach for treating antibiotic-contaminated water. Photoluminescence and radical scavenging experiments indicated that the H2O2-assisted degradation process proceeded via a Z-scheme charge transfer mechanism, highlighting a strong synergistic interaction between photocatalysis and the Fenton reaction. Overall, this study offers a promising strategy for designing Z-scheme heterostructures to efficiently eliminate antibiotics from wastewater.

PP44. PH DEPENDENT CHROMOGENIC AND SMART PHONE ASSISTED DETECTION OF FE(III) BY ACID SENSITIVE BENZIMIDAZOLE 1,2,3- TRIAZOLE HYBRIDS: IN VITRO ANTICANCER PROPERTY EVALUATION AND IN SILICO INHIBITION OF BREAST CANCER ESTROGEN RECEPTOR MUTANT L536S

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ABSTRACT

Two benzimidazole–1,2,3-triazole hybrids, Pact and Oact, were synthesized via Cu(I)-catalyzed click reaction and characterized by spectroscopic and single-crystal XRD analyses. Pact exhibited high selectivity and sensitivity toward Fe(III) under physiological pH, with LOD values of 0.3 nM (emission) and 0.07 nM (absorption). Binding studies confirmed a 1:1 stoichiometry through UV–Vis, fluorescence, NMR, mass, and FT-IR analyses. RGB-based detection (LOD 3.4 mM) and portable paper kit tests demonstrated practical applicability, while EDTA-assisted reversibility enabled molecular logic gate construction. Real water analysis and DFT studies supported its environmental sensing potential. pH-dependent studies revealed Pact's efficacy as a low-pH sensor. Thermal analysis (TGA/DSC) indicated good stability. The nitro-substituted Oact showed enhanced anticancer activity against HeLa cells and stronger binding affinity (−9.10 kcal/mol) to the breast cancer receptor (PDB ID: 6sbo) than Pact (−8.63 kcal/mol), alongside superior antioxidant activity.

PP45. EXPLORATION AND REMOVAL OF MULTIPLE METAL IONS USING MIXED-LINKER-ARCHITECTED ZN-MOF IN AQUEOUS MEDIA

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ABSTRACT

In this work, a new zinc-based metal–organic framework (MOF) named PUC-5 was

prepared using trimesic acid and 1-(3-aminopropyl)imidazole through a simple solvothermal method. The structure and properties of PUC-5 were studied using different techniques such as XRD, FTIR, XPS, SEM, BET, and TGA. The results showed that PUC-5 is a stable and microporous material that can tolerate a wide pH range (3–12) and remain unchanged in water. PUC-5 was used to detect and remove toxic metal ions (Fe^{2+}, Pb^{2+}, and V^{5+}) from water. It showed very high sensitivity with detection limits of 0.129 µM (Fe^{2+}), 0.113 µM (Pb^{2+}), and 0.246 µM (V^{5+}), which are lower than the limits allowed by the World Health Organization (WHO) for drinking water. The adsorption process followed pseudo-second-order kinetics and Langmuir isotherm, showing monolayer adsorption. The maximum adsorption capacities were 208.7, 192.6, and 203.6 mg g^{-1} for Fe^{2+}, Pb^{2+}, and V^{5+} respectively. The process was spontaneous and exothermic, and the material could be reused several times without losing its efficiency. Overall, PUC-5 is a highly stable, recyclable, and cost-effective material for simultaneous detection and removal of multiple heavy metal ions from polluted water, making it a promising candidate for environmental purification and water treatment applications.

PP46. SYNTHESIS, CHARACTERIZATION AND PHOTOPHYSICAL PROPERTIES OF SCHIFF BASE OF 4-BROMONAPHTHYLAMINE

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ABSTRACT

The study reports the successful synthesis of a Schiff base (3) derived from 4-bromonaphthylamine through condensation with o-nitrobenzaldehyde. The structure of the synthesized compound 3 was confirmed using various spectroscopic and mass spectrometric techniques. In the ^{1}H NMR spectrum, a characteristic singlet at δ 8.4 ppm was observed, corresponding to the imine proton (–N=CH–). The ^{13}C NMR spectrum further supported the formation of 3 by showing a signal at δ 157 ppm, attributed to the imine carbon. Mass spectrometry revealed a prominent molecular ion peak at m/z 355, consistent with the calculated molecular weight, thereby confirming the proposed structure. UV–vis absorption spectroscopy demonstrated that compound 3 exhibits selective sensing behavior toward Cu(II). Additionally, DFT studies confirmed the binding interaction between the ligand and the metal ion.

PP47. INVESTIGATING 1,2,3-BISTRIAZOLE-FUNCTIONALIZED SN (II) CHEMOSENSORS FOR COX-2 DETECTION

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ABSTRACT

This article, describe the synthesis of 4-ethynylaniline derived 1,2,3-bis-triazole (3) via Cu(I) catalyzed click reaction and various spectroscopic methods such as FT-IR, TGA, 1H and 13C NMR, and mass spectrometry are used for characterization. The probe 3 exhibits high sensitivity and selectivity to Sn (II) in UV–visible spectroscopy, with a limit of detection of 27 µM and association constant 8.32 MM−1, respectively. The synthetic sensor practical application was further explored by detecting Sn (II) in real sample analysis. The computational analysis using the DFT techniques shows the binding mechanism of sensor with Sn (II). Additionally, molecular docking investigation was conducted against cyclooxygenase-2 to shows the anti-inflammatory properties of the synthesized ligand having a good binding energy −10.26 Kcal mol−1.

PP48. TBAF-CATALYSED CONVERSION OF CARBAMATES TO UNSYMMETRICAL UREAS: A SUSTAINABLE PHOSGENE-FREE APPROACH

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ABSTRACT

Ureas are valuable structural motifs widely present in pharmaceuticals, agrochemicals, and functional materials. Conventional synthetic routes to urea often use toxic reagents such as phosgene, isocyanates, and moisture-sensitive carbonyl diimidazole, which pose significant environmental and safety concerns. In this study, a sustainable, metal-free method for the synthesis of unsymmetrical ureas via TBAF-catalysed transcarbamoylation of carbamates with various amines has been established. This reaction proceeds smoothly under mild conditions, avoiding use of an external activation or harsh reagents. Optimization of reaction parameters revealed that catalytic amounts TBAF efficiently activates the carbamate carbonyl toward nucleophilic substitution, enabling the formation of a wide range of urea derivatives in moderate to excellent yields. This protocol demonstrates broad substrate tolerance, accommodating both aromatic and

aliphatic carbamates and amines bearing electron-donating and electron-withdrawing substituents. Mechanistic insights suggest that TBAF deprotonates the carbamate, promoting phenoxide elimination to form a reactive isocyanate intermediate which is trapped by amines to afford unsymmetrical ureas and TBAF is regenerated. This operationally simple and scalable process provides an eco-friendly and practical alternative to conventional urea synthesis, aligning well with the principles of green chemistry.

PP49. SYNTHESIS OF COPPER OXIDE NANOPARTICLES BY GREEN METHOD USING HIBISCUS ROSA-SINENSIS LEAVES EXTRACT, CHARACTERISATION AND ANTIBACTERIAL POTENTIAL

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ABSTRACT

The copper oxide nanoparticles (CuO NPs) were phytofabricated using Hibiscus rosa-sinensis commonly called China rose leaves ethanolic (70%) extract as a reducing and capping agent and tested for antibacterial potential against food pathogenic bacteria. The leaves extract was prepared via Soxhlet extraction method. As per GC-MS analysis, china rose leaves extract consisted of 32 compounds with 5-hydroxymethylfurfural (49.95%) and 3,5-dihydroxy-6-methyl-2,3-dihydro-4H-pyran-4-one (31.51%) as major compounds. CuO NPs were fabricated with sol-gel formulation procedure by optimizing various physiochemical parameters like precursor salt $CuSO4 \cdot 5H2O$ concentration (0.1 mM), amount of bio-reductant extract (10 mL), pH (12), temperature (80°C) and heating time (3 hours). UV-visible spectrum of showed absorption band at 274 nm characteristic of CuO NPs. Fourier transform infrared spectrum of CuO NPs confirmed functionalisation of NPs with the extract. X-ray diffraction diffractogram of NPs revealed the average crystallite size of 15.01 nm. Energy Dispersive X-ray Spectroscopic analysis showed peaks of Cu, O and C elements. Morphological analysis from Scanning Electron Microscopy and Transmission Electron Microscopy micrographs showed aggregated spherical NPs which had diameter in the range of 15-36.94 nm as per TEM analysis. CuO NPs exhibited higher antibacterial activity than china rose leaf extract as the MIC values of CuO NPs (10 mg/ml) were less than that of extract (50 mg/ml) against bacteria Escherichia coli, Proteus mirabilis, Staphylococcus aureus and Bacillus subtilis. Hence, CuO NPs fabricated by using China rose leaves extract may be used as a natural antibacterial agent as a substitute for its synthetic analogue as an approach towards sustainable development.

PP50. EXTRACTION & PURIFICATION OF PHYTOCHEMICALS FROM WATER HYACINTH

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ABSTRACT

Water hyacinth, also known as *Pontederia crassipes*, is a fast growing aquatic weed. It is native to the amazon basin and has become one of the most invasive species across tropical and subtropical regions of the world. Despite its negative impact on aquatic ecosystems, this plant is known to contain a variety of phytochemicals with potential pharmaceutical, agricultural and industrial applications. In this study, a novel nonpolar solvent based extraction was adopted to explore the phytochemicals composition of water hyacinth. The extracts of air dried leaves of water hyacinth were obtained with different concentrations of n-hexane and ethyl acetate through soxhlet extraction. The obtained extracts were then further purified using column chromatography. TLC analysis was done to evaluate the number of compounds in the extract. Column chromatography showed five bands, which showed three-five compounds across different fractions in TLC. Phytochemical analysis was further carried out using HPLC. HPLC analysis shows different peaks having absorption in the range of 220- 650 nm which confirms the presence of useful secondary metabolites. This result highlights that nonpolar solvent extraction can effectively isolate a diverse range of phytochemicals from water hyacinth, indicating it as a potential source of important compounds.
Keywords: Water hyacinth, Phytochemicals, HPLC, Nonpolar extraction, TLC, Column chromatography, Soxhlet extraction

PP51. STRAIGHTFORWARD SYNTHESIS OF QUINOLINE SULFONAMIDES VIA AMINOSULFONYLATION USING A BENCH-STABLE SO2 SURROGATE

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ABSTRACT

Quinoline-sulfonamide derivatives have emerged as a crucial class in medicinal applications, and their ability to coordinate with metals enables their use as fluorescent probes and ligands in catalytic systems. Quinoline-3-sulfonamide analogues display diverse biological activities, including antitumor, antidepressant, and anxiolytic effects, as well as utility in treating other CNS disorders. Quinoline sulfonamides are

predominantly synthesized through the coupling of quinolinesulfonyl chlorides with amines. However, this approach is limited by the use of malodorous thiols or sulfides as precursors, challenging reaction handling, and narrow substrate compatibility. To avoid reliance on sulfur-containing substrates, approaches involving direct sulfur dioxide (SO2) insertion could also be utilized. The direct utilization of SO2 gas presents inherent challenges, primarily attributed to its low boiling point (-10 °C), suffocating odor, toxicity, and difficulties in storage and handling. To address these limitations, several SO2 surrogates have been developed. In this study, we utilize an inexpensive, bench-stable, and non-toxic surrogate for SO2 in a palladium-catalyzed one-pot, two-step synthesis of quinoline-3-sulfonamides. The protocol exhibits broad substrate tolerance, accommodating a wide range of amines and substituted quinolines, affording sulfonamides in 25-92%. We obtained mechanistic insights through time-dependent reaction monitoring and control experiments. The methodology was successfully extended to synthesizing an antiproliferative analogue and the one-pot diaminosulfonylation of 3,6-diiodoquinoline, demonstrating its versatility and scalability.

PP52. IMIDAZO[1,2-A]PYRIDINE BENZOHETEROBICYCLIC HYBRID AS ANTI-CANCER AGENTS TARGETING TUBULIN

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ABSTRACT

Colchicine-site targeting compounds are promising candidates for anticancer therapy due to their ability to interfere with microtubule dynamics. A novel series of nitrogen-linked imidazo[1,2-a]pyridine-benzoheterobicyclic hybrids were synthesized as potential tubulin inhibitors. Biological screening highlighted two compounds, 6b and 6c, as having significant antiproliferative effects on HeLa cervical cancer cells. Among them, compound 6c demonstrated superior activity by disrupting tubulin polymerization and breaking down existing microtubules in both HeLa and MCF-7 cell lines. It also caused mitotic arrest, elevated intracellular reactive oxygen species, and triggered cancer cell death. Mechanistic investigations showed that 6c binds strongly to the colchicine site on tubulin. Quantum chemical studies and docking simulations revealed a preference for its iminic tautomer when interacting with the tubulin binding pocket. Furthermore, chemoinformatic evaluation indicated that compound 6c resides in a distinct chemical space favorable for drug development, with optimal physicochemical characteristics, predicted ADMET behavior, and pharmacokinetic properties. These findings support the potential of compound 6c as a lead structure for the development of new tubulin-targeting anticancer drugs.

PP53. PHYSICOCHEMICAL POLLUTION ASSESSMENT OF YAMUNA RIVER: IMPLICATIONS FOR SUSTAINABLE USE

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ABSTRACT

This study provides a detailed evaluation of the physicochemical water quality of the Yamuna River at four key locations in Uttar Pradesh—Mathura, Agra, Firozabad, and Etawah—during June to December 2023, covering both pre- and post-monsoon seasons. Eight essential parameters were systematically analyzed: pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Turbidity, Dissolved Oxygen (DO), Biological Oxygen Demand (BOD), and Chemical Oxygen Demand (COD). The findings revealed pronounced spatial and seasonal variability, primarily driven by industrial discharges, domestic wastewater, and agricultural runoff. Most parameters exceeded the limits prescribed by the Bureau of Indian Standards (BIS), indicating that the river water is unsuitable for direct domestic consumption. The results emphasize the urgent need for comprehensive river management strategies, including pollution mitigation, continuous monitoring, and ecological restoration initiatives, to safeguard water quality. This study offers valuable insights for policymakers, environmental authorities, and local communities, highlighting the importance of integrated approaches to maintain the ecological health of the Yamuna River while ensuring sustainable access to clean water for human populations.

PP54. NANOMATERIAL INTERVENTION ENHNAVES STRESS RESLIENCE IN HIBISCUS ROSA-SINESIS LEAVES

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ABSTRACT

This study explores the in vivo physiological impact of three nanomaterials—multi-walled carbon nanotubes (MWCNTs), MWCNT-nanocurcumin conjugates (CNT-NC), and silicon dioxide nanoparticles SiO_2 in live Hibiscus rosa-sinensis leaves under simulated abiotic stress (UV and high-intensity light).We utilized a needleless infiltration technique to introduce the nanomaterials. Stress responses were non-invasively monitored using infrared thermal imaging alongside physiological assays including chlorophyll fluorescence, membrane stability, and stomatal conductance.Key Findings:Functionalized

MWCNTs localized within stomatal pores without causing tissue damage and significantly enhanced photosynthetic efficiency by facilitating electron transport.SiO2 nanoparticles strengthened cellular membranes and promoted stomatal conductance, leading to a greater cooling capacity under stress conditions.CNT-NC conjugates boosted protective responses but exhibited reduced mobility within the leaf tissues.This research demonstrates that nanoscale interventions can effectively modulate plant physiology at the leaf level. Furthermore, it validates infrared thermography as a powerful, non-invasive tool for visualizing these nano-bio interactions. These findings advance the field of leaf-level nanobionics and pave the way for developing nano-enabled precision agriculture strategies to improve plant adaptability and stress tolerance.

PP55. MOLECULAR DOCKING & ADMET- BASED PREDICTION OF NEUROTOXIC EFFECTS OF COMMON SYNTHETIC FOOD PRESERVATIVES

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ABSTRACT

Concerns about the possible neurotoxic effects and interactions of synthetic food preservatives with important neurological biomolecular targets have grown as a result of their widespread use in contemporary diets. Although they are crucial for prolonging the shelf life of food, little is known about the chemical mechanisms by which they impact the central nervous system (CNS). In order to clarify the neuropharmacological effects of widely used synthetic food preservatives, such as calcium propionate, sodium nitrite, potassium sorbate, ethoxyquin, tert-butylhydroquinone (TBHQ), parabens, and benzoates, this study uses a computational toxicology approach that integrates molecular docking, quantum chemical analysis, and ADMET profiling.In order to determine the electronic stability and reactivity of each preservative molecule, quantum chemical parameters—such as total energy, HOMO–LUMO energy, dipole moments, chemical hardness, electronegativity, and electrophilicity—were calculated using the Gaussian 09 software and the semi-empirical PM6 method. Using predictive computer models, ADMET profiling was carried out to assess drug-likeness characteristics, gastrointestinal absorption, CNS toxicity, and blood–brain barrier (BBB) permeability. Acetylcholinesterase (AChE; PDB ID: 4EY7), a key neurotoxic and neuropharmacological target involved in cholinergic neurotransmission and neuronal communication, was the subject of molecular docking research utilizing AutoDock 4 to anticipate ligand–protein interactions. This integrative computational study highlights the potential role of synthetic food preservatives in interfering with neural transmission and causing oxidative neurotoxicity by offering mechanistic insight into their neurotoxic and receptor-binding interactions.

PP56. BILE ACID-BASED AMPHIPHILIC MOLECULES: PROMISING ANTIMICROBIALS AGAINST DRUG-RESISTANT PATHOGENS

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ABSTRACT

The rapid emergence of multidrug-resistant (MDR) bacteria and fungi presents an alarming global challenge, demanding the development of novel antimicrobials with unique mechanism of action.1 Membrane-targeting antibiotics are promising as they reduce the likelihood of resistance development.2 In this study, facially amphiphilic bile acid derivatives were synthesized as membrane targeting antimicrobial agents. We explored cholic acid-based oligomers linked with polar polyamines3 and steroid-based peptides bearing an N-α-Fmoc functionality at the N-terminal of cholic acid-lysine conjugates4 which exhibited promising antimicrobial activity. Cholic acid dimers particularly compounds 9a and 15a, showed strong antibacterial activity (MIC 4 µg/mL for each) against Staphylococcus aureus. These dimers enhanced the efficacy of existing antibiotics, producing up to 67-fold and 33-fold reductions in MIC values for amikacin and cefotaxime respectively and completely inhibited S. aureus biofilm formation. Fmoc-protected cholic acid-lysine conjugates (compounds 13 and 17) which displayed broad spectrum activity against S. aureus. E. coli, and candida albicans (MICs were 4, 2, and 8 µg/mL respectively) by disrupting microbial membranes. They also acted synergistically with antifungal drugs such as amphotericin B (ΣFIC = 0.12 and 0.25 with compounds 13 and 17, respectively) and additive with voriconazole (ΣFIC = 0.75 and 0.63, respectively) without inducing mammalian cell toxicity. These findings demonstrate that bile acid-derived amphiphilic molecules, hold strong potential against MDR bacterial and fungal infections. Building on these promising results, further studies are underway to design improved analogues, explore their mechanism of action and evaluate their biological potential in detail.

PP57. SYNTHESIS AND CATALYTIC APPLICATION OF FE_3O_4 (MAGNETITE) NANOPARTICLES FOR ENHANCING THE FENTON USE OF PEROXIDE

Priya Kaloni[1], Priyal Singhal[1], Pragti Arora[1], Lakshya Sharma[1], Sanjeev Gautam[1]
[1] Advanced Functional Material lab Dr.SSBUICET, Panjab University , Chandigarh

ABSTRACT

Our poster investigates the synthesis and catalytic application of Fe_3O_4 (magnetite) nanoparticles for enhancing the Fenton use of peroxide, which is further used in AOP

(Advanced Oxidation Process) in water treatment. It also depicts in detail synthesis & characterization of Fe_3O_4 nanoparticles/precipitate as an outstanding, reusable catalyst for the Fenton reaction. Our goal was to leverage the dynamic Fe^{2+}/Fe^{3+} redox cycle inherent to magnetite to efficiently generate abundant hydroxyl (•OH) radicals, driving the rapid & complete degradation of organic pollutants. The catalyst bears low catalytic efficiency & is hence advantageous in maintaining maximum sustainability & also allow seperation with magnetization with ease. The nanoparticles were synthesized using the co-precipitation method, heating Fe^{2+} and Fe^{3+} precursors in a 1:2 molar ratio in a basic solution. Following synthesis, the material's internal crystalline structure was investigated using X-ray Diffraction (XRD). This XRD pattern, which was diffracting X-rays through the atomic planes, was expected to confirm the characteristic structure of pure Fe_3O_4. However, the XRD analysis suggested that the product was not pure magnetite but rather a composite mixture of FeO and Fe_2O_3. The initial broad XRD indicates that non-pure synthesis conditions may result in a combination of iron oxides. Although it requires further investigation to confirm the desired Fe_3O_4 structure, presently maintaining the continuous Fe^{2+} regeneration necessary for sustained catalytic activity. The good part is that a combination of FeO and Fe_2O_3 can still be used in AOP in basic water treatment & other uses.

PP58. MOLECULAR DOCKING AND ADMET-BASED COMPARATIVE ANALYSIS OF THE IMMUNOMODULATORY POTENTIAL OF GREEN TEA AND BLACK TEA PHYTOCHEMICALS

Dr. Reenu[1], Manpreet Kaur[1]
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ABSTRACT

Tea derived from Camellia sinensis exists mainly as green and black tea, both rich in bioactive compounds that influence immune function. This study presents a comparative computational analysis of phytochemicals from green and black tea to evaluate their immune-enhancing potential. Major bioactive compounds were selected from literature and analyzed using quantum mechanical studies, ADMET profiling, and molecular docking. Quantum chemical parameters were calculated using Gaussian 09 software with the semi-empirical PM6 method to determine total energy, HOMO–LUMO gap, dipole moment, chemical hardness, electronegativity, and electrophilicity, providing insights into molecular stability and reactivity. ADMET (Absorption, Distribution, Metabolism, Excretion, and Toxicity) profiling through SwissADME assessed pharmacokinetic properties and predicted immunological effects of tea phytochemicals. Molecular docking using AutoDock 4 predicted ligand–protein interactions between major tea compounds and C-reactive protein (CRP), a key inflammatory biomarker. CRP was chosen to evaluate potential anti-

inflammatory and immunomodulatory effects of the selected compounds. Comparative analysis revealed that green tea constituents, particularly EGCG and ECG, showed stronger binding affinities and more favourable pharmacokinetic profiles than black tea compounds such as theaflavins and thearubigins. Overall, green tea demonstrated greater immunomodulatory potential, emphasizing the role of computational biology in identifying tea-derived compounds beneficial for immune health.

PP59. MURRAYA KOENIGII LEAVES ESSENTIAL OIL MEDIATED GREEN SYNTHESIS OF MAGNESIUM OXIDE NANOPARTICLES; THEIR ANTIBACTERIAL AND ANTIOXIDANT POTENTIAL

Manveen Kaur Saggu[1], Sonia Kaushal[1], Prathibha Vyas[2]

[1] Department of Chemistry, Punjab Agricultural University, Ludhiana, [2] Department of Microbiology, Punjab Agricultural University, Ludhiana

ABSTRACT

The biogenic synthesis of MgO NPs was carried out using *Murraya koenigii* (Curry Patta) leaves essential oil as a reducing and capping agent and tested for antibacterial and antioxidant potential. The curry leaves essential oil (CLEO) was extracted by hydro-distillation method having alpha-pinene (32.40%) and beta-phellandrene (21.93%) as major compounds. MgO NPs were fabricated using CLEO by sol gel method by optimising various physicochemical parameters like Mg (NO3)2·6H2O concentration (0.1 mM), amount of CLEO (20 mL), pH (12), temperature (60°C) and heating time (2 hours). UV-visible spectrum showed a characteristic absorption band at 289 nm. Fourier transform infrared spectrum of MgO NPs revealed functionalisation of NPs with CLEO. X-ray diffraction diffractogram revealed an average crystallite size of 11.16 nm and a face-centered cubic crystal lattice. Energy Dispersive X-ray Spectroscopic analysis showed peaks of Mg, O and C elements. Transmission Electron Microscopy micrographs revealed aggregated spherical nanoparticles with diameters ranging from 7.51 to 22.54 nm. MgO NPs exhibited higher antibacterial potency than CLEO having lesser values of minimum inhibitory concentration against Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus and Bacillus subtilis. The NPs also exhibited lower IC50 value than CLEO in 2, 2-diphenyl-1-picrylhydrazyl and nitric oxide free radical scavenging assay. In mustard oil degradation assay, MgO NPs exhibited less increase in peroxide value, anisidine value, thiobarbituric acid value and total oxidation value than CLEO. Hence, MgO NPs fabricated by using CLEO may be used as natural bio-preservative as substitute for its synthetic analogue as an approach towards sustainable development.

DENTAL SCIENCES

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

Sectional President
Dr Sonia B Bhardwaj

Sectional Secretary
Dr Virender Kumar

CHASCON 2025

NATIONAL CONFERENCE ON

“*Empowering Humanity:*

Science, Technology, and Healthcare for All

November 06 - 08, 2025

Section: DENTAL

Program

November 07, 2025

Venue: Dr Harvansh Singh Judge Institute of Dental Science & Hospital.

Sectional President	**Sectional Secretary**
Name -Dr Sonia B Bhardwaj Mobile -9872523838	Name – Dr Virender Kumar Mobile -9417889227

Time	**Program**
09:00-09:45	Display of posters by participants **Venue:** Near LT 1(Ground floor)
09:45-10:00	Inauguration of Sectional Program ***Venue:*** LT 1
10:00-10:45	**Session Chair:** Dr Kitty Sidhu **Speaker:** Dr Ritu Garg ***Title “-***Oral-Systemic link: Microbial Pathways to Systemic Disease
10:45-11:30	**Session Chair:** Dr Rajesh Joshi **Speaker:** Dr Vijay Prakash Mathur. ***Title “-***The essential steps in handling dental trauma in children.***”***
11:30-12:00	Tea Break
12:00-13:00	Oral Presentation ***Venue:*** LT1 Poster Presentation **Venue:** Near LT 1
13:00-14:00	Lunch
14:00-17:00	Oral Presentation **Venue: LT 1** Poster Presentation **Venue:** Near LT 1 **Tea break from 15:30-16:00**

Abstracts of Invited Talks

ORAL–SYSTEMIC LINK: MICROBIAL PATHWAYS TO SYSTEMIC DISEASE

Dr Ritu Garg

Professor & Head
Department of Microbiology
Dr B R Ambedkar State Institute of Medical Sciences, Mohali

ABSTRACT

The human oral cavity harbors one of the most diverse microbial ecosystems in the body, serving as both a gateway and a potential reservoir for systemic disease. Emerging evidence underscores that oral infections, particularly periodontitis, are not confined to the oral cavity but can exert far-reaching effects through hematogenous dissemination of pathogens and inflammatory mediators. This lecture explores the intricate microbial pathways connecting oral health to systemic conditions such as cardiovascular disease, diabetes mellitus, adverse pregnancy outcomes, and respiratory infections. This guest lecture will be emphasizing how oral pathogens act as silent contributors to systemic inflammation and chronic disease progression. By integrating microbiological concepts with clinical implications, the session aims to reinforce the importance of comprehensive oral care as a cornerstone of general health. Emerging diagnostic biomarkers and preventive strategies targeting the oral microbiome will also be discussed, offering a holistic view of the oral-systemic connection.

THE ESSENTIAL STEPS IN HANDLING DENTAL TRAUMA IN CHILDREN

Dr Vijay Prakash Mathur

Professor, Department of Pediatric Dentistry,
Centre for Dental Education and Research, AIIMS, New Delhi

Traumatic dental injuries in children and adolescents have a prevalence of 11-30% in different parts of the world and emerging as a major public health problem. In developing countries like India, these injuries are often the reason for first dental or emergency room visit of the child and associated with a panic situation. The Dentists must effectively manage the dental trauma, pacify the parents and prevent psychological trauma to the child. Another aspect of these injuries is their long-term sequelae and slowly developing adverse effects which remain unrecognized till their clinical manifestations develop.

The evidence-based guidelines have helped in providing a road map to effectively manage the traumatic dental injuries and improve their prognosis. However, there are some essential stets to examine the patient before taking up the dental management. This lecture aims to highlight the essential steps in screening and preventing systemic complication in cases of dental trauma in children.

Abstracts of Oral Presentations

Oral Presentation- Dental Sciences		
OP1	Dr. Amrita Rawla	Gene-Driven Tooth Regeneration: A Breakthrough in Restorative Dentistry
OP2	Dr. Ruchi Singla	Growing Smiles: The Science Behind Lab-Generated Teeth
OP3	Dr. Suruchi Aditya	Knowledge of blood-borne infection control amongst undergraduate dental students: A cross-sectional study
OP4	Dr. Vandana Chhabra	Informed Consent - Ethical, legal, and practical dimensions
OP5	Mr. Aarush Joshi	Journey of enamel: Development, structure, and its irreversible wear
OP6	Dr. Aarushi Sharma	Effectiveness of Minimally Invasive Surgical Techniques in the regeneration of Peri-Implant defects- A Systematic Review of Clinical Cases
OP7	Dr. Amrita Kaur	Evaluation of AI Chatbots in Delivering Prosthodontic Patient Information: A Comparative Analysis of Four AI CHATBOTS
OP8	Ms. Anushka Chandra	Telemedicine and Digitalisation in Healthcare: Bridging the Gap Between Patients and Professionals
OP9	Ms. Anushka tewari	Impact of Social Media on Oral Health Awareness and Hygiene Habits amongst Students of Chandigarh
OP10	Mr. Aryan Bali	Harnessing the fourth state of matter: efficacy and applications of cold atmospheric plasma in oromaxillofacial asepsis.
OP11	Mr. Aryan Gupta	Antimicrobial Resistance in Dentistry
OP12	Dr. Charvi Raheja	From innovation to inclusion: Reimagining healthcare through science and technology
OP13	Dr. Diksha Aggarwal	Enamel Defects as Early Indicators of Celiac Disease: A Diagnostic Opportunity Beyond Gastrointestinal Symptoms
OP14	Dr. Harleen Arora	Reduction in Biofilm Adhesion on 3D Printed Dentures with Inclusion of Metal and Non- metal Oxide Nanoparticles in Print Resin : A Review
OP15	Ms. Mandeep Sahu	The Oral Microbiome: A Hidden Kingdom Guarding Our Smile
OP16	Ms. Maneet Kaur	Prevalence of medical emergencies in dental clinics situated in and around panjab university
OP17	Dr. Navneet Kaur	From Gums to Gray Matter : Unravelling the oral – brain axis in Alzheimer’s Disease when microbes talk to neurons
OP18	Dr. Nidhi Aggarwal	Clash of the Implants: Zirconia vs. Titanium – Who Sparks More Inflammation?
OP19	Ms. Pramiti Kaur	A REVIEW-USAG-1 Antagonists in Tooth Regeneration and Their Implications for Modern Dentistry

OP20	Dr. Preeti Gupta	Influence of Implant Angulation on Retention of Implant Supported Mandibular Overdentures : A Review
OP21	Dr. Ritika Thakral	Advances In Caries Diagnostic Techniques: Enhancing Precision In Preventive Care
OP22	Dr. Riya Arora	Translucency differences between 3Y-TZP and 5Y-PSZ zirconia restorations: A comprehensive review
OP23	Ms. Riya Khurana	Smart Dental Materials with Nano-sensors: The Future of Oral Health Monitoring.
OP24	Ms. Ruchika	Nanovirus : A dual strike on oral cancer
OP25	Dr. Sakshi Janbade	Decoding POI: AI-Driven Risk Stratification for Oral Squamous Cell Carcinoma
OP26	Dr. Sangeeta Gupta	Discovery to Digital
OP27	Dr. Shrutika	Comparison of accuracy maxillary cast transfer to virtual articulator using an analog facebow, digital photography technique, and a facial scan technique.
OP28	Dr. Snehal Mandal	Smart Biomaterials in Dentistry From Concept to Clinical Reality
OP29	Ms. Snigdha Sran	Oral health awareness and dysbiosis risk in automimune Vasculitis patients
OP30	Dr. Somya Jain	Saving Smiles with Precision: The Minimal Invasive Dentistry Approach”
OP31	Dr. Soumya Bhasin	Comparison of Retentive Force of Polyetheretherketone (PEEK) and Cobalt - Chromium Removable Partial Denture clasps of Varying Thickness and Undercut Depth
OP32	Dr. Vansh Goyal	Perception of Socially Pleasing Dental Esthetics in Relation to Maxillary Anterior Tooth Proportions and Smile Characteristics Among Young Population
OP33	Dr. Vibhuti Shukla	"Emerging Nanotechnologies in Prosthodontics: From Material Enhancement to Clinical Translation" A Comprehensive Review
OP34	Ms. Shreshtha Bansal	Smart Vision for Early Oral Cancer Detection Using OpenCV and Python

ABSTRACTS OF ORAL PRESENTATIONS

OP1. GENE-DRIVEN TOOTH REGENERATION: A BREAKTHROUGH IN RESTORATIVE DENTISTRY

Amrita Rawla[1]
[1] *Dr Harvansh Singh Judge Institute of Dental Science and Hospital Panjab University*

ABSTRACT

Humans naturally develop only two sets of teeth in their lifetime—deciduous and permanent. Once lost, teeth can be replaced only through artificial means such as implants, bridges, or dentures. However, recent advances in gene editing and regenerative biology have opened exciting possibilities for natural tooth regeneration. Researchers have identified key genetic pathways, including MSX1, PAX9, USAG-1, and the Wnt signaling pathway, which regulate tooth development and can potentially be reactivated in adults. Using modern genetic tools such as CRISPR/Cas9 and targeted antibody therapies like TRG-035, scientists have stimulated dormant stem cells in the jaw to form new, functional teeth. Experimental studies in mice and dogs have shown successful regeneration of tooth structures through precise gene modulation. This breakthrough marks a paradigm shift from conventional restorative dentistry toward a self-regenerating approach. Although human clinical trials are ongoing, gene-based tooth regeneration represents a transformative advancement in dental medicine, offering the potential for permanent, natural restoration of lost teeth. Current research continues to focus on gene activation, stem cell science, and tissue engineering, bringing this vision closer to clinical reality.

OP2. GROWING SMILES: THE SCIENCE BEHIND LAB-GENERATED TEETH

Dr Ruchi Singla[1]
[1] *Dr Harvansh Singh Judge Institute of Dental Sciences and Hospital*

ABSTRACT

Tooth loss remains one of the most common oral health challenges worldwide, traditionally managed with dentures or implants that often lack natural function and feel. Recent breakthroughs in stem cell research and tissue engineering have opened the possibility of lab-generated teeth — bioengineered structures that mimic the anatomy and biology of natural teeth. By combining dental stem cells, biocompatible scaffolds, and growth factors, scientists are now able to stimulate the formation of enamel, dentin, and pulp tissues in controlled environments. This revolutionary approach holds the promise of restoring teeth that integrate seamlessly into the jawbone and surrounding tissues, offering a permanent, natural alternative to artificial replacements. While challenges such as vascularization, nerve integration, and ethical concerns remain, the rapid progress in regenerative dentistry suggests that growing new teeth in the lab may soon shift from imagination to clinical reality, redefining future dental care.

OP3. KNOWLEDGE OF BLOOD-BORNE INFECTION CONTROL AMONGST UNDERGRADUATE DENTAL STUDENTS: A CROSS-SECTIONAL STUDY

Dr Suruchi Aditya[1]

[1] *Department of Pharmacology, Dr Harvansh Singh Judge Institute of Dental Sciences, Panjab University, Chandigarh.*

ABSTRACT

Objective: To assess the knowledge of blood-borne infection control among undergraduate dental students of a tertiary care hospital. Materials and methods: This cross-sectional descriptive study used a validated and reliable questionnaire to collect anonymous data from 48 final-year dental students at Dr. Harvansh Singh Judge Institute of Dental Sciences, Chandigarh. It gathered demographic details and information on virus persistence, post-exposure prophylaxis, and diagnostic tests for blood-borne infections [Hepatitis B virus (HBV), Hepatitis C virus (HCV), Human Immunodeficiency virus (HIV)]. The collected data was statistically analyzed. Results: Most of the students agreed that the infections can be transmitted by both direct (81%) and indirect (83%) contact. Majority acknowledged that protective equipment was important for protection (92%) and the need to notify the doctor when suffering from an infectious disease (83%). Students felt that all patients should be treated as infected (85%).However, knowledge about the persistence of HBV, HCV, and HIV was limited. Awareness of rapid diagnostic tests for these infections was moderate—50% for HBV, 48% for HCV, and 35% for HIV. While most students claimed to know post-exposure protocols, only 33% knew immediate testing was required, and 37% were aware that prompt treatment was essential after accidental exposure. Additionally, 54% correctly identified that used needles should be discarded in sharps disposal containers. Conclusion: The study highlights the importance of imparting continuing medical education on blood-borne infections and their management.

OP4. INFORMED CONSENT - ETHICAL, LEGAL, AND PRACTICAL DIMENSIONS

Dr Vandana Chhabra[1]

[1] *Dr HSJ Institute of Dental Sciences and Hospital Panjab University Chandigarh*

ABSTRACT

Informed consent has gained more importance these days due to technological advances, diverse patient populations, and a growing emphasis on shared decision-making. Being a cornerstone of medicine it ensures ethical treatment decisions and patient-centered care. Patients have the right to make informed and voluntary treatment decisions. It ensures that the patient is fully informed about the nature of the procedure or intervention, the potential risks

and benefits, and the alternative treatments available. The informed consent process serves ethical and legal purposes by safeguarding patient rights, fostering transparency, and promoting trust between healthcare professionals and patients. It also protects clinicians by documenting that patients were adequately informed, reducing legal liability in case of adverse outcomes. Medical care and medical research have become increasingly complex. As new medical challenges arise , role of informed consent continues to become more complicated.

OP5. JOURNEY OF ENAMEL: DEVELOPMENT, STRUCTURE, AND ITS IRREVERSIBLE WEAR

Aarush Joshi[1]

[1] *Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.*

ABSTRACT

Enamel is the hardest and most mineralized tissue in the human body, forming the protective outer layer of the tooth crown. Enamel develops from the ectoderm of the tooth germ and is secreted by ameloblasts during tooth formation. Ameloblasts are lost once the tooth erupts, so enamel cannot regenerate later in life. The thickness and size of enamel are predetermined before the tooth erupts. Although post-eruptive maturation increases its hardness through fluoride and mineral uptake from saliva, once the outer enamel layer is completely abraded, it can never be regained. Enamel loss can happen due to various mechanical, chemical, and microbial factors. Once the outer enamel layer is lost, the underlying dentin becomes exposed, leading to sensitivity, pain, and faster wearing of teeth, which may lead to tooth loss and reduced masticatory function, and aesthetic issues. Preventing enamel loss through proper oral hygiene, dietary control, careful toothpaste selection, and regular dental supervision is essential to maintain oral health and facial harmony throughout life.

OP6. EFFECTIVENESS OF MINIMALLY INVASIVE SURGICAL TECHNIQUES IN THE REGENERATION OF PERI-IMPLANT DEFECTS- A SYSTEMATIC REVIEW OF CLINICAL CASES

Aarushi Sharma[1], Vishakha Grover[2], Shaveta Sood[2], Ashish Jain[3]

[1] *PG student, Dept. of Periodontology, Dr.Harvansh Singh Judge Institute of Dental Sciences,* [2] *Associate Professor, Dept. of Periodontology, Dr.Harvansh Singh Judge Institute of Dental Sciences,* [3] *Professor and Head, Dept. of Periodontology, Dr.Harvansh Singh Judge Institute of Dental Sciences*

ABSTRACT

The theme “Empowering Humanity: Science, Technology and Healthcare for All” calls for innovation that not only heals efficiently but does so responsibly, ethically, and sustainably.

Peri-implantitis presents a growing global burden, often resulting in bone loss, functional compromise, and emotional distress for implant patients. While conventional surgical treatments can be effective, their associated morbidity, postoperative discomfort, and risk of esthetic deterioration limit their acceptance and accessibility—especially among medically vulnerable or economically constrained individuals. Minimally invasive surgical techniques (MIST), though currently perceived as technology-intensive, represent an evolution toward gentler, biologically respectful care. This PRISMA-based systematic review of 12 clinical cases assessing MIST for peri-implant regeneration revealed consistent outcomes in mean bone gain (2.3 ± 1.3 mm to 6 mm), alongside favorable reductions in probing depth (1.97–7 mm), gingival recession, and improved soft-tissue stability. Importantly, MIST reduces surgical trauma, accelerates healing, and minimizes the need for repeat interventions—thereby lowering long-term treatment burden. While initial setup costs may be higher, the long-term economic and biological sustainability of minimally invasive protocols positions them as future models for scalable, patient-preserving care. By prioritizing tissue preservation over aggressive correction, MIST aligns with the philosophy that true healthcare equity is not only about affordability at entry, but about minimizing suffering across the treatment journey. With broader training and standardization, minimally invasive implant regeneration can evolve from a specialist tool to a universally accessible standard.

OP7. EVALUATION OF AI CHATBOTS IN DELIVERING PROSTHODONTIC PATIENT INFORMATION: A COMPARATIVE ANALYSIS OF FOUR AI CHATBOTS

Amrita Kaur[1], Dr. Shefali Singla[1]
[1] *Dr. Harvansh Singh Judge Institute of Dental Sciences*

ABSTRACT

Background The integration of artificial intelligence (AI) chatbots in healthcare communication is rapidly expanding, offering new avenues for patient education, engagement, and treatment adherence. However, their use presents several challenges, including potential inaccuracies, limited empathy, inherent biases, user over-reliance, inadequate handling of complex topics, and ethical concerns. In prosthodontics, patients often seek guidance on treatment options such as fixed versus removable prostheses, conventional dentures versus implant-supported prostheses, as well as implications for function, aesthetics, comfort, cost, and long-term outcomes. Many of these queries are now being directed to AI chatbots for preliminary information. Objective To assess and compare the accuracy, consistency, and comprehensibility of responses generated by four AI chatbot platforms—ChatGPT (OpenAI), Google Gemini, Claude AI (Anthropic), and

Perplexity—when addressing frequently asked questions (FAQs) in prosthodontics. Methods: A structured set of prosthodontic planning questions was presented to each AI model. Responses were independently evaluated by a panel of prosthodontic specialists using standardized criteria: accuracy, completeness, readability, alignment with current clinical guidelines, and patient-friendliness. Results and Conclusion AI chatbots are expected to serve as valuable adjunctive tools for patient education, but professional validation will remain essential to support informed treatment decision-making in prosthodontic care.

OP8. TELEMEDICINE AND DIGITALISATION IN HEALTHCARE: BRIDGING THE GAP BETWEEN PATIENTS AND PROFESSIONALS

Anushka Chandra[1]

[1] *Dr HSJIDS and Hospital, Panjab University, Chandigarh 160014*

ABSTRACT

The digitalisation of healthcare has revolutionised the way care is delivered, creating stronger, faster, and more compassionate connections between patients and professionals. In the post-COVID era, telemedicine has emerged as a transformative tool—ensuring uninterrupted access to quality care, reducing overcrowding, and expanding the reach of medical expertise beyond physical boundaries. In dentistry, this transformation has given rise to teledentistry—a vital innovation enabling remote diagnosis, digital consultations, and preventive oral health education. Patients can now share intraoral images for early detection of cavities, gum diseases, or orthodontic concerns, while clinicians plan treatments and prioritise cases efficiently. This digital shift not only enhances accessibility but also fosters preventive, patient-centred oral care. Institutions such as AIIMS Delhi, and PGIMER Chandigarh, have pioneered hybrid OPDs and electronic health record systems, while national initiatives like Aarogya Setu, the *National Health Portal (NHP)*, and the *National Dental Register (NDR)* reflect India's growing commitment to integrated, secure, and transparent digital healthcare. Private platforms like Practo and PharmEasy further extend this ecosystem, offering home diagnostics, teleconsultations, and medicine delivery with unprecedented convenience. While challenges in data privacy and digital literacy remain, the momentum is unstoppable. Telemedicine and digitalisation are not just tools—they are a movement reshaping the future of healthcare. Together, they promise a world where technology amplifies empathy, every patient is within reach, and where every smile can be restored—one digital connection at a time.

OP9. IMPACT OF SOCIAL MEDIA ON ORAL HEALTH AWARENESS AND HYGIENE HABITS AMONGST STUDENTS OF CHANDIGARH

Anushka Tewari[1], Dr. Pradeep Tewari[2]

[1] BDS 3rd Year Student, Dr. H. S. J. Institute of Dental Sciences, Punjab University, [2] Chief Photographer, The Tribune

ABSTRACT

In the past two decades, the influence of social media has increased immensely across nearly every aspect of life and it has become a major medium of communication in the oral healthcare field thereby influencing the oral health awareness and oral hygiene habits of young individuals. The aim of this study was to evaluate this influence of social media amongst students of Chandigarh. A questionnaire-based survey was conducted among students aged 15–25 years from various schools and colleges through a Google Form, including questions on oral health awareness and the impact of online content on hygiene habits. Participation was voluntary and anonymous and the responses were analysed using SPSS with frequencies and percentages summarising the data. The results showed that 41% of the 200 respondents had been influenced by online content seen on social media. Additionally, 37% of students said they trust content shared by dental professionals, while 40% mentioned that it depended on the source. These results suggest that social media definitely has an impact on the oral health awareness and habits of students in Chandigarh where a majority tend to trust online content if they consider the source credible rather than relying on information from dental professionals thus highlighting the need for dental professionals to create and share accurate, evidence-based content to reduce misinformation bridging the gap between knowledge and practice, therefore contributing to improved oral health in student populations.

Keywords: Oral health awareness, oral hygiene habits, social media, students, Chandigarh

OP10. HARNESSING THE FOURTH STATE OF MATTER: EFFICACY AND APPLICATIONS OF COLD ATMOSPHERIC PLASMA IN OROMAXILLOFACIAL ASEPSIS.

Aryan Bali[1]

[1] Undergraduate Student, Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh

ABSTRACT

Soft tissue sterilisation is an important aspect in preventing postoperative infections and maximising healing in any oromaxillofacial surgery. The traditional sterilisation procedures cannot be used in live tissues because of their possible thermal effects and cytotoxicity. This

requires the emergence of new biocompatible sterilisation methods. The non-thermal ionised gas known as cold atmospheric plasma (CAP) has come out to be one of the potential technologies in sterilisation without damaging the tissue. The process of generation of CAP involves ionising gases under atmospheric pressure, forming a plasma which does not reach an equilibrium state, forming a mixture of reactive oxygen and nitrogen species (RONS), UV photons, electrons and ions. Its antimicrobial effect is attributed to its ability to cause oxidative stress, lipid peroxidation and DNA disruption of microbes, and it does it at low temperatures (less than 40 °C), which makes it safe to be used for soft tissue sterlization. In addition to sterilisation, CAP facilitates wound healing by increasing the active proliferation of fibroblasts, activating angiogenesis and regulating inflammatory reactions. CAP is a novel technology with primary benefits in comparison to conventional techniques, which are its non-thermal mechanics, its effectiveness against wide-spectrum multidrug-resistant organisms and the absence of any chemical residues. CAP has shown potential for enhancing surgical outcomes. Even though there are challenges in its adoption, including the necessity to formulate standardised protocols and specific devices. To incorporate this technology in the routine surgical asepsis, further clinical trials are required.

OP11. ANTIMICROBIAL RESISTANCE IN DENTISTRY

Aryan Gupta[1]

[1] *Dr Harvansh Singh Judge Institute of Dental Sciences and Hospital*

ABSTRACT

Antibiotics are the cornerstone of modern medicine. Effective antibiotics are essential for both preventive and curative measures, protecting patients from potentially fatal diseases. However, once a boon for medicine and dentistry, the rampant use has raised major concerns in dental and periodontal care in the form of antimicrobial resistance (AMR), which is made worse by the overuse of antibiotics in dental procedures. With little prospect of new classes of antibiotics being developed in the short term, a post-antibiotic era is expected, in which antibiotics will no longer be effective. A recent systematic review has determined that periodontal illnesses were associated with a significant prevalence of antibiotic resistance, specifically to amoxicillin and metronidazole. As antibiotics become increasingly ineffective because of the development and spread of resistant infections, even minor surgeries and routine operations could become high-risk procedures. Standard treatments for infections will also become less effective, allowing infections to persist and spread more easily among populations. Also, resistance is largely caused by inappropriate prescriptions and poor patient adherence. The problem of AMR is further compounded by self-medication through the influences of social media and other available internet options. Due to this, antibiotic resistance is a risk to public health, which is comparable to the risk posed by climate change and global terrorism. Accordingly, before prescribing antibiotics, care must be taken to assess the risk of antibiotic resistance developing for the individual patient as well as for society. So, this paper will discuss various solutions to address the issue of AMR.

OP12. FROM INNOVATION TO INCLUSION: REIMAGINING HEALTHCARE THROUGH SCIENCE AND TECHNOLOGY

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ABSTRACT

Science, technology and healthcare together form the foundation for empowering humanity by enhancing well-being, improving quality of life and promoting equity. Advances in science have paved the way for innovations such as vaccines, genomics, artificial intelligence and regenerative medicine, transforming the diagnosis, prevention and treatment of diseases. Technology amplifies these scientific achievements by enabling tools like telemedicine, wearable electronics and Internet of Things–based health systems that facilitate real-time monitoring, personalized care and remote access to medical services, especially for underserved populations. For example, wearable healthcare devices now integrate biosensors, artificial intelligence and data analytics to monitor physiological parameters, assist in early disease detection and empower individuals to take control of their health. Healthcare systems, when combined with such innovations, can shift from reactive treatment to proactive, inclusive and patient-centred care. These technologies also play a vital role in addressing global challenges such as aging populations, chronic diseases and healthcare disparities. However, true empowerment requires that these scientific and technological benefits are accessible, ethical and sustainable. Barriers including cost, digital divides, data privacy concerns and lack of infrastructure must be addressed to ensure healthcare for all. Collaborative efforts among scientists, policy makers, engineers and healthcare professionals are essential to create solutions that are innovative yet inclusive. In essence, empowering humanity is not only about technological progress, but about using science and healthcare responsibly to build a world where every individual, regardless of geography or socioeconomic status, can live healthier, informed and dignified lives.

OP13. ENAMEL DEFECTS AS EARLY INDICATORS OF CELIAC DISEASE: A DIAGNOSTIC OPPORTUNITY BEYOND GASTROINTESTINAL SYMPTOMS

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ABSTRACT

Background: Celiac disease (CeD) is a chronic autoimmune disorder triggered by gluten ingestion in genetically predisposed individuals. While classical gastrointestinal (GI) symptoms often guide clinical suspicion, many patients—especially children—present with

extraintestinal signs, including developmental enamel defects (DEDs). These defects may precede GI symptoms or appear independently, offering a unique window for early diagnosis. Objective: To highlight the diagnostic value of DEDs as early markers of CeD in asymptomatic individuals and to establish criteria for differentiating CeD-related DEDs from other similar-appearing enamel anomalies. Method: This presentation synthesizes findings from published studies to explore characteristic features of CeD-related DEDs and their differentiation from other enamel anomalies such as fluorosis and amelogenesis imperfecta. Key distinguishing features include symmetry, eruption timing, and absence of environmental or familial patterns. The review also outlines a diagnostic pathway involving dental recognition, serological testing (tTG-IgA, EMA), HLA typing, and confirmatory duodenal biopsy. Results: CeD-related DEDs are predominantly symmetrical, chronologically distributed across permanent dentition, and characterized by white, yellow, or brown opacities with surface irregularities. Unlike fluorosis or genetic enamel disorders, these defects lack environmental or familial clustering. In 1/3rd of cases, DEDs are the sole presenting feature, prompting serological testing and definitive diagnosis. Conclusion: Dental professionals play a pivotal role in the early detection of CeD. Recognizing the unique pattern of CeD-related enamel defects and integrating clinical, serological, and histological data can facilitate timely diagnosis, even in the absence of GI symptoms.

OP14. REDUCTION IN BIOFILM ADHESION ON 3D PRINTED DENTURES WITH INCLUSION OF METAL AND NON- METAL OXIDE NANOPARTICLES IN PRINT RESIN : A REVIEW

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ABSTRACT

Statement of Problem: Microorganisms adhering to the denture base by formation of a biofilm are the main cause of denture stomatitis. Dentures are now being 3D printed and the process produces a surface with microgrooves that form retentive sites for microorganisms. The objective of this review was to systematically review literature studies reporting influence of inclusion of metal and non metal oxide nanoparticles on microbial adhesion on surface of 3D printed denture base. Methods: A systematic search conducted across Pubmed, Web of Science and Cochrane using the terms nanoparticles and 3D printed denture yielded a total of 157 studies. 9 studies were included for the review based on exclusion and inclusion criteria. Results: Literature studies reported reduction in biofilm adherence to the denture surface by inclusion of oxides of zirconium, titanium, cerium and silica as nanoparticles 1.5-2% concentration in the 3D printing denture base resin. The improvement has been attributed to the ability of nanoparticle structure to fill the microscopic irregularities and their specific chemical composition which confer the ability to deliver antimicrobial action by various mechanisms interfering with microbial cell metabolism. However, higher concentrations (>3%) leads to reduction in desirable mechanical properties. Conclusion: The addition of

nanoparticles to printing resin improves biological properties and reduces the chances of incidence of denture stomatitis thereby improving the quality of life of denture wearing patients.

OP15. THE ORAL MICROBIOME: A HIDDEN KINGDOM GUARDING OUR SMILE

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ABSTRACT

Behind every radiant smile lies an unseen world — the oral microbiome, a thriving kingdom of bacteria, fungi, and viruses that live in harmony within the mouth. This microscopic society is not an enemy but a guardian, silently defending our teeth and gums. Together, these organisms form a balanced ecosystem that protects against harmful invaders, maintains oral pH, and strengthens immunity. But when this delicate balance is disturbed — by poor hygiene, sugary diets, stress, or antibiotics — this peaceful kingdom turns chaotic. Friendly microbes rebel, harmful ones dominate, and the result is a cascade of dental problems like tooth decay, gingivitis, and periodontitis. This state of imbalance, known as dysbiosis, links oral health directly to systemic diseases such as diabetes and cardiovascular disorders. Modern research powered by genomic sequencing and probiotic therapy is now revealing the hidden language of these microbes — how they interact, compete, and cooperate. By understanding this communication, dentistry is shifting from the idea of "killing bacteria" to preserving microbial harmony. This presentation explores the fascinating story of the oral microbiome — its balance, its breakdown, and its role in reshaping preventive dentistry. It reminds us that true oral health lies not in sterilizing the mouth but in nurturing the tiny kingdom that guards our smile.

OP16. PREVALENCE OF MEDICAL EMERGENCIES IN DENTAL CLINICS SITUATED IN AND AROUND PANJAB UNIVERSITY

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ABSTRACT

RATIONALE Prevalence of medical emergencies in the dental clinics situated in and adjoining panjab university. It is based on hypothesis that quick identification and efficient management of medical emergencies by dental professional can increase the safety of the patient and enhance the outcome of the treatment. INTRODUCTION:-

Professionalism is synonymous to responsibility. As a dental professional, being aware of the 'Medical Emergencies' that can happen to a patient during diagnosis / treatment is a prerequisite. Ways to manage the situation is mandatory skill. Since an emergency in the clinic may become life threatening, therefore important is to take thorough history of the patient in order to prevent or manage any eventuality. METHOD:- An online sample survey responded by dental clinic professionals in and adjoining panjab university. ANALYSIS:- A sample survey of 47 respondents including BDS 4th year and Interns & MDS with experience ranging from 1 to >5 years. The survey indicated the efficiency of handling any emergency to about 52%. In general, the data varies from 0-5 emergencies encountered in the clinics per respondent. The emergencies reported were uncontrolled bleeding, chest pain, respiratory distress, seizures, unconsciousness. Out of the emergencies reported, the maximum share belongs to 'Unconsciousness' (51.1%) and for 'Excessive bleeding' being 36.2% . CONCLUSION:- Emergencies do occur in dental clinics, although prevalence is low. Emphasis on thorough medical history taking and risk assessment be ensured. The dental staff to be adequately trained in identifying and managing the emergencies. Participation in simulated emergency drills ensure preparedness.

OP17. FROM GUMS TO GRAY MATTER : UNRAVELLING THE ORAL – BRAIN AXIS IN ALZHEIMER'S DISEASE WHEN MICROBES TALK TO NEURONS

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ABSTRACT

Introduction It begins with a name misplaced, a face forgotten, a memory dissolving like mist— the silent unravelling of Alzheimer's disease. Once seen purely as a disorder of amyloid plaques and tau tangles, it is now recognized as a multifactorial neurodegenerative disease. Chronic oral dysbiosis, an imbalance in the oral microbiome, is now recognized as a potential peripheral trigger of Alzheimer's disease. Periodontal pathogens such as *Porphyromonas gingivalis* and *Fusobacterium nucleatum* release toxins that can cross the blood–brain barrier, activate microglia and fuel neuroinflammation. Aim To explore the mechanistic connection between oral dysbiosis and Alzheimer's disease highlighting disrupted neuroplasticity as the key research gap. Results The evidence paints a compelling though incomplete picture. Oral dysbiosis appears to ignite neuroinflammatory cascades that accelerate amyloid buildup and cognitive decline. Yet the bridge to neuroplasticity remains faintly drawn. Few studies show that chronic periodontal infection dampens Brain-Derived Neurotrophic Factor, reduces hippocampal neurogenesis and weakens synaptic strength while human data

remain largely correlative. Conclusion Disrupted neuroplasticity may be the missing mechanistic link in the oral–brain axis of Alzheimer's disease. Understanding this pathway could recast oral health as a frontline defense proving that inflamed gums can indeed breed inflamed minds.

OP18. CLASH OF THE IMPLANTS: ZIRCONIA VS. TITANIUM – WHO SPARKS MORE INFLAMMATION?

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ABSTRACT

Dental implants have become a cornerstone of modern dentistry, with titanium traditionally regarded as the "gold standard" due to its high biocompatibility and mechanical strength. However, zirconia has recently gained attention as a metal-free alternative with potential biological advantages. This study aims to compare the inflammatory response associated with zirconia and titanium implants by assessing key inflammatory markers in peri-implant tissues. A comparative evaluation was conducted using clinical parameters and biochemical analysis of markers such as interleukin-1β (IL-1β), tumor necrosis factor-α (TNF-α) in peri-implant crevicular fluid.

OP19. A REVIEW-USAG-1 ANTAGONISTS IN TOOTH REGENERATION AND THEIR IMPLICATIONS FOR MODERN DENTISTRY

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ABSTRACT

Congenital tooth agenesis, the developmental loss of six or more permanent teeth, compromises oral function and esthetics from an early age and is further complicated by inadequate alveolar bone formation. Traditional prosthetic treatments like dentures and dental implants are severely challenged in these patients, highlighting the need for urgent development of biological tooth regeneration techniques. Since the 1990s, the development of regenerative dentistry has made inroads into stem cell transplantation, scaffold-based tissue engineering, cell sheet technology, 3D bioprinting, and molecular pathway-targeted therapy. Among these, uterine sensitization-associated gene-1 (USAG-1) antagonism, a major BMP and Wnt signaling suppressor, has been identified as a new target to release the latent odontogenic capability(Takahashi *et al.*,). TRG-035, a humanized USAG-1-neutralizing

monoclonal antibody, has shown vigorous induction of supernumerary teeth in ferret and murine models through non-surgical systemic delivery. Phase I clinical trials among healthy adults provided positive safety and pharmacokinetics, paving the way for current pediatric trials. This review spots TRG-035 as a paradigm-shift, non-surgical treatment in regenerative dentistry, notwithstanding challenges such as ectopic ossification, long-term immunogenicity, and pediatric dosing ethical issues. Through tracing out these translational challenges, the article hopes to provoke critical debate and evidence-based action toward incorporating USAG-1 antagonism into clinical practice in conjunction with current prosthetic modalities.

OP20. INFLUENCE OF IMPLANT ANGULATION ON RETENTION OF IMPLANT SUPPORTED MANDIBULAR OVERDENTURES : A REVIEW

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ABSTRACT

INTRODUCTION - Implant supported mandibular overdentures have become reliable treatment option for edentulous patients, offering improved stability and comfort compared with conventional dentures. Success of Implant overdenture relies on multiple components including denture base, mucosa, supporting bone, implants, and attachment system. Although implants for overdentures should be placed parallel to each other, implant inclination toward ideal path of denture insertion may occur due to bone quality, anatomical structures, and clinical practice. Implant angulation should be considered when selecting an attachment as implant inclination affects levels of attachments retention. Attachment system plays crucial role in accommodating various implant position and angulations ensuring long-term success of prosthesis. Stud attachments are frequently preferred in clinical practice over bar attachments. These attachments employ flexible matrix components available in various retentive strengths, distinguished by different colors. The objective of this review is to analyse influence of implant angulation on retention of Implant supported mandibular overdentures based on available literatures studies. METHOD - A comprehensive electronic search of PubMed, Web of Science, and Cochrane databases identified 97 studies using term “implant angulation” and “retention” and “implant-supported mandibular overdentures. 15 Studies were selected for review based on inclusion and exclusion criteria. RESULT AND CONCLUSION – Implant angulation and attachment type influence the retention of mandibular overdentures. Parallel implants provide optimal retention, while angulations up to certain degree may either increase or decrease or cause no change in attachment retention longevity depending upon attachment system used.

OP21. ADVANCES IN CARIES DIAGNOSTIC TECHNIQUES: ENHANCING PRECISION IN PREVENTIVE CARE

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ABSTRACT

Advances In Caries Diagnostic Techniques: Enhancing Precision In Preventive Care CONTEXT: Dental Caries is multifactorial oral disease caused by imbalance of oral flora due to presence of fermentable dietary carbohydrates on the tooth surface over time. Dental caries are most widespread chronic infections globally. Dental Explorer and Radiograph have traditionally been used in caries diagnosis. Newer diagnostic tool such as laser fluorescence and light fluorescence give more accurate information about dental caries. AIM: To Highlight Recent Advances In Diagnostic techniques that enhance Precision and Early diagnosis of caries. METHOD: various articles have been studied regarding recent advances in caries diagnosis that include CBCT ,Digital Transillumination ,Light induced fluorescence ,Electrical conductance measurement, Laser induced thermal imaging ,Biomarkers and salivary analysis. CONCLUSION: Recent advances in caries diagnosis mark a significant leap forward in the field of dentistry .Early and Accurate diagnostic tool not only improve patient care but also shift the focus from restorative to truly preventive dental practice. Keywords: Caries detection , Early diagnosis ,Diagnostic technologies.

OP22. TRANSLUCENCY DIFFERENCES BETWEEN 3Y-TZP AND 5Y-PSZ ZIRCONIA RESTORATIONS: A COMPREHENSIVE REVIEW

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ABSTRACT

Background: High-translucency zirconia has gained popularity in anterior restorations due to its enhanced optical properties and esthetic appeal. Unlike conventional zirconia, newer formulations offer improved light transmission, allowing restorations to blend more naturally with surrounding dentition. These advancements aim to meet the growing demand for lifelike esthetics without compromising durability. Objective: To review the optical performance of 5Y-Zr and 3Y-Zr in anterior tooth restorations. Methods: A systematic search was conducted across PubMed, Scopus, Cochrane Library and Google scholar for in-vitro and clinical studies assessing translucency outcomes of 5Y and 3Y zirconia in anterior applications published during last 15 years. Data extraction and risk of bias assessment were performed independently by two reviewers using the ROBINS-I and RoB 2 tools. Results: Seven studies met the inclusion criteria. Across all studies, 5Y-Zr consistently demonstrated higher translucency values than 3Y-Zr, attributed to its increased cubic phase content and reduced light scattering. While 3Y-Zr maintained superior flexural strength, 5Y-Zr offered sufficient mechanical performance for anterior use. Conclusion: 5Y-Zr exhibits superior translucency compared to 3Y-Zr, making it a favorable choice for esthetically demanding anterior restorations. However, long-term clinical trials are needed to validate its durability and establish standardized guidelines for material selection.

OP23. SMART DENTAL MATERIALS WITH NANO-SENSORS: THE FUTURE OF ORAL HEALTH MONITORING

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ABSTRACT

Advancements in nanotechnology have revolutionized dental materials, leading to the emergence of smart biomaterials capable of sensing and responding to changes in the oral environment. These innovative materials incorporate nanosensors within restorative, coating, or implant systems, allowing real-time detection of variations in pH, temperature, and bacterial activity. Such continuous monitoring provides valuable insights into caries formation, biofilm accumulation, and material degradation, enabling a shift from reactive to preventive dentistry. When early signs of infection or demineralisation are detected, these intelligent materials can autonomously release antimicrobial agents or remineralising compounds, promoting timely intervention and maintaining oral health stability. Additionally, nano-structured coatings enhance the mechanical strength, biocompatibility, and longevity of restorations, ensuring superior patient outcomes. By integrating nanotechnology, microbiology, and digital diagnostics, smart dental materials are paving the way toward personalised, self-monitoring oral care systems. They align seamlessly with the global vision of minimally invasive, technology-driven, and patient-centered healthcare. Moreover, continuous research into bio-responsive polymers and nano-enabled drug delivery systems holds immense potential to address persistent challenges such as secondary caries, periodontal infections, and implant failures. In essence, nanotechnology is not only transforming dental materials but also redefining the philosophy of oral healthcare- from treatment to prevention, and from restoration to regeneration. As these smart materials evolve, they promise a future where dentistry becomes more predictive, sustainable, and accessible for all.

OP24. NANOVIRUS : A DUAL STRIKE ON ORAL CANCER

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ABSTRACT

Oral cancer is a type of cancer that occurs in the mouth, often affecting the tongue, cheeks, gums, or lips. It involves the uncontrolled growth of abnormal cells and can be life-threatening if not detected early. Traditional diagnostic and treatment methods—such as clinical exams, biopsies, surgery, radiation, and chemotherapy—can be invasive, less targeted, and often damage healthy tissues. A promising new approach combines therapeutic viruses and nanomaterials for improved detection and treatment. Therapeutic (oncolytic) viruses are engineered to infect and kill only cancer cells while also activating the immune system. Nanomaterials, like nanoparticles or liposomes, act as carriers that protect the virus, enhance its delivery to tumor sites, and allow for controlled release. In diagnosis, nanomaterials can carry imaging agents that help detect oral tumors earlier and more accurately than conventional methods. This combination reduces side effects, increases targeting precision, and may improve treatment outcomes. Though still in early research stages, especially for oral squamous cell carcinoma, studies show this strategy to be safer and more effective. It represents a major step toward personalized, less invasive, and highly targeted oral cancer therapy.

OP25. DECODING POI: AI-DRIVEN RISK STRATIFICATION FOR ORAL SQUAMOUS CELL CARCINOMA

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ABSTRACT

Background: Pattern of Invasion (POI) is a critical histopathological parameter in the Brandwein-Gensler risk model for oral squamous cell carcinoma (OSCC) and a key predictor of patient prognosis. However, its manual assessment by pathologists can be subjective and time-consuming, leading to inter-observer variability. This study aims to develop and validate a deep learning model for the automated, objective classification of POI from whole-slide images (WSIs). Methods: We developed a deep learning system based on a Convolutional Neural Network (CNN) architecture. The model was trained on a large, curated dataset of H&E-stained WSI sections of OSCC, which were reviewed and annotated by multiple expert pathologists according to the four-tiered POI scoring system (Score 1-4) from the Brandwein-Gensler model. The system was designed to first identify the tumor-host interface and then classify the invasion pattern, distinguishing between pushing borders, solid cords, small nests, and widespread single-cell infiltration. Results: The trained AI model demonstrated high accuracy in classifying POI patterns when compared against a consensus ground truth from expert pathologists. The model achieved a overall accuracy of 92% and showed particular strength in identifying high-risk patterns (Score 3 and 4), which are most critical for prognostic stratification. The model's objective scoring significantly reduced the variability observed in manual assessment. Conclusion: We have successfully developed an AI-based model for the automated and objective assessment of POI in OSCC. This tool has the potential to be integrated into digital pathology workflows, providing a rapid, reproducible, and reliable method for POI scoring.

OP26. DISCOVERY TO DIGITAL

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ABSTRACT

Healthcare has undergone a remarkable transformation, evolving from ancient herbal remedies and rudimentary surgical practices to cutting-edge digital technologies that empower humanity worldwide. In recent decades, digital innovations such as telemedicine, artificial intelligence, wearable devices, 3D printing, and gene-editing technologies have revolutionized patient care and accessibility. The presentation emphasizes the critical need for inclusive and sustainable healthcare innovation, demonstrating that true empowerment occurs when scientific and technological progress benefits all of humanity. Through a blend of historical perspective and modern developments, it provides a comprehensive overview of how discoveries in healthcare continue to shape a healthier, more equitable world.

OP27. COMPARISON OF ACCURACY MAXILLARY CAST TRANSFER TO VIRTUAL ARTICULATOR USING AN ANALOG FACEBOW, DIGITAL PHOTOGRAPHY TECHNIQUE, AND A FACIAL SCAN TECHNIQUE.

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ABSTRACT

Statement of Problem: Maxillary cast can be transfered to virtual articulators using analog facebow, digital photography, and facial scan techniques. However, the comparative accuracy of these methods remains unclear, necessitating evaluation. Materials and Methods: Three records will be obtained based on the respective techniques. In the analog facebow group,

facebow records will be digitized and used to transfer the maxillary scan into the virtual articulator. In the digital photography group, photographs will be taken with a natural head position reference device. Each photograph will be aligned with the maxillary scan, allowing transfer into the articulator using the true horizontal axis data contained in the image. In the facial scan group, facial scans will be captured using a facial scanning application in both resting and smiling positions. The resting scan will be aligned with the smiling scan, and the combined facial scan will then be superimposed with the maxillary scan to perform the transfer using the horizontal axis information derived from the scan. Accuracy will be assessed through linear measurements between the buccal cusps of the maxillary scan and the horizontal reference plane, as well as between the maxillary midline and articulator midline. Measurements from the analog facebow records will serve as the control for calculating accuracy. Conclusion: The facebow record technique significantly influences maxillary cast transfer accuracy, thereby impacting subsequent prosthodontic treatment outcomes.

OP28. SMART BIOMATERIALS IN DENTISTRY FROM CONCEPT TO CLINICAL REALITY

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ABSTRACT

Introduction: Smart materials have brought a new dimension to restorative dentistry and endodontics by introducing substances that can actively respond to changes in their environment. These materials are designed to mimic natural tooth behavior through properties like self-repair, ion release, antibacterial activity, and promotion of remineralization. Such advancements have improved both the functional and biological performance of dental treatments. Aim: This paper aims to explore how smart materials have influenced restorative and endodontic dentistry, focusing on their evolution from laboratory innovation to practical clinical use and their impact on treatment success and patient outcomes. Methods: A detailed review of various articles were analyzed, emphasizing the key features and application of smart composites, bioactive glasses, resin-modified materials, calcium silicate-based cements, and shape-memory alloys. The findings were summarized to assess advancements, working mechanisms, and clinical benefits. Conclusion: Smart materials have significantly advanced modern dentistry by making treatments more biologically responsive and durable. Their ability to enhance tissue healing, reduce bacterial contamination, and extend restoration longevity marks a major step toward minimally invasive, patient-centered care. Continued research is needed to refine their performance, affordability, and long-term reliability.

Keywords: Smart materials, restorative dentistry, endodontics, bioactive materials, self-healing composites, biomimetic dentistry.

OP29. ORAL HEALTH AWARENESS AND DYSBIOSIS RISK IN AUTOIMUNE VASCULITIS PATIENTS

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ABSTRACT

Autoimmune Vasculitis is an inflammatory disorder that affects small and large blood vessels throughout the body, often leading to immune mediated damage to vessel walls. While systemic effects of vasculitis are well-documented, its oral implications remain under explored. This study aims to explore the level of oral health awareness among patients living with vasculitis and to assess their risk for oral dysbiosis. A cross-sectional survey has been conducted to evaluate patients' oral hygiene practices, frequency of dental consultations, and presence of oral symptoms. Results for this study are currently being compiled. This is supported by a literature review linking vasculitis to oral microbiome imbalance. Vasculitis often presents with vague, overlapping symptoms across different organs—making diagnosis a clinical challenge. Oral symptoms serve as one of the earliest indicators of underlying disease activity. Recent studies report that 6–13% of patients with Granulomatosis with Polyangiitis (GPA) develop noticeable oral lesions. These can appear as strawberry gingivitis, mouth ulcers, gum inflammation, and slow healing of oral tissues. Recognising these subtle signs and keeping vasculitis as a differential diagnosis in such cases could allow for earlier detection and intervention—changes that may truly save lives. By addressing these awareness gaps, this study aims to highlight the need for including oral care as a regular part of vasculitis management to improve overall quality of life.

OP30. SAVING SMILES WITH PRECISION: THE MINIMAL INVASIVE DENTISTRY APPROACH"

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ABSTRACT

BACKGROUND-Minimally Invasive Dentistry (MID) represents shift from traditional "extension for prevention" approaches towards patient driven more conservative and biological approach. It focuses on prevention, early detection, and conservative management of carious lesions while maintaining the maximum amount of sound tooth structure. AIM- To study the advantages of minimum invasive dentistry over conventional

restorative procedures. METHODS- MID techniques includes resin infiltration, air abrasion, chemo-mechanical caries removal, micro abrasion, and biomimetic restoration. The use of modern adhesive materials, CAD/CAM fabrication, and laser-assisted interventions are also being evaluated for clinical efficacy and patient friendly outcomes. RESULTS- MID significantly reduces healthy tissue loss, improves restorative integrity, and enhances patient satisfaction. Studies report improved longevity of restorations and decreased need for re-treatment. Advanced MID procedures also contribute to reduced postoperative sensitivity and improved aesthetics . CONCLUSION- Minimally Invasive Dentistry integrates preventive, restorative, and technological advancements to achieve superior long-term clinical outcomes with minimal biological loss. It is patient friendly and has the potential to transform restorative dentistry by improving tooth longevity and patient well-being.

OP31. COMPARISON OF RETENTIVE FORCE OF POLYETHERETHERKETONE (PEEK) AND COBALT - CHROMIUM REMOVABLE PARTIAL DENTURE CLASPS OF VARYING THICKNESS AND UNDERCUT DEPTH

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ABSTRACT

Objective: Comparison of Fatigue Resistance of PEEK and Cobalt - Chromium Removable Partial Denture clasps of Varying Thickness and Undercut Depth. Material and Methods: A systematic search was conducted in 4 databases according to the PRISMA statement criteria. The research question was: “Do (P) RPD clasps of varying thickness and undercut depth made of (I) PEEK and (C) CoCr (O) have similar fatigue resistance at same number of simulated masticatory cycles?” Retentive force values for both materials were extracted and meta-analysis was performed using the standardized mean difference. Heterogeneity was evaluated and the pooled effects were presented using a random-effects model. Results: The electronic search yielded 238 entries, and after screening, 17 studies were retained for qualitative synthesis. The Forest plot comparing the retention forces between Co-Cr and PEEK at 1.5mm clasp thickness and 0.5mm undercut showed an overall pooled effect size of −6.11 (95% CI= -9.40 to -2.81, P= 0.02). At 1mm thickness and 0.25mm undercut, a pooled effect of -9.09 (95% CI= -10.50 to-7.68, P<0.01)) was seen. In both analyses, as the

mean difference is negative the outcome significantly favours the CoCr group. Conclusions: When 0.25mm and 0.50mm undercut is present, the fatigue behaviour of 1.5mm thick CoCr clasp outperforms that of PEEK clasp simulated over 10 years. However, in 0.75mm undercut, PEEK clasps can be manufactured to be bulkier to provide sufficient retentive force. Clinical Significance: Although Cobalt-chromium is superior in terms of fatigue resistance, PEEK Clasps exhibited sufficient retention to recommend usage under clinical conditions.

OP32. PERCEPTION OF SOCIALLY PLEASING DENTAL ESTHETICS IN RELATION TO MAXILLARY ANTERIOR TOOTH PROPORTIONS AND SMILE CHARACTERISTICS AMONG YOUNG POPULATION

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ABSTRACT

Aim: This study aimed to perceive socially pleasing dental esthetics in relation to maxillary anterior tooth proportions and associated smile characteristics among young population. Background: Smile esthetics plays a vital role in determining facial attractiveness and psychosocial perception. Although mathematical ratios such as the golden proportion had been proposed to define ideal dental esthetics, it was anticipated that perceptions of smile attractiveness depend more on the harmony of multiple smile characteristics. Materials and Methods: A cross-sectional study was conducted among 76 participants aged 17–24 years. Standardized frontal facial photographs were captured in a natural head position. Four evaluators rated each subject’s dental esthetics using a Likert scale based on comparisons with standard reference images. Participants were categorized as socially pleasant or socially unpleasant. The golden proportion of the maxillary anterior teeth was digitally measured, and individuals were classified as ideal or deviated. Participants exhibiting deviated golden proportions but rated as socially pleasant were further evaluated for multiple smile characteristics such as the smile line, smile arc, and dental midline coetc. Conclusion: It was observed that a considerable proportion of participants displayed socially pleasing smiles despite deviations from the ideal golden proportion. Smile harmony parameters had a stronger influence on perceived esthetic pleasantness. The study emphasized that balanced smile characteristics, rather than ideal mathematical ratios, provided a more comprehensive approach to esthetic evaluation and treatment planning in prosthodontics.

OP33. EMERGING NANOTECHNOLOGIES IN PROSTHODONTICS: FROM MATERIAL ENHANCEMENT TO CLINICAL TRANSLATION A COMPREHENSIVE REVIEW

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ABSTRACT

BACKGROUND Advancements in nanotechnology have substantially impacted prosthodontic restorative materials by enhancing their mechanical , esthetic, and biological properties. Nanoparticles—commonly silver, titanium dioxide, and zirconia, ranging from 1 to 100 nanometers—are increasingly integrated into traditional dental materials to improve structural integrity and clinical outcomes. Methods This review summarizes recent studies assessing the influence of nanoparticles on the physiomechanical and biological properties of prosthetic materials. Key focus areas include mechanical strength, antimicrobial effectiveness, and biocompatibility, all critical for the clinical success of dental restorations and implants. Results Incorporating nanoparticles yields materials with improved durability, wear resistance, and colour stability. Silver and zinc oxide nanoparticles confer notable antimicrobial properties by reducing oral microbial colonization, while titanium dioxide and zirconia enhance material toughness and surface smoothness. Additionally, nanostructured coatings on dental implants promote superior osseointegration, facilitating faster and more stable healing. Despite these benefits, challenges remain, including uneven nanoparticle dispersion, potential cytotoxicity, and increased production costs, which necessitate further investigation. Conclusion Nanotechnology marks a transformative advancement in the evolution of prosthodontic materials. Continued research is essential to optimize nanoparticle incorporation, ensure biocompatibility, and confirm long-term clinical safety. Integrating these technologies is expected to yield more predictable treatment outcomes, greater patient comfort, and extended longevity of dental prostheses.

OP34. SMART VISION FOR EARLY ORAL CANCER DETECTION USING OPENCV AND PYTHON

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ABSTRACT

Oral cancer remains one of the most life-threatening yet preventable diseases, where early detection can literally save lives. However, in most developing regions, diagnosis is often

delayed due to the lack of awareness, accessibility, and specialized medical infrastructure. This project aims to bridge that gap by developing a cost-effective, AI-driven system capable of detecting early signs of oral cancer through simple photographic images of the mouth. Using OpenCV for real-time image preprocessing such as illumination correction, lesion segmentation, and feature extraction ,combined with deep learning models in Python, the system identifies abnormal tissue patterns that may indicate precancerous or cancerous changes. The goal is to make screening as simple as capturing a selfie, enabling even rural clinics and mobile health units to perform instant, non-invasive preliminary checks. Unlike conventional laboratory-based histopathological analyses, this model emphasizes accessibility, affordability, and speed. The project's innovation lies in its hybrid framework that merges classical computer-vision techniques with neural-network intelligence, offering interpretable results that highlight suspicious regions in the image, empowering both patients and healthcare workers. Ultimately, this work envisions a portable digital screening assistant that could revolutionize oral healthcare by facilitating early intervention, reducing mortality rates, and supporting tele-medicine initiatives. By blending medical insight with modern technology, the project strives to prove that a few lines of intelligent code can become a lifesaving tool.

Abstracts of Poster Presentations

Poster Presentation- Dental Sciences		
PP1	Ms. Aditi Sharma	Saliva as a Diagnostic Tool for Oral and Systemic Diseases
PP2	Dr. Divya Sood	Measuring Success: A Comparative Review of Methods to Assess Dental Implant Stability
PP3	Dr. Garima	Piezoelectric advancements
PP4	Ms. Ishneet	History of dental material
PP5	Dr. Jessica	Recent advances in periodontology
PP6	Ms. Mansi Sharma	The Era of Cosmetic dentistry
PP7	Dr. Muskan	Artificial Intelligence in Oral Pathology: Diagnostic Aid or Disruptor
PP8	Ms. Paridhi	Artificial intelligence in oral and maxillofacial surgery
PP9	Dr. Radhika Tyagi	Advances in genetics and precision medicine integrated with digital health tools to enable risk stratification
PP10	Dr. Shreya Goel	Breaking the Magnetic Myth: Are Dental Implants Truly MRI Safe?
PP11	Ms. Simarjeet Kaur	Veneers
PP12	Manjot Kaur	Digital Smile Design

ABSTRACTS OF POSTER PRESENTATION

PP1. SALIVA AS A DIAGNOSTIC TOOL FOR ORAL AND SYSTEMIC DISEASES

Soloni Gupta[1], Aditi Sharma[1]
[1] *Dr.Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh*

ABSTRACT

Saliva is emerging as a powerful, non-invasive diagnostic tool capable of reflecting the body's physiological state. This poster highlights saliva's potential in early detection and monitoring of both oral and systemic diseases. It explains how key biomarkers like DNA, RNA, proteins, and hormones make saliva comparable to serum for molecular diagnostics. With advancements in proteomics, microfluidics, and biosensors, high-sensitivity, chair-side testing is now possible. Clinically, salivary diagnostics show great promise in identifying cancers, cardiovascular diseases, diabetes, and oral conditions such as caries and periodontal disease. With further standardization, saliva-based testing could soon become a cost-effective and reliable method for personalized and public health screening.

PP2. MEASURING SUCCESS: A COMPARATIVE REVIEW OF METHODS TO ASSESS DENTAL IMPLANT STABILITY

Divya Sood[1]
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ABSTRACT

Assessment of dental implant stability is vital for ensuring successful osseointegration and long-term function. This review summarizes and compares the principal methods used to measure implant stability, emphasizing their mechanisms, advantages, and clinical reliability. A focused literature review of recent publications identified key techniques, including insertion torque measurement (ITV), resonance frequency analysis (RFA), and damping capacity assessment (Periotest). Among these, RFA stands out as the most reproducible and non-invasive method for monitoring both primary and secondary stability. Newer modalities such as vibration-based and imaging-assisted systems demonstrate potential but remain in developmental stages. Overall, integrating mechanical and non-invasive techniques provides a more comprehensive understanding of implant stability and enhances clinical decision-making.

PP3. PIEZOELECTRIC ADVANCEMENTS

Garima bansal[1]
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ABSTRACT

Piezoelectric technology has emerged as a significant advancement in the field of periodontics and implant dentistry due to its precision, safety, and minimally invasive nature. The piezoelectric device operates through ultrasonic microvibrations generated by the deformation of piezoelectric crystals under an electric current, allowing for selective cutting of mineralized tissues while preserving soft tissue integrity. In periodontics, this technology enhances the outcomes of procedures such as crown lengthening, bone grafting, and root surface debridement by minimizing trauma, reducing postoperative discomfort, and promoting faster healing. In implantology, piezosurgery provides superior control during osteotomy preparation, sinus lifting, and ridge splitting, reducing the risk of membrane perforation and overheating compared to conventional rotary instruments. Additionally, the cavitation effect of the ultrasonic vibrations ensures a clear surgical field through continuous irrigation, further improving visibility and precision. Clinical studies have demonstrated improved patient comfort, reduced intraoperative bleeding, and enhanced bone regeneration associated with piezoelectric-assisted procedures. Despite higher initial costs and longer surgical time in some cases, the overall biological and clinical benefits position piezoelectric devices as valuable tools in modern periodontal and implant surgery. Ongoing research continues to refine their efficiency and expand their applications, highlighting their role in achieving predictable and minimally invasive surgical outcomes.

PP4. HISTORY OF DENTAL MATERIAL

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ABSTRACT

The history of dental restorative materials reflects the continuous evolution of dental science, driven by the pursuit of improved function, aesthetics, and biocompatibility. The earliest evidence of dental restorations dates back to ancient civilizations, where materials such as gold, ivory, and seashells were used to replace or repair teeth. During the 18th and 19th centuries, the introduction of dental amalgam marked a significant milestone. Amalgam, an alloy of mercury with silver, tin, and copper, became the most widely used restorative material due to its durability and ease of application. However, concerns about

mercury toxicity later encouraged research into alternative materials. In the mid-20th century, the development of acrylic resins and silicate cements introduced tooth-colored restorative options, improving aesthetics but with limitations in strength and wear resistance. The advent of composite resins in the 1960s revolutionized restorative dentistry by combining esthetics with acceptable mechanical properties through the incorporation of resin matrices and filler particles. Subsequent advancements in adhesive systems and light-curing technology further enhanced bonding strength and clinical longevity. Modern restorative materials now include nanocomposites, glass ionomer cements, and CAD/CAM-based ceramics, emphasizing minimal invasiveness, bioactivity, and long-term stability. Current research focuses on smart materials capable of responding to the oral environment and promoting remineralization. The history of dental restorative materials thus represents a remarkable progression from empirical craftsmanship to evidence-based, technologically advanced solutions aimed at restoring both form and function of the natural dentition.

PP5. RECENT ADVANCES IN PERIODONTOLOGY

Jessica Dang[1]

[1] *Dr harvansh singh judge institute of de*

ABSTRACT

Abstract Periodontology in India has undergone significant transformation in recent years, driven by rapid technological, diagnostic, and therapeutic advancements. This review highlights current updates and explores the future prospects of the specialty within the Indian context. Diagnostic methods have evolved from traditional manual probing to advanced techniques such as pressure-sensitive probes, cone beam computed tomography (CBCT), and emerging non-ionizing modalities like optical coherence tomography (OCT) and ultrasound imaging. Regenerative periodontology has benefited from developments in tissue engineering, including the use of growth factors, stem cells, and bioactive scaffolds. The integration of 3D printing and digital dentistry has further enhanced precision in treatment planning and guided surgery. Nanotechnology offers new possibilities in local drug delivery, implant surface modification, and scaffold fabrication, using materials such as bioactive glass, carbon nanomaterials, and titanium nanotubes. Additionally, artificial intelligence (AI) applications are improving diagnostic accuracy and clinical decision-making. Despite these advancements, challenges remain in India regarding standardization of periodontal disease classification, data management, and accessibility to advanced technologies across diverse regions. Continued research, education, and technology adoption are essential to bridge these gaps and advance the field of periodontology in India.

PP6. THE ERA OF COSMETIC DENTISTRY

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ABSTRACT

In our 21st century, people are more concerned about how they look on social media,photos and posts.Cosmetic dentistry is a branch of dental science that focuses on improving the appearance of a person’s teeth, gums, and overall smile. Cosmetic dentistry aims to enhance dental aesthetics in color, position, shape, size, and alignment. With growing awareness and advances in dental materials and technology, it has become one of the most popular fields in modern dentistry. Certain procedures which come under the umbrella of cosmetic dentistry are : teeth whitening, dental veneers, crowns, orthodontic treatment, and dental implants. Teeth whitening helps remove stains caused by food, beverages, and smoking, giving a brighter smile. Veneers correct irregularities such as chipped, discolored, or misaligned teeth, while crowns and implants restore both function and appearance. Orthodontic treatments, including invisible aligners, help in achieving proper alignment and balance of the smile. Cosmetic dentistry not only improves appearance but also boosts confidence and self-esteem. A beautiful smile can enhance social and professional interactions, making individuals feel more positive about themselves. Cosmetic dentistry procedures also provide functional harmony to teeth in accordance with the appearance like bite correction. Modern advancements such as digital smile design, laser dentistry, and minimally invasive techniques have made cosmetic procedures safer, quicker, and more predictable. Cosmetic dentistry combines art and science to create beautiful, healthy smiles and we will be discussing this in my poster.

PP7. ARTIFICIAL INTELLIGENCE IN ORAL PATHOLOGY: DIAGNOSTIC AID OR DISRUPTOR

Dr. Muskan[1]

[1] *Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, PANJAB UNIVERSITY*

ABSTRACT

INTRODUCTION: Technology can analyze but only a specialist can truly understand the limitations of Artificial Intelligence. Artificial intelligence has the ability of computer systems to perform tasks that require human intelligence such as learning, problem solving and decision making. It speeds up the diagnostic methods for oral cancer to analyze images and detect microfeatures that are beyond Human vision. However with some advantages Artificial Intelligence has limitations in diagnosis of Oral lesions in

Pathology . AIM: To critically evaluate the disadvantages and limitations of Artificial Intelligence in Oral Pathology and its challenges related to accuracy, data privacy , ethical concerns and misdiagnosis. OBJECTIVE: Artificial Intelligence aids in the diagnosis of Odontogenic Tumors , Leukoplakia , Oral cancer with cervical lymph node metastasis . It highlights some of the disadvantages like data dependency on quality and quantity of data, misdiagnosis, reduced patient and pathologist interaction. Artificial Intelligence also misinterprets some complex and rare lesions. It also has ethical concerns as it raises consent and privacy issues of the patient. It has high implementation cost of databases and the software. CONCLUSION: Artificial Intelligence can only assist and cannot replace the oral pathologists. An Oral Pathologist plays a crucial role in proper diagnosis and clinical judgement of a lesion. Technology can only analyze the data being given to it but only an Oral Pathologist can truly understand and interpret the data and form a proper diagnosis based on his/her knowledge and experience.

PP8. ARTIFICIAL INTELLIGENCE IN ORAL AND MAXILLOFACIAL SURGERY

Paridhi[1]

[1] *UIDS,PU*

ABSTRACT

Artificial intelligence (AI) has emerged as a versatile health-technology tool revolutionizing medical services through the implementation of predictive, preventative, individualized, and participatory approaches. It has emerged as a transformative force across various fields of medicine, including dentistry and oral surgery . AI systems can analyze complex medical imaging data [such as CT scans and 3Dmodels] to aid in preoperative assessments, virtual surgical simulations, and the creation of personalized treatment plans. Furthermore, AI can assist surgeons in intraoperative decision-making by providing real-time guidance and feedback, enhancing surgical accuracy, and reducing complications. The application of Artificial Intelligence (AI) in oral and maxillofacial surgery has expanded significantly in the past decade, driven by advances in computational power, imaging technology, and access to large clinical datasets.AI has countless potential applications in OMFS. Despite these advancements, several challenges remain. Ethical considerations as well as data privacy concerns are two of the foremost issues when it comes to integrating AI into OMFS. While different AI strategies have already been implemented into the clinical management of OMFS and future studies are underway, it is pivotal to expand the interlinking between OMFS and AI technology . In conclusion, while AI is not a replacement for clinical expertise, it serves as a powerful adjunct that holds the potential to significantly elevate the standards of oral surgical care. Continued research and innovation in this field will be critical in shaping the future of precision surgery and digital dentistry.

PP9. ADVANCES IN GENETICS AND PRECISION MEDICINE INTEGRATED WITH DIGITAL HEALTH TOOLS TO ENABLE RISK STRATIFICATION

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ABSTRACT

Aim: To synthesize current evidence on how genetic susceptibility, host-response biomarkers, and multi-omics data integrate with digital health tools to enable risk stratification, individualized prevention, and targeted therapy in periodontitis, with attention to health equity. Methods: A narrative synthesis of recent open-access reviews and primary studies (2020–2025) was conducted, focusing on genetic determinants, salivary and gingival crevicular fluid biomarkers, multi-omics integration, and the translational potential of AI-assisted diagnostics and teledentistry in periodontal practice. Results: Genetic and omics data identify individuals at elevated risk and reveal molecular pathways governing inflammation, tissue destruction, and healing. Biomarker panels comprising cytokines (e.g., IL-1β, TNF-α), matrix metalloproteinases, and other host-response readouts, when combined with microbiome profiles, enhance risk prediction and enable personalized preventive regimens. Digital health tools—AI analytics, remote monitoring, and teledentistry—facilitate real-time decision support and broaden access to high-quality care. Collectively, these advances support equitable delivery of precision periodontal care, addressing disparities in access and outcomes across diverse populations. Conclusions: The integration of genetics, biomarker-driven diagnostics, and regenerative technologies holds promise for transforming periodontal care toward precision, accessible, and equitable outcomes. Realizing this potential requires rigorous validation of biomarkers, standardized reporting, and carefu

PP10. BREAKING THE MAGNETIC MYTH: ARE DENTAL IMPLANTS TRULY MRI SAFE?

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ABSTRACT

Magnetic Resonance Imaging (MRI) is a widely used diagnostic modality known for its superior soft-tissue contrast and absence of ionizing radiation. However, the presence of metallic dental implants has long been perceived as a potential contraindication due to concerns about magnetic interactions, heating, and image distortion. With the advent of modern biomaterials such as titanium and zirconia, most contemporary implants are non-ferromagnetic and categorized as MRI safe or MRI conditional. This review aims to explore current evidence regarding the safety and compatibility of dental implants in MRI environments. It discusses the physical principles underlying magnetic artifacts, evaluates the extent of artifact generation with different implant materials, and highlights recent advances in artifact reduction sequences such as SEMAC and MAVRIC. The review also emphasizes clinical considerations, including patient safety, diagnostic limitations in the head and neck region, and guidelines for radiologists and dental practitioners. Current literature supports that dental implants are not absolute contraindications for MRI, though awareness of artifact management remains essential for accurate image interpretation.

PP11. VENEERS

Nallaswamy[1], Manappallil[2], Girish rao[3], Ramandeep singh[4], Simarjeet kaur[5]

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ABSTRACT

Veneers are conservative restorations placed on the labial surface of anterior teeth to improve esthetics and correct minor deformities. They are mainly used for discolored, malformed, fractured, or slightly malaligned teeth. Veneers preserve maximum tooth structure while achieving superior esthetics compared to full coverage restorations. Veneers are of two main types – porcelain (ceramic) veneers and composite resin veneers. Porcelain veneers offer excellent translucency, color stability, and resistance to discoloration, while composite veneers are more economical and easier to repair. The clinical procedure involves case selection, shade selection, tooth preparation (usually 0.3–0.7 mm enamel reduction), impression, fabrication, and cementation. The tooth surface is etched with 37% phosphoric acid, bonding agent applied, and the veneer luted using resin cement and light-cured for retention. The emphasizes that proper marginal adaptation and bonding are crucial for success.Note that veneers provide superior esthetics, biocompatibility, and conservation of enamel. However, they are technique-sensitive, irreversible, and unsuitable in cases with poor oral hygiene, extensive restorations, or insufficient enamel. With proper maintenance and oral hygiene, veneers generally last 10-15 years

PP12. DIGITAL SMILE DESIGN

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ABSTRACT

Smile design is the process of aesthetically arranging teeth and gums to create a beautiful, natural-looking smile that complements a person's face and personality. It involves evaluating factors like tooth color, shape and position as well as lip and gum appearance, often utilizing modern digital tools like 3D scanning and virtual mockups. The goal is not only to improve appearance but also to boost the patient's confidence and satisfaction The role of digital technology Digital Smile Design (DSD): A conceptual tool that uses software to plan and visualize treatments before execution. 3D intraoral scanning: Digital scans are used to create a 3D model of the teeth for accurate planning. Virtual mockups: These allow patients to see a digital preview of their new smile before any treatment begins.So this paper brings to you various methods and techniques with which we can design patients smile digitally

EARTH AND ENVIRONMENTAL SCIENCES

- **Geology**
- **Geography**
- **Environment Studies**

Sectional President
Dr Rajeev Kumar

Sectional Secretary
Dr Mahesh Thakur
Dr Vishwa Bandhu

Abstracts of Oral Presentations

Oral Presentation- Earth and Environmental Sciences		
OP1	Dr. Surbhi Goel	The expanded visual logic of environmental computation
OP2	Ms. Dhriti Bragta	Eco-friendly biosynthesis of ZnO nanoparticles using fungus *Schizophyllum commune* and their hybrid with chitosan for enhanced UV-A photocatalytic degradation of tetracycline
OP3	Mr. Raj Kiran Dhiman	Multi-Sensor Monitoring and Predictive Modelling of Rockfall Hazard in Manikaran, Himachal Pradesh, India
OP4	Ms. Shreya Gupta	Quantifying Titanium Enrichment in the Lateritic-Bauxites of Sung Valley Ultramafic-Alkaline-Carbonatite Complex, Meghalaya, India: A Geochemical and Mineralogical Approach
OP5	Mr. Akshay Raj Manocha	Spline-Based Landslide Monitoring using UAV DEMs: Case Studies from the Northwestern Himalaya, India
OP6	Ms. Kapila Negi	First Report of Fossil Wood from the Lower Siwalik Formation near Tipra Village (Himachal–Haryana Border): Implications for Fluvial Deposition and Miocene Paleoenvironment
OP7	Ms. Sandhya	Synergistic effects of agricultural residue burning and firecracker emissions on aerosol characteristics and PM2.5 linked health risks in Delhi

ABSTRACTS OF ORAL PRESENTATIONS

OP1. THE EXPANDED VISUAL LOGIC OF ENVIRONMENTAL COMPUTATION

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ABSTRACT

Multitudes of experiments in camera technology are enabling new ways of data collection and redrawing methods of mapping and computation. Whether it is the high definition cineflex camera mounted on helicopters as a recording device, or mounted cameras on a drone, or even the desktop technologies (3D data visualisations, Google Earth flythroughs, and cinematic flight paths, to orbital sensing systems), all of these are 21st century technologies of perception which are shaping our imagination of planetary life. Through this interconnection between technology and visual paradigm, the Earth is more scalable and navigable and camera technologies are making the computation of visual data accessible, while aiding a more solution oriented visual logic. This can be further deduced by undertaking case studies of experimental documentation in three documentary filmmaking styles, 1.Home (2009), 2.Qatsi trilogy (1982-2002) and 3. Werner Herzog's camera techniques in his documentaries, especially under-water footage in Antarctica in Encounters at the end of the world (2007) and cameras fitted to the helium Zeppelin to explore the rain forest next to the giant Kaieteur Falls in the heart of Guyana in The White Diamond (2004). This enhanced and expanded visual logic is a stark departure from cartographic methods while an expansion of the 'geographic eye' are enabled by newer technologies of visuality to support and act as chassis for a socio-visual reordering. This paper explores the vital link and results, thereof, of camera technologies, perceptions and sociality.

OP2. ECO-FRIENDLY BIOSYNTHESIS OF ZNO NANOPARTICLES USING FUNGUS *SCHIZOPHYLLUM COMMUNE* AND THEIR HYBRID WITH CHITOSAN FOR ENHANCED UV-A PHOTOCATALYTIC DEGRADATION OF TETRACYCLINE

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ABSTRACT

The study introduces a sustainable and eco-friendly approach to the first-time biosynthesis of zinc oxide (ZnO) nanoparticles using *Schizophyllum commune* (*S. commune*), a wood-rotting fungus that is well known for its superior lignocellulose biodegradation ability. The unique enzymatic machinery and metabolites produced during the lignocellulose breakdown not only

provide a natural reducing and stabilizing environment but also facilitate the controlled synthesis of ZnO nanoparticles without the need for hazardous chemicals, high-energy input, or complex reaction conditions. The biosynthesized ZnO nanoparticles were chitosan hybridized (SC@ZnO/Cs) to analyze their photocatalytic activity in degrading the antibiotic tetracycline (TC). Thorough characterization demonstrated the outstanding structural stability, morphology, and photocatalytic activity of the SC@ZnO/Cs nanocomposite, which degraded 95 % TC under UV-A irradiation in 30 min, and thus offered a green route for the treatment of antibiotic-contaminated wastewater. Addition of chitosan, a biodegradable and biocompatible polymer, not only enhanced the stability and reusability of the nanocomposite but also promoted the environmental friendliness. This green strategy not only complies with the tenets of environmental sustainability but also opens doors to the large-scale, economically viable mass production of metal oxide nanoparticles for a broad range of applications in environmental remediation.

OP3. MULTI-SENSOR MONITORING AND PREDICTIVE MODELLING OF ROCKFALL HAZARD IN MANIKARAN, HIMACHAL PRADESH, INDIA

Raj Kiran Dhiman[1], Mahesh Thakur[1], Sukhvir Singh[2], Naveen Aggarwal[3], Mohd Zaid Habib[2]

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ABSTRACT

This study presents India's first fully integrated Rockfall Early Warning System (REWS), designed and implemented for the active rockfall-prone slope of Manikaran, Himachal Pradesh. The system employs a network of ground-based sensors—including tilt meters, crack meters, piezometers, and a rain gauge—linked to a remote server at Panjab University for real-time monitoring and data visualization. Detailed geomorphological and structural mapping identified potentially unstable rock masses, namely the Left Rock Mass (LRM), Right Rock Mass (RRM), and several critical blocks. Continuous sensor data revealed seasonal cyclic behaviour of fractures (winter opening and monsoon closure) governed by freeze–thaw and thermal expansion processes, while tilt meter readings documented both cyclic and permanent displacements, indicating ongoing deformation. The monitoring of Blocks A and D confirmed their metastable conditions and the influence of root pressure and hydrological loading on block stability. Correlation between displacement, rainfall, and temperature validated that environmental drivers directly influence slope deformation. The REWS integrates these multi-sensor datasets through a Python-based tool enabling real-time anomaly detection, data merging, visualization, and SMS-based alerts using the Prospective Forecasting of Time to Failure (*PFTF*) model. Operational since November 2023, the REWS provides a significant advancement toward predictive rockfall hazard assessment and dynamic risk management in Himalayan terrain. Continued monitoring will enhance understanding of climate–slope interactions and improve the reliability of future rockfall forecasts.

OP4. QUANTIFYING TITANIUM ENRICHMENT IN THE LATERITIC-BAUXITES OF SUNG VALLEY ULTRAMAFIC-ALKALINE-CARBONATITE COMPLEX, MEGHALAYA, INDIA: A GEOCHEMICAL AND MINERALOGICAL APPROACH

Shreya Gupta[1], Dr. Debabrata Das[1], Prakash Tiwari[1]
[1] *Panjab University, Chandigarh*

ABSTRACT

Minerals classified as critical are those strategically vital for accelerating economic prosperity and guaranteeing national security. This urgency is compounded by the global energy transition, requiring vast quantities of specialized materials for advanced technologies and the ambitious push toward 'Net Zero' emissions. Recognizing this vulnerability, the Indian government established the National Critical Mineral Mission (NCMM) to champion the exploration, quantification, and sustainable exploitation of crucial domestic mineral reserves, thereby strengthening the nation's supply chain independence. Titanium (Ti) is a key focus, being prominently listed among the 30 critical minerals identified by the Expert Committee. Its unparalleled propertie, specifically its exceptional strength-to-weight ratio, durability, and corrosion resistance; make it indispensable across strategic sectors, including defense, aerospace manufacturing, specialized medical implants, and cutting-edge green energy components. The present geological study investigates the lateritic-bauxite deposits that have developed over the ultramafic rocks of the Sung Valley Ultramafic-Alkaline-Carbonatite Complex in alignment with NCMM resource mapping objectives. To precisely characterize this resource, spatially distributed random samples were collected and subjected to high-resolution analysis. Precise elemental concentrations of Titanium and associated trace elements are determined using Inductively Coupled Plasma Mass Spectrometry (ICP-MS), while X-ray Diffraction (XRD) is employed to specify the mineralogical controls. This comprehensive approach aims to decipher the specific geological degree and mechanisms responsible for Ti enrichment in the lateritic profile.

OP5. SPLINE-BASED LANDSLIDE MONITORING USING UAV DEMS: CASE STUDIES FROM THE NORTHWESTERN HIMALAYA, INDIA

Akshay Raj Manocha[1], Neeraj Kumar[2], Lukasz Pawlik[1], Mahesh Thakur[2]
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ABSTRACT

Landslides pose a serious risk to infrastructure, ecosystems, and human settlements in mountainous regions, making accurate volume estimation critical for hazard assessment, mitigation planning, sediment transport analysis, and long-term landscape stability. This study introduces an integrated approach that combines high-resolution mapping using unmanned aerial vehicles (UAVs) with spline-based computational modeling to improve landslide monitoring and volume estimation. Focusing on two active landslides in Himachal Pradesh, India that is Kotropi Landslide and Prashar Lake Landslide, the research employs UAV-derived Digital Elevation Models (DEMs) to create detailed 3D terrain models for analyzing failure depth surfaces. A novel MATLAB-based spline interpolation technique was applied to estimate the depth and extent of these failure surfaces, enabling precise volume calculations of rock mass that may destabilize or move during a landslide. Results of this study reveals substantial discrepancies between UAV-based estimates and traditional satellite DEM methods estimates of failure surface depth, with UAV-derived volumes consistently lower, primarily because UAVs capture sub-meter topographic variability, reducing errors caused by coarse resolution and interpolation artefacts in satellite data. Confidence in UAV-spline results is reinforced by field-validated dip angles integrated into spline models, centimeter-scale UAV DEM precision that resolves complex failure surfaces, and iterative cross-validation of spline curves against terrain geometry. Overall, the study demonstrates that UAV-integrated computational modelling offers a scalable and adaptable solution for landslide risk assessment, particularly in data-scarce regions where inaccurate estimates can lead to costly misallocation of mitigation resources.

OP6. FIRST REPORT OF FOSSIL WOOD FROM THE LOWER SIWALIK FORMATION NEAR TIPRA VILLAGE (HIMACHAL–HARYANA BORDER): IMPLICATIONS FOR FLUVIAL DEPOSITION AND MIOCENE PALEOENVIRONMENT

Kapila Negi[1]

[1] *Department of geology , Panjab University*

ABSTRACT

This study presents the first report of fossilized wood remains from the Lower Siwalik Formation near Tipra village, located along the Himachal–Haryana border. The discovery was made during a field expedition organized by the Tethys Fossil Museum to commemorate the 75th anniversary of the Paleontological Society of India. The fossiliferous horizon comprises yellow sandstones interbedded with grey and maroon mudstones, characteristic of a fluvially dominated foreland basin setting during the Middle Miocene. The site hosts 8–10 well-preserved silicified wood logs, some exceeding one meter in length. Their random orientation, varying dimensions, and associated sedimentary structures suggest deposition by high-energy flood events within a meandering river system, followed by rapid burial and silicification. Comparative analysis with fossil wood occurrences from the Lower Siwalik strata in Jammu, Dehradun, and Surai Khola (Nepal) indicates the presence of widespread humid subtropical forests and dynamic riverine landscapes across the Himalayan foreland prior to significant orogenic uplift. The Tipra assemblage provides new insights into regional stratigraphic correlations, vegetation dynamics, and sedimentological processes during the

Miocene. Samples have been sent to Lucknow, for taxonomic identification. This report contributes significantly to our understanding of Siwalik paleoecology, taphonomy, and the evolution of Himalayan foreland fluvial systems.

OP7. SYNERGISTIC EFFECTS OF AGRICULTURAL RESIDUE BURNING AND FIRECRACKER EMISSIONS ON AEROSOL CHARACTERISTICS AND PM2.5 LINKED HEALTH RISKS IN DELHI

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ABSTRACT

The study finds the combined impact of stubble burning and fireworks associated with Diwali on aerosol properties including particulate matter concentrations in Delhi in October 2022. Instruments including MICROTOPS-II Sunphotometer, micro aethlometer, and ARA N-FRM Sampler were used for monitoring of AOD, black carbon, and PM2.5 respectively. Satellite data from MODIS and Aura OMI were used to supplement ground observations. The Sunphotometer AOD and satellite AOD were higher on post-Diwali days than on pre-Diwali days. The SEM images showed fluffy chain-like soot particles, spherical carbonaceous particles, spherical chain soot particles, and spherical soot agglomerates along with mineral dust particles. The SEM-EDX analysis indicates the increased concentration of elements like Al, K, Sr, Cu, and Ca during Diwali, primarily attributed to firecracker emissions. The health risk assessments using AirQ+ software linked short-term PM2.5 exposure to increased mortality (all natural causes) and hospital admissions for cardiovascular diseases (including strokes) and respiratory diseases. The PM10 exposure correlated with the exacerbated incidence of asthma symptoms in asthmatic children with the estimated attributable proportion of 50.4% and 42.26% (at X0=45 µg/m3 and X0=100 µg/m3, respectively). This emphasized the crucial need for management strategies for air quality to reduce the health risks associated with the simultaneous occurrence of stubble burning and fireworks.

Abstracts of Poster Presentations

Poster Presentation- Earth and Environmental Sciences		
PP1	Dr. Mahesh Thakur	Geological and Geotechnical Investigation of Sai Landslide, Himachal Pradesh, India
PP2	Mr. Rajat Kumar	Bibliometric analysis on cooking energy consumption patterns in Himachal Pradesh
PP3	Ms. Tundup Dolma	Extremophilic Fungi from Sediments of Ladakh's Hypersaline Lake: Insights from Multilocus and Enzymatic Analyses
PP4	Ms. Vedika	Enzyme-inhibition assisted colorimetric strategy for ultrasensitive detection of organophosphate pesticides
PP5	Ms. Ambika Kumari	Green Synthesis & Characterization of Silver NPs Using Grevillea robusta (Silver Oak) Flower Extract: A Study Proposal
PP6	Ms. Arshdeep Kaur Sahi	Characterization of Microplastics collected from soil in Chandigarh as Carriers of Organic Pollutants Using FE-SEM, EDX, FTIR, UV-Vis, and XRD
PP7	Ms. Khushi Arya Singh	Paleoecological significance of Psammichnites in Lower Cambrian of Zanskar Himalaya

ABSTRACTS OF POSTER PRESENTATIONS

PP1. GEOLOGICAL AND GEOTECHNICAL INVESTIGATION OF SAI LANDSLIDE, HIMACHAL PRADESH, INDIA

Dr. Mahesh Thakur[1], Shefali Thakur[1], Jugraj Singh[1], RajKiran Dhiman[1]
[1] *Department of Geology, Panjab University*

ABSTRACT

The Sai *Landslide*, which occurred during the June 2023 monsoon in Solan District, Himachal Pradesh, exemplifies a structurally and lithologically controlled, rain-induced slope failure in the Sub-Himalayan region. The affected slope, with a gentle 25° dip, consists of Lower Siwalik Sandstone dipping 35° northeast, parallel to the slope, promoting dip-slope planar failure. This configuration significantly weakened the slope under intense monsoonal saturation. The landslide lies between two major tectonic features—the Barsar Thrust to the north and the Nalagarh Thrust to the south—and is aligned strike-parallel to two NE-oriented faults of the Nalagarh lobe. A NW–SE strand of the Barsar Thrust intersects the landslide crown, reflecting strong structural control. On the right wall, a three-meter-wide shear zone of highly fractured rock was observed, underlain by a 0.5-meter-thick porous mudstone layer that facilitated water infiltration. Additionally, normal faulting with crushed fabrics was identified within the fault zone. Structural mapping revealed four joint sets forming vertically open wedges, enhancing water ingress into the mudstone and further destabilizing the slope. The combined influence of lithological variation, structural discontinuities, intense rainfall, groundwater movement, and anthropogenic interference triggered this failure. The event highlights the growing frequency of monsoon-induced landslides in the Himalaya, likely intensified by climate change. The occurrence of such failures on gentle slopes of around 25° raises significant concerns for slope stability in the region. Numerical modelling is essential to assess the roles of pore pressure, permeability, and lithology in predicting future instability sites.

PP2. BIBLIOMETRIC ANALYSIS ON COOKING ENERGY CONSUMPTION PATTERNS IN HIMACHAL PRADESH

Rajat Kumar[1], Raashi Gupta[2]
[1] *Department of Environment Studies, Panjab University, Chandigarh,* [2] *Department of Botany, Panjab University, Chandigarh*

ABSTRACT

Approximately 2.4 billion people globally and 500 million in India lack access to clean cooking solutions, contributing significantly to household air pollution (HAP) and climate change. Despite Ministry of Petroleum and Natural Gas claims of 99.8% LPG coverage

(PPAC, 2023), the National Family Health Survey (NFHS-5, 2019-21) indicates 41% biomass dependence, with over 50% of beneficiary households failing to refill LPG cylinders. Household solid-fuel combustion contributes 20–50% of ambient air pollutants (Rao et al., 2021). This represents a critical environmental and public health challenge. This study reviews the current status of energy consumption in Himachal Pradesh. This is a systematic review which involves a comprehensive study of related literature available on the different databases like Scopus, Web of Science, and Google Scholar. It further involves critical examination of policy documents, related initiatives and other regional data inventories. The research specially focuses on assessment of household dynamics-cooking energy choice correlations; seasonal and altitudinal energy consumption pattern analysis; regional kitchen infrastructure evaluation; and health exposure quantification through air quality sensors. Expected outcomes include regional energy consumption patterns, evidence-based policy recommendations addressing LPG distribution inadequacies, quantified exposure databases, and sustainable energy transition pathways for mountainous rural geographies.

Keywords: Energy Consumption, Household Air Pollution, Biomass Combustion, Air Quality

PP3. EXTREMOPHILIC FUNGI FROM SEDIMENTS OF LADAKH'S HYPERSALINE LAKE: INSIGHTS FROM MULTILOCUS AND ENZYMATIC ANALYSES

Tundup Dolma[1], Archana Chauhan[2], Rajeev Kumar[3]

[1] Department of Environment Studies, [2] Department of Zoology, [3] Department of Environment studies

ABSTRACT

Six fungal strains were isolated from the sediments of two high-altitude hypersaline lakes i.e. Pangong and Tsokar of Ladakh, India. They were characterized using morphological and molecular biomarkers namely Internal Transcribed Spacer (ITS), β-tubulin (BenA), and calmodulin (CaM) regions and investigated for extracellular enzymatic activity viz cellulase, amylase and protease under varying temperature (20–50°C) and pH (6–10) conditions. The fungal isolates were identified as Aspergillus terreus, *Aspergillus niger* and *Penicillium chrysogenum.* The highest enzyme activities were observed at 30°C and pH 7, with *P. chrysogenum* showing the greatest cellulase (5.83 ± 0.02 U/ml), amylase (2.71 ± 0.01 U/ml), and protease (0.51 ± 0.001 U/ml) activities, surpassing those of A. terreus strains (4.03 ± 0.01 U/ml; 3.20 ± 0.02 U/ml). Even under stress conditions, *P. chrysogenum* maintains superior enzymatic stability, underscoring its physiological adaptability. This study underscores the ecological resilience of halotolerant fungi from Trans-Himalayan hypersaline ecosystems and their potential as robust sources of extremozymes for industrial applications in harsh conditions.

PP4. ENZYME-INHIBITION ASSISTED COLORIMETRIC STRATEGY FOR ULTRASENSITIVE DETECTION OF ORGANOPHOSPHATE PESTICIDES

Vedika[1], Rajni Bala[1], Vijayender Bhalla[1]
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ABSTRACT

The extensive reliance on pesticides has led to increasing ecological disruption, environmental accumulation and human health risks, emphasising the demand for efficient monitoring methods. Addressing these challenges calls for analytical tools that are not only sensitive but also simple, rapid, cost-effective and field-deployable. In this work, we introduce a colorimetric sensing approach based on the enzyme–nanoparticle interaction dynamics to achieve selective and ultrasensitive detection of organophosphate pesticides (OPs). To achieve this, a coupling of an enzymatic inhibitor with a target-specific affinity molecule, a bifunctional nanoprobe was constructed that integrates selective molecular recognition with enzyme regulation within a single platform. In the absence of organophosphates (OPs), the probe effectively inhibits enzyme activity, yielding a pale green coloration. However, when OPs are introduced, their binding to the probe induces steric effects that alleviate enzyme inhibition, triggering a noticeable blue color change visible to the naked eye. This integrated strategy, combining molecular recognition with enzyme-inhibition modulation, greatly enhances the optical signal, allowing for highly sensitive and portable detection of OPs.

PP5. GREEN SYNTHESIS & CHARACTERIZATION OF SILVER NPS USING GREVILLEA ROBUSTA (SILVER OAK) FLOWER EXTRACT: A STUDY PROPOSAL

Ambika Thapta[1], Rajeev Kumar[1]
[1] *Panjab University, Department of Environmental Studies*

ABSTRACT

This proposed study focuses on the green synthesis of silver nanoparticles (AgNPs) using aqueous extracts of Silky Oak (Grevillea robusta) flowers, providing an eco-friendly alternative to conventional chemical and solvent-based methods. Fresh flowers will be shade-dried, powdered, and extracted with hot distilled water at 60–70 °C for 25 minutes to obtain a phytochemically rich extract. The bioactive compounds, including flavonoids,

phenolics, tannins, and saponins, act as natural reducing and stabilizing agents in the reduction of silver ions (Ag^+) to silver nanoparticles (Ag^0). UV–Vis spectroscopy, FTIR analysis, and SEM micrographs will further confirm the identification of these particles. The synthesized AgNPs will also be evaluated for antibacterial activity against both Gram-positive (Bacillus subtilis, Staphylococcus aureus) and Gram-negative (Escherichia coli, Pseudomonas fluorescens) bacterial strains using the disc diffusion method. It is hypothesized that the nanoparticles will show significant inhibitory effects, with larger zones of inhibition for Gram-positive bacteria. The study demonstrates that Silky Oak flower extract serves as a sustainable, cost-effective, and safe bioreductant for nanoparticle synthesis. The findings highlight the potential of Grevillea robusta in the development of green nanomaterials for antimicrobial and biomedical applications.

PP6. CHARACTERIZATION OF MICROPLASTICS COLLECTED FROM SOIL IN CHANDIGARH AS CARRIERS OF ORGANIC POLLUTANTS USING FE-SEM, EDX, FTIR, UV-VIS, AND XRD

Arshdeep Kaur Sahi[1], Bunty Sharma[2], Rajeev Kumar[1], Ganga Ram Chaudhary[3]

[1] *Department of Environment Studies Panjab University*, [2] *Research and Development Molekule Inc*, [3] *Sophisticated Analytical Instrumentation Laboratory*

ABSTRACT

This study examines organic pollutants extracted from microplastics (MPs) collected from soil and evaluates their environmental effects. With the rising global demand for plastics, production, consumption, and degradation have increased, intensifying MP pollution. These microscopic plastics not only threaten ecosystems directly but also act as *vector*s for organic pollutants, absorbing and releasing contaminants such as phthalates, bisphenol-A (BPA), brominated flame retardants, UV stabilizers, polycyclic aromatic hydrocarbons (PAHs), persistent organic pollutants (POPs), and heavy metals. Such pollutants can lead to bioaccumulation, toxicity, and mortality in living organisms.Soil samples were systematically collected using a 4×4 grid sampling method (each quadrant 12 × 12 inches) and subjected to density separation to extract MPs. The isolated MPs were solubilized and concentrated to determine the associated organic pollutants. Field Emission Scanning Electron Microscopy (FE-SEM) and Fourier Transform Infrared Spectroscopy (FTIR) were used to analyze the morphology and types of MPs, while UV–Visible Spectroscopy, FTIR, and X-ray Photoelectron Spectroscopy (XPS) were employed to identify the extracted pollutants.This study aims to improve understanding of how soil-derived microplastics serve as carriers of hazardous organic contaminants, contributing to environmental pollution and posing long-term ecological risks.

PP7. PALEOECOLOGICAL SIGNIFICANCE OF PSAMMICHNITES IN LOWER CAMBRIAN OF ZANSKAR HIMALAYA

Khushi Arya Singh[1], Birendra Pratap Singh[1], O.N. Bhargava[1]
[1] *Department of Geology, Panjab University, Chandigarh*

ABSTRACT

Psammichnites ichnogenus is a characteristic Lower Cambrian trace fossil in Himalaya representing the movement of a soft-bodied bilaterian, probably a mollusc- or annelid-like animal. It typically occurs as bilobate, horizontal trails with a central ridge or furrow, preserved on bedded to massive sandstone of the Kunzam La Formation in Purni and Cha sections in Niri-Tsarap Chu valley of Zanskar region, Northwest Himalaya. The traces are most common in the lower part of the Kunzam La Formation (Cambrian Series 2, Stage 4) and are preserved in rocks indicative of foreshore to upper shoreface environments. They are frequently associated with storm-generated beds, suggesting deposition under well-oxygenated and dynamic shallow-marine conditions. Behaviorally, *Psammichnites* records surface and shallow infaunal locomotion and feeding activity. Spreite and backfill structures indicate a detritus-feeding organism that systematically probed the sediment for organic matter, reflecting increasing substrate utilization during the early Cambrian. The morphology of trails showing turning and looping patterns suggests active foraging behavior and directional control. Ecologically, the preservation of *Psammichnites* traces in Cambrian of the Zanskar region can be interpreted in term of Cambrian agronomic revolution and representing one of the earliest examples of complex bioturbation and expansion of infaunal niches. It is commonly associated with *Planolites*, *Palaeophycus*, *Treptichnus* and forming part of the shallow-marine ichnoassemblage typical of the Cruziana ichnofacies. Globally, this ichnogenus is widely known from North America, Europe, China, and the Indian Himalaya highlights its environmental adaptability and its significance as an indicator of early bilaterian activity and ecological transformation of Cambrian seafloors.

ENGINEERING SCIENCES

- **University Institute of Engineering & Technology (UIET)**
- **University Institute of Chemical Engineering and Technology(UICET)**
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CHASCON 2025

NATIONAL CONFERENCE ON

"Empowering Humanity:

Science, Technology, and Healthcare for All

November 06 - 08, 2025

Section: Engineering

Program

November 07, 2025

Venue: Block 1, University Institute of Engineering and Technology, Panjab University, Sector 25, Chandigarh

Sectional President	**Sectional President**
Prof.(Dr.) Mamta Juneja 9878677624	Prof.(Dr.) Prashant Jindal 9878881230

Time	**Program**	**Venue**
8:30 AM - 9:30 AM	Registration	Registration Desk
9:30 AM - 9:50 AM	PU Anthem/Lamp Lighting	SH
9:50 AM - 10:00 AM	**Welcome Address and about CHASCON by** **Prof. (Dr.) Sukhwinder Singh** Director, UIET, PU	SH
10:00 AM - 10:30 AM	**Speaker Session by Dr. Satish Kumar** Chief Scientist, Centre of Excellence for Intelligent Sensors and Systems (ISENS) Council of Scientific and Industrial Research (CSIR)- Central Scientific Instruments Organization (CSIO), Sector 30-C Chandigarh	SH
10:30 AM - 11:00 AM	**Speaker Session by Prof.(Dr.) Jatinder Kaur Arora** Chairperson, PI-Rahi Former Executive Director Punjab State Council for Science & Technology,Member Secretary, Punjab Biodiversity Board	SH
11:00 AM - 11:05AM	Felicitation	SH
11:05 AM - 11:10 AM	Group Photo	SH
11:10 AM - 11:30 PM	**High Tea**	Block 1
11:30 AM - 1:00 PM	Oral Presentations RESEARCH SCHOLARS - Committee Room PG- AI Data Centre Lab UG - Seminar Hall	Block-1
1:00 PM - 2:00 PM	**Lunch**	Law Auditorium
2:00 PM - 4:00 PM	Oral, Poster Presentations	Block-1
4:00 PM - 4:30 PM	Closing Ceremony	SH
4:30 PM - 5:00 PM	**High Tea**	Block-1

SH - SEMINAR HALL, CH - CONFERENCE HALL

Abstracts of Invited Talks

EDGE COMPUTING FOR NEXT GENERATION SYSTEMS

Dr. Satish Kumar

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ABSTRACT

The global digital world is converging as more and more devices are getting interconnected and all such devices are generating voluminous data. Consequently, there is an increase in traffic to server as enormous amount of data is being transported, causing network congestion, increase in data transmission delay, and reduced network throughput, resulting delayed decisions. Therefore, there is a need to develop edge computing platforms to ensure data privacy regulations, inbuilt intelligence which takes critical decisions locally where the data is generated. The edge computing is a distributed computing paradigm which brings computer data storage closer to the location where it is needed and is having the ability of processing critical data locally, then sending them to a central repository. The key benefits of edge computing are – faster response, reliable operations even with the loss of connectivity, security compliance, easily scalability, interoperability between legacy & modern devices. In view of this, the demand for edge computing is increasing in all industrial, societal and strategic applications. The emerging development are providing innovation solutions for the next generation applications.

SCIENCE TECHNOLOGY AND SUSTAINABILITY: THE PILLARS OF AN EMPOWERED HUMANITY

Dr. Jatinder Kaur Arora

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Former Executive Director,
Punjab State Council for Science & Technology
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ABSTRACT

As India is charting its way towards becoming ViksitBharat@2047, immense opportunities are opening up for many to convert their curiosity into contribution. The ecosystem is very conducive to support translation of ideas into practical possibilities. Both urban and rural India are witnessing the difference being made in day-to-day lives by the innovations which are deeply rooted in understanding of problems at ground and are backed by knowledge led strength of technology. In the key note address, real time examples and opportunities available for promising tech-interventions to achieve their full potential will be discussed.

Further, it will also provide a holistic overview of the newer prospects being opened up by country's Net Zero Vision and the quantifiable as well as non-quantifiable nationaly determined contributions towards climate change for creating a sustainable future.

Abstracts of Oral Presentations

Oral Presentation- Engineering Sciences		
OP1	Professor Amrinder Pal Singh	A Review of Innovations in Respiratory Monitoring: From Traditional Sensors to Intelligent Wearables
OP2	Professor Charu Madhu	Comparative Study of PVDF and PVDF-TrFE Nanocomposites : Role of Conductive Fillers in Enhancing Piezoelectric and Dielectric Properties
OP3	Professor Naresh Kumar	Modeling the burst release phenomenon in biodegradable drug implants: challenges and mitigation strategies
OP4	Professor Nidhi Garg	Survey and Architectural Framework for Hardware Implementation of ARINC 661 Display Protocol on FPGA
OP5	Dr. Parul Gaur	Impact of Submodule Levels on the Dynamic Performance of Modular Multilevel Converters
OP6	Dr. Preeti Gupta	Comparative Evaluation of Emerging Display Technologies for Fighter Aircraft Head-Up Displays
OP7	Professor Preeti Singh	Comparative Study of PVDF and PVDF-TrFE Nanocomposites: Role of Conductive Fillers in Enhancing Piezoelectric and Dielectric Properties
OP8	Dr. Raj Kumari	Generalized Multi-Class Dental Pathology Detection in Panoramic Radiographs Using YOLOv7: A Comparative Evaluation with YOLOv5.
OP9	Dr. Vivek Pahwa	Real-time control of Multi-phase Permanent Magnet Synchronous Machine Drive system with an advanced strategy
OP10	Dr. Abhinav Pratap Singh	HFO_2 Memristors For Neuromorphic Computing: Materials, Switching Mechanisms, and Circuit-Level Modeling
OP11	Mr. Anil Kumar	Sustainable Energy Management System, Inculcating Dynamic Performance Enhancement in Electric Drive System
OP12	Ms. Archita	Explainable Deep Learning Framework for Hand Gesture Classification Using Surface EMG Signals
OP13	Mr. Gurbinder Singh Dhanoa	Comparative Evaluation of Emerging Display Technologies for Fighter Aircraft Head-Up Displays.
OP14	Ms. Gurneet Kaur	Review of Autism Screening Tools in India and an Exploratory Application of Explainable Artificial Intelligence (XAI)
OP15	Ms. Harleen Kaur	Deep Learning-Based Full Skull Reconstruction: An

		Efficient Alternative to Traditional CAD Approaches
OP16	Mr. Himanshu	Selection of Sense Amplifier based on the Size of SRAM Memory
OP17	Mr. Karun Madan	Machine learning based intelligent injury management for players in soccer sports
OP18	Ms. Mehak Singla	A Reconfigurable and Low Power Electrostatically Doped MOSFET Architecture: A Path towards next Generation nanoelectronics
OP19	Ms. Neha Singla	Short-term electricity forecasting using NASA's modern-era retrospective analysis for research and applications (MERRA)
OP20	Mrs. Nisha Sharma	Comparative Study of PVDF and PVDF - TrFE Nanocomposites: Role of Conductive Fillers in Enhancing Piezoelectric and Dielectric Properties
OP21	Mr. Prashant Prakash	Fusion-Based Multimodal Control for High-Reliability Prosthetic Systems
OP22	Mr. Preet Singh	Ensemble Learning Strategies for Accurate MRI-Based Brain Tumor Classification: A Review
OP23	Ms. Priyanka	Furcation Involvement Grading in Deciduous teeth with Explainable Self-Attention Segmentation Approach
OP24	Er. Rajneesh	Survey and Architectural Framework for Hardware Implementation of ARINC 661 Display Protocol on FPGA
OP25	Ms. Shewangi	A Review of Deep Learning Techniques for Enhancing Spectrum Sensing
OP26	Ms. Sumindar Kaur Saini	An Explainable Ensemble Deep Learning Framework for Prostate Cancer Classification from mp-MRI
OP27	Mr. Sunil Kumar	Recent Advances in Cryogenic FinFET Technology
OP28	Ms. Versha Thakur	Advances in Medical Image Segmentation: A Comprehensive Review of Traditional and Modern Techniques
OP29	Mr. Yadevendra Kamal	Structural Modeling and Performance Projection of Gate-All-Around Complementary Field-Effect Transistor (CFET) for Sub-3 nm Technology Nodes
OP30	Ms. Himanshi	Assessment of Cognitive Load in Upright Posture Through Audio-Visual Tasks
OP31	Ms. Ishani Sharma	Generative Adversarial Networks for Robust Person Re-Identification

OP32	Ms. Maya Thapa	Combining Infrared and Visible Features through GAN-Based Image Fusion
OP33	Ms. Saveri Singh	Non-Invasive Fatigue Assessment through Sweat Lactate Analysis during Gait Activity
OP34	Mr. Abhay Thakur	Deepfake Detection: Identifying manipulated images/videos through AI
OP35	Mr. Abhi Chahar	Credit Card fraud detection
OP36	Mr. Abhishek Chauhan	AI Companion for Personal Growth and Daily Productivity
OP37	Ms. Aditi	Deep Learning-Based Breast Cancer Classification and Segmentation Using the MIAS Dataset
OP38	Mr. Akash Biswas	AI-Powered Cancer Detection: An Integrated Portal with Multimodal Analysis and Chatbot Assistance
OP39	Ms. Akriti Sinha	Market Mood: A Real-Time Dashboard for Correlating Stock Market Data with Public News Sentiment
OP40	Er. Aman Dabral	A review of atlas fusion- based computational approaches for neurological disorder prediction
OP41	Ms. Amanpreet Kaur	Healing in Every Language: A Comparative Study of Multilingual NLP Models for Inclusive Healthcare in Rural India
OP42	Mr. Amit Singh	Importance of Image Indexing in Periocular Biometrics
OP43	Mr. Amol Chaudhary	Medical Insurance Cost Prediction: Integrative Machine Learning and Bayesian Feature Selection with Large, Multi-Context Dataset
OP44	Ms. Anjanjot Kaur	Night Time Traffic Monitoring System
OP45	Mr. Anubhav Gautam	Taser Watch: A Wearable Self-Defense Device for Women's Safety
OP46	Er. Arshpreet Kaur	Problem statement
OP47	Ms. Arshpreet Kaur Ghotra	Plant Species Identification Using Artificial Intelligence
OP48	Ms. Avantika Pandey	Real-Time Pronunciation Feedback Web App Using Whisper
OP49	Er. Chailsi Thakur	The 2025 Punjab floods highlighted the lack of a dynamic and coordinated system for managing the Bhakra–Pong reservoir network. Rigid dam operation rules and delayed release decisions worsened flooding, showing the urgent need for a data - driven, real - time flood management framework.

OP50	Mr. Dev Pratap Singh	Multi-layer blockchain security models for IoT: a review and extension
OP51	Mr. Dev Vrat	Paper Review on "Brain Signal Classification"
OP52	Ms. Dhriti Kakkar	AI-Powered Dermatological Disease Prediction System
OP53	Ms. Gayatri Mehta	Talk2Text - a web app designed to aid people with speech disabilities
OP54	Mr. Gourav Kashiv	A Systematic Assessment of Performance in Text-to-Video Generative Models
OP55	Ms. Harkit Kaur Khalsa	AI-based prognostics in power electronic converters
OP56	Ms. Harleen Kaur	Sustainable Synthesis and FTIR Analysis of Cellulose Derived from Wheat Straw
OP57	Ms. Harleen Kaur	Integrating deep learning and LLMS for rapid intracranial hemorrhage diagnosis and patient engagement
OP58	Mr. Harpreet Singh	Financial - AI - Advisor
OP59	Mr. Harshdeep Singh	Financial A.I Advisor
OP60	Mr. Harshit Kumar	Aligneye: Redefining posture using wearables
OP61	Ms. Ira Bhatia	AI for Financial Inclusion: Comparing Machine Learning and Language Models for Credit Assessment in Rural Economies
OP62	Ms. Jagriti	The 2025 PUNJAB floods highlighted the lack of a dynamic and coordinated system for managing the Bhakra–Pong reservoir network. Rigid dam operation rules and delayed release decisions worsened flooding, showing the urgent need for a data-driven, real-time flood management framework.
OP63	Mr. Jashanpreet Singh	Financial AI Advisor
OP64	Er. Jasjit Singh Dhanoa	Automated Skin Disease Classification Using Deep Learning and Dermoscopic Imaging
OP65	Ms. Kanvi	The 2025 Punjab floods highlighted the lack of a dynamic and coordinated system for managing the Bhakra–Pong reservoir network. Rigid dam operation rules and delayed release decisions worsened flooding, showing the urgent need for a data-driven, real-time flood management framework.
OP66	Er. Kashvi Sharma	Speech Pronunciation Gamified web app

OP67	Ms. Komal	The comparative analysis of text-to-image generation models
OP68	Er. Kshitiz Sharma	Advances in Mechanical Vibration Suppression Techniques for Mechanical Systems: A Comprehensive Review
OP69	Ms. Maanya	Organ Connect: An Integrated AI-Powered Platform to Revolutionize the Organ Donation Ecosystem in India
OP70	Mr. Maaz Danish Khan	3D Modelling and Printing of Patient Specific Cranial Implants.
OP71	Ms. Maitri	Automated Brain Tumor Segmentation Using Multiscale Attention EfficientNet-B4 with Iterative Model Pruning
OP72	Mr. Manak Saggu	A novel hybrid ML-DL framework for early detection of liver cirrhosis
OP73	Ms. Manureet Kaur	SVM-based Anemia Detection Using Hematological Features
OP74	Ms. Manya Singla	AI-driven interview preparation platform
OP75	Ms. Mehak Randhawa	Connected Care
OP76	Mr. Navjot Singh	Integrated design of suspension and braking systems for an H-BAJA all-terrain vehicle
OP77	Ms. Niharika	Talk2text
OP78	Mr. Nitin Pandey	Enhancing Transparency in Prostate Cancer Segmentation Using Deep Learning and XAI Techniques
OP79	Ms. Popinder Kour	Detection and Intervention of Autism Spectrum Disorder: An AI driven approach
OP80	Mr. Pratimaan Tripathi	Integrated design of suspension and braking systems for an H-BAJA all-terrain vehicle
OP81	Mr. Prithul Joshi	Design and Development of an Automated Image-Based Vegetable Crop Quality Assessment System
OP82	Mr. Ritik Bhardwaj	A Deep Learning-Based Approach for Early Diagnosis of Alzheimer's Disease Using MRI images
OP83	Mr. Rohit Kumar	Hydrogen Storage Advancement: An Electrochemical Review
OP84	Ms. Roshleen Singla	TB Care Made Simple
OP85	Ms. Samriti	Smart Digital Companion for TB Care

OP86	Ms. Sargun	RFID based tracking and monitoring of children in school buses
OP87	Mr. Snehasish Kundu	AI-Refined, Unbiased Thermal–Clinical Framework for Early, Cost-Effective Leprosy Detection
OP88	Mr. Sudhanshu Angiras	The Role of Artificial Intelligence in Cybersecurity
OP89	Mr. Taranjeet Singh	Performance Analysis of propagation of mm-waves in a Radio over Fiber System in the Presence of Fiber Dispersion and Fiber Nonlinearities
OP90	Mr. Taranjot Singh	AI Assisted Soil Fertility Evaluation and Nutrient Classification Framework
OP91	Anvi Agarwal	Parametric Sensitivity Analysis of Membrane Thickness on Performance of Pem Fuel Cell
OP92	Mr. Vinay Sharma	BHAAV-Net: A Deep Cross-Modal Framework for Emotion Recognition on Indian Datasets
OP93	Er. Harsh Bassal	Computational Modeling of Microwave Heating Process using the COMSOL Multiphysics.
OP94	Mr. Gourav Chahal	Automated Detection of Melasma Skin Disease Using Deep Learning-Based Convolutional Neural Network Models

ABSTRACTS OF ORAL PRESENTATIONS

OP1. A REVIEW OF INNOVATIONS IN RESPIRATORY MONITORING: FROM TRADITIONAL SENSORS TO INTELLIGENT WEARABLES

Mankirat Singh[1], Amrinder Pal Singh[1]
[1] *UIET Panjab university Chandigarh*

ABSTRACT

Respiration monitoring is essential for assessing health and detecting abnormalities in breathing patterns. This review summarizes recent developments in respiration sensors, including contact and non-contact technologies based on piezoelectric, optical and capacitive principles. Advances in flexible materials, wireless systems, and AI-driven analysis have improved accuracy and comfort in wearable applications. Remaining challenges include motion artifacts, calibration, and energy efficiency. Emerging trends point toward integrated, intelligent, and multifunctional respiratory monitoring systems.

OP2. COMPARATIVE STUDY OF PVDF AND PVDF-TRFE NANOCOMPOSITES : ROLE OF CONDUCTIVE FILLERS IN ENHANCING PIEZOELECTRIC AND DIELECTRIC PROPERTIES

Nisha Sharma[1], Preeti Singh[1], Charu Madhu[1]
[1] *University Institute of Engineering and Technology, Panjab University, Chandigarh*

ABSTRACT

Polyvinylidene fluoride (PVDF) and its copolymer poly (vinylidene fluoride trifluoroethylene) (PVDF-TrFE) have attracted extensive attention as active materials for flexible and piezoelectric sensors due to their low density, mechanical flexibility, and strong electromechanical coupling. Each material has electroactive characteristics like piezoelectricity, pyroelectricity, and ferroelectricity. Both materials have been researched for many years in many different applications such as memory, transducers, actuators, and energy harvesting. This study represents a comparative study between PVDF & PVDF-TrFE emphasizing the distinctions in their structural, electrical, and sensing capabilities. PVDF is a homopolymer. It requires mechanical stretching or electrical poling to induce the electroactive β-phase, While PVDF-TrFE naturally has a large β-phase fraction because of its copolymer structure. In comparison to pristine PVDF (~ 20–30 pC/N), the copolymer exhibits a larger dielectric constant, stronger remanent polarization, and superior piezoelectric coefficient (d_{33} = 30–38 pC/N). Thus, PVDF-TrFE is identified as a more efficient material for high-performance and multifunctional sensor applications, whereas PVDF remains advantageous for low-cost, flexible designs. The performance of PENGs is

greatly improved by conductive fillers such metal nanoparticles (Ag, Au), graphene/rGO, MXenes, and carbon nanotubes (CNTs). In PVDF and PVDF-TrFE, they serve as nucleation sites for the β-phase, enhancing piezoelectric activity and dipole alignment.

OP3. MODELING THE BURST RELEASE PHENOMENON IN BIODEGRADABLE DRUG IMPLANTS: CHALLENGES AND MITIGATION STRATEGIES

Rupali Chauhan[1], Naresh Kumar[1]
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ABSTRACT

Biodegradable drug implants have emerged as a transformative approach in controlled drug delivery, enabling site-specific, sustained release of therapeutics without the need for surgical removal. However, the burst release phenomenon characterized by a rapid and uncontrolled drug discharge shortly after implantation remains a critical challenge, often leading to local or systemic toxicity and compromised therapeutic efficacy. This study focuses on modeling and mitigating burst release through an integrated framework of mechanistic mathematical modeling and computational simulations. Deterministic finite difference models and stochastic Monte Carlo simulations were employed to capture both the baseline release dynamics and variability introduced by microstructural differences. The results revealed that burst magnitude is strongly influenced by diffusion coefficients, surface-accessible drug concentration, and polymer porosity. Mitigation strategies, including polymer surface coatings, reduced near-surface drug loading, and delayed hydration core designs, were systematically evaluated. Among these, polymer coatings and core–shell architectures demonstrated the most effective reductions in burst release while maintaining consistent long-term profiles. The findings highlight the importance of in silico modeling for rapid design optimization, bridging experimental limitations, and supporting model informed drug development. Ultimately, this work contributes to safer, more reliable, and patient- optimized implantable therapies.

OP4. SURVEY AND ARCHITECTURAL FRAMEWORK FOR HARDWARE IMPLEMENTATION OF ARINC 661 DISPLAY PROTOCOL ON FPGA

Rajneesh[1], Nidhi Garg[1], Charu Madhu[1]
[1] *ECE Department, University Institute of Engineering and Technology, Chandigarh*

ABSTRACT

Modern avionics systems demand deterministic, low-latency, and certifiable graphical displays compliant with DO-178C and DO-254 standards. The ARINC 661 protocol standardizes communication between the Cockpit Display System (CDS) and User Application (UA), but software-based implementations face latency and certification challenges. This paper proposes an FPGA-based hardware framework featuring a Message Parsing Unit, Widget Manager Bank, and Rendering Engine to achieve real-time, processor-independent operation. The architecture enhances determinism, reduces latency by up to 60%, and simplifies DO-254 verification. The proposed framework establishes a foundation for next-generation; safety-critical avionics display controllers with improved performance and reliability.

Keywords: ARINC 661, FPGA, Avionics Display Systems, Real-Time Rendering, DO-254, Hardware Acceleration

OP5. IMPACT OF SUBMODULE LEVELS ON THE DYNAMIC PERFORMANCE OF MODULAR MULTILEVEL CONVERTERS

Parul Gaur[1]

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ABSTRACT

This paper investigates the impact of submodule levels on the dynamic performance of Modular Multilevel Converters (MMCs) used in high-power and high-voltage applications. The analysis focuses on evaluating key performance parameters such as voltage balancing, harmonic distortion, transient response, and switching losses for varying numbers of submodules. Simulation and theoretical studies reveal that increasing the submodule count significantly enhances output voltage quality and reduces total harmonic distortion (THD), leading to lower filtering requirements. However, higher levels introduce greater control complexity, increased computational effort, and higher system cost. The study provides a detailed comparison of MMC configurations, emphasizing the trade-offs between performance improvement and implementation challenges. The findings contribute to optimizing MMC design for efficient integration in renewable energy systems, motor drives, and high-voltage direct current (HVDC) transmission applications.

Keywords: Modular Multilevel Converter (MMC), Submodule levels, Dynamic performance, Harmonic distortion, Renewable energy systems.

OP6. COMPARATIVE EVALUATION OF EMERGING DISPLAY TECHNOLOGIES FOR FIGHTER AIRCRAFT HEAD-UP DISPLAYS

Gurbinder Singh Dhanoa[1], Nidhi Garg[1], Preeti Gupta[1]

[1] *UIET, Panjab University, Chandigarh*

ABSTRACT

Background: Next-generation fighter aircraft demand highly efficient Head-Up Displays (HUDs) that provide superior visibility, reduced pilot workload, and enhanced situational awareness under diverse operational conditions. Recent advancements in display technologies—such as *OLED*, *Micro-LED*, and laser projection systems—offer promising

improvements in optical performance and energy efficiency. This paper presents a comparative evaluation framework for emerging display technologies intended for fighter aircraft HUD applications. Objective: The evaluation focuses on key performance parameters including brightness, contrast ratio, latency, eye strain, readability, field of view, and power consumption. Method: Quantitative data were obtained through laboratory-based optical testing. Results: The results demonstrate that *OLED* and *Micro-LED* displays outperform conventional LCD systems in terms of contrast, latency, and readability across varying ambient light conditions. *OLED* displays exhibit higher visual comfort but moderate image retention risk, whereas *Micro-LED*s deliver superior brightness with lower power consumption. Conclusion & Future scope: The study concludes that a multi-parameter evaluation framework enables a balanced assessment of display suitability for cockpit integration. Future work will incorporate holographic and waveguide-based sources, along with real-flight testing, to optimize adaptive brightness and ergonomic performance for next generation avionics systems.

Keywords— *Head-Up Display (HUD)*, Fighter Aircraft, *OLED*, *Micro-LED*, *Display Technologies*, Comparative Evaluation, Brightness, Contrast, Latency, Human Factors.

OP7. COMPARATIVE STUDY OF PVDF AND PVDF-TRFE NANOCOMPOSITES: ROLE OF CONDUCTIVE FILLERS IN ENHANCING PIEZOELECTRIC AND DIELECTRIC PROPERTIES

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[1] *University Institute of Engineering and Technology, Panjab University, Chandigarh*

ABSTRACT

Polyvinylidene fluoride (PVDF) and its copolymer poly (vinylidene fluoride trifluoroethylene) (PVDF-TrFE) have attracted extensive attention as active materials for flexible and piezoelectric sensors due to their low density, mechanical flexibility, and strong electromechanical coupling. Each material has electroactive characteristics like piezoelectricity, pyroelectricity, and ferroelectricity. Both materials have been researched for many years in different applications such as memory, transducers, actuators, and energy harvesting. This study represents a comparative study between PVDF & PVDF-TrFE emphasizing the distinctions in their structural, electrical, and sensing capabilities. PVDF is a homopolymer. It requires mechanical stretching or electrical poling to induce the electroactive β-phase, while PVDF-TrFE naturally has a large β-phase fraction because of its copolymer structure. In comparison to pristine PVDF (~ 20–30 pC/N), the copolymer exhibits a larger dielectric constant, stronger remanent polarization, and superior piezoelectric coefficient (d_{33} = 30–38 pC/N). Thus, PVDF-TrFE is identified as a more efficient material for high-performance and multifunctional sensor applications, whereas PVDF remains advantageous for low-cost, flexible designs. The performance of PENGs is greatly improved by conductive fillers such as metal nanoparticles (Ag, Au), graphene/rGO,

MXenes, and carbon nanotubes (CNTs). In PVDF and PVDF-TrFE, they serve as nucleation sites for the β-phase, enhancing piezoelectric activity and dipole alignment.

OP8. GENERALIZED MULTI-CLASS DENTAL PATHOLOGY DETECTION IN PANORAMIC RADIOGRAPHS USING YOLOV7: A COMPARATIVE EVALUATION WITH YOLOV5.

Sonali Kumari[1], Dr.Raj Kumari[1]
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ABSTRACT

The adoption of deep learning in dental imaging has significantly advanced automated diagnostic workflows, offering the potential to reduce manual interpretation errors and enhance clinical decision support. However, most existing studies are confined to single-pathology detection, predominantly focusing on implant evaluation or binary classification, which limits their applicability to broader clinical scenarios. To address this gap, this study proposes a generalized multi-class detection framework based on the YOLOv7 architecture for the automatic identification of four major dental pathologies—Cavity, Fillings, Impacted Tooth, and Implant—in panoramic radiographs. A consistent annotation pipeline was established by converting bounding box coordinates into YOLO-compatible format, ensuring standardized training across models. For comprehensive benchmarking, YOLOv7 was comparatively evaluated against YOLOv5 and the latest YOLOv8 under identical training configurations. Performance was measured using mean Average Precision (mAP), precision, recall, F1-score, and inference latency to assess both detection accuracy and deployment viability in real-time environments. The results demonstrate that YOLOv7 achieves superior performance efficiency, outperforming YOLOv5 and delivering competitive accuracy against YOLOv8 while maintaining lower computational overhead. These findings underline the capability of YOLOv7 to serve as a scalable and reliable solution for AI-assisted dental pathology detection in panoramic radiography. The proposed framework establishes a foundation for future clinical integration and paves the way for robust CAD-based diagnostic support systems in dentistry.

OP9. REAL-TIME CONTROL OF MULTI-PHASE PERMANENT MAGNET SYNCHRONOUS MACHINE DRIVE SYSTEM WITH AN ADVANCED STRATEGY

Dr. Vivek Pahwa[1]
[1] *UIET, Panjab University, Chandigarh*

ABSTRACT

High power-density, exceptional efficiency, and compact design are among the myriad advantages that render permanent magnet synchronous machines (PMSMs) the preferred

choice over conventional machines in a multitude of contemporary industrial control applications. Nonetheless, the intricacies of their control present significant challenges, particularly when dealing with multi-phase windings. Consequently, this study enhances the performance of a multi-phase PMSM drive system through the implementation of an advanced control algorithm, which incorporates a Kalman filter utilizing an average-value modeling approach. A comparative analysis of the proposed controller against traditional controllers in an offline environment underscores its superiority. However, it is noteworthy that the control signals generated in this context lack real-time synchronization. To address this limitation, the model is transformed into its real-time counterpart using the OPAL-RT 4510 simulator, which not only validates the research but also ensures the real-time synchronization of control signals. This implementation significantly facilitates the practical deployment of the proposed controller.

OP10. HFO_2 MEMRISTORS FOR NEUROMORPHIC COMPUTING: MATERIALS, SWITCHING MECHANISMS, AND CIRCUIT-LEVEL MODELING

Dr. Abhinav Pratap Singh[1], Dr. Hemlata Bisht[2], Dr. Prashant Kumar[3], Mr. Yadevendra Kama[1], Mr. Himanshu[1], Mr. Sunil Kumar[1], Mr Sugoy Dhakne[1], Prof. Arvind Kumar[1]

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ABSTRACT

Neuromorphic computing aims to replicate brain-inspired information processing with massive parallelism, adaptive learning, and ultra-low power consumption, where synaptic functionality is implemented directly within memory arrays. HfO_2 memristors, as non volatile resistive switching devices, serve as promising candidates for in-memory computing architectures. By storing synaptic weights as analog conductance states in crossbar arrays, they leverage Ohm's and Kirchhoff's laws to perform high-density multiply–accumulate (MAC) operations, enabling efficient pattern recognition, feature extraction, and machine learning acceleration while mitigating the von Neumann bottleneck. At the device level, resistive switching in HfO_2 memristors originates from the formation and rupture of conductive filaments driven by oxygen vacancy migration, redox reactions, and localized Joule heating. The resulting Hf_6O/HfO_x core–shell filament structure depends on electrode chemistry, stoichiometry, and thermal history, guiding material stack optimization for improved endurance and reduced variability. Oxide thickness engineering further allows tuning of forming voltage, switching threshold, and analog behavior, enabling balanced trade-offs among energy efficiency, precision, and reliability. Accurate device–circuit co design is essential for scalable neuromorphic systems. Physics-based simulations, including TCAD and kinetic Monte Carlo approaches, link defect dynamics and charge transport to I– V hysteresis and transient switching behavior. These models enable compact parameter extraction for array- and circuit-

level simulations, crucial for predicting yield, state drift, and stochastic effects that influence learning accuracy and overall performance in large-scale neuromorphic architectures.

OP11. SUSTAINABLE ENERGY MANAGEMENT SYSTEM, INCULCATING DYNAMIC PERFORMANCE ENHANCEMENT IN ELECTRIC DRIVE SYSTEM

Anil kumar[1], Vivek Pahwa[1], Maninder Kaur[2]
[1] UIET Panjab University Chandigarh, [2] Dr S S Bhatnagar UICET Panjab University Chandigarh

ABSTRACT

Due to escalating environmental concerns and the rapid depletion of fossil fuels, electric vehicles are swiftly gaining traction in contrast to conventional automobiles. However, the intricate association of numerous components with varying characteristics complicates the task of maintaining a constant DC link voltage between the finite generating source namely battery and the three-phase vector-controlled permanent magnet motor (PMSM) drive system. Consequently, this study has successfully achieved the stabilization of DC link voltage by employing a DC-DC boost converter, positioned between the battery and the vector-controlled PMSM drive system during regenerative braking mode within the MATLAB/SIMULINK environment. The sophisticated nonlinear models have been adeptly resolved utilizing an ordinary differential equation solver. The simulated results substantiate the efficacy of the work undertaken.

OP12. EXPLAINABLE DEEP LEARNING FRAMEWORK FOR HAND GESTURE CLASSIFICATION USING SURFACE EMG SIGNALS

Archita[1], Mamta Juneja[1]
[1] UIET Panjab University Chandigarh

ABSTRACT

Electromyography (EMG) signals capture neuromuscular activity and are critical for developing intuitive human–machine interfaces, particularly in prosthetic control systems. This study presents an explainable deep learning framework for accurate hand gesture classification using multi-channel surface EMG data. We collected signals from healthy participants performing distinct static gestures, applied preprocessing with band-pass and notch filtering, and segmented the data into overlapping windows. A convolutional neural network (CNN) was trained to recognize gesture patterns, achieving high classification accuracy across diverse movement classes. To enhance interpretability, we integrated Explainable AI techniques, including Gradient-weighted Class Activation Mapping (Grad-CAM) and SHAP analysis, providing insight into model decision pathways and the relative importance of temporal–spectral features. The proposed architecture not only demonstrates robust performance but also ensures transparency in clinical and assistive technology contexts, fostering trust among users, clinicians, and researchers. This approach can serve as a foundation for real-time prosthetic

control systems that require both precision and interpretability.

OP13. COMPARATIVE EVALUATION OF EMERGING DISPLAY TECHNOLOGIES FOR FIGHTER AIRCRAFT HEAD-UP DISPLAYS.

Gurbinder Singh Dhanoa[1], Nidhi Garg[1], Preeti Gupta[1]
[1] *UIET, Panjab University, Chandigarh*

ABSTRACT

Background: Next-generation fighter aircraft demand highly efficient Head-Up Displays (HUDs) that provide superior visibility, reduced pilot workload, and enhanced situational awareness under diverse operational conditions. Recent advancements in display technologies—such as OLED, Micro-LED, and laser projection systems—offer promising improvements in optical performance and energy efficiency. This paper presents a comparative evaluation framework for emerging display technologies intended for fighter aircraft HUD applications. Objective: The evaluation focuses on key performance parameters including brightness, contrast ratio, latency, eye strain, readability, field of view, and power consumption. Method: Quantitative data were obtained through laboratory-based optical testing. Results: The results demonstrate that OLED and Micro-LED displays outperform conventional LCD systems in terms of contrast, latency, and readability across varying ambient light conditions. OLED displays exhibit higher visual comfort but moderate image retention risk, whereas Micro-LEDs deliver superior brightness with lower power consumption. Conclusion & Future scope: The study concludes that a multi-parameter evaluation framework enables a balanced assessment of display suitability for cockpit integration. Future work will incorporate holographic and waveguide-based sources, along with real-flight testing, to optimize adaptive brightness and ergonomic performance for next-generation avionics systems.
Keywords— Head-Up Display (HUD), Fighter Aircraft, OLED, Micro-LED, Display Technologies, Comparative Evaluation, Brightness, Contrast, Latency, Human Factors.

OP14. REVIEW OF AUTISM SCREENING TOOLS IN INDIA AND AN EXPLORATORY APPLICATION OF EXPLAINABLE ARTIFICIAL INTELLIGENCE (XAI)

Gurneet Kaur[1], Prof. Sukhwinder Singh[1]
[1] *UIET, Panjab University*

ABSTRACT

Early identification of autism spectrum disorder (ASD) is essential for timely support and intervention. Several screening tools have been developed and adapted for use in India, including the Indian Scale for Assessment of Autism (ISAA), Indian Autism Screening Questionnaire (IASQ), and others. This study reviews the existing Indian autism screening tools in terms of their development, structure, validation, and applicability in clinical and

community settings. Alongside the review, an exploratory effort is being made to apply Explainable Artificial Intelligence (XAI) methods to datasets containing responses to these tools. The goal is to understand which questions or behavioral domains most influence screening outcomes. Although the XAI implementation is still in progress, this approach holds promise for improving the interpretability and transparency of autism screening, bridging the gap between traditional assessment methods and AI-driven insights.

OP15. DEEP LEARNING-BASED FULL SKULL RECONSTRUCTION: AN EFFICIENT ALTERNATIVE TO TRADITIONAL CAD APPROACHES

Harleen Kaur[1], Prashant Prakash[1], Mamta Juneja[1], Prashant Jindal[1]
[1] *UIET PU*

ABSTRACT

Complete skull reconstruction plays a crucial role in craniofacial surgery, forensic analysis, and personalized implant design. Traditional Computer-Aided Design (CAD) methods, while effective, are often time-consuming, costly, and highly dependent on manual expertise, which can lead to variations in anatomical symmetry. This study proposes an AI-driven, fully automated deep learning framework for complete skull reconstruction, encompassing the cranial, maxillary, and mandibular regions. The proposed methodology integrates advanced 3D convolutional neural networks and transformer-based architectures to accurately predict and reconstruct missing or damaged skull segments from partial or defective input scans. By leveraging large-scale medical imaging datasets and optimized feature extraction pipelines, the system aims to generate anatomically precise, symmetric, and patient-specific 3D skull models with significantly reduced computational time and human intervention. Comparative analysis with conventional CAD-based approaches demonstrates the superiority of the proposed AI model in terms of reconstruction accuracy, processing speed, cost-effectiveness, and morphological symmetry. The presented framework lays the foundation for next-generation intelligent craniofacial reconstruction systems, facilitating faster clinical workflows and improved patient outcomes.

OP16. SELECTION OF SENSE AMPLIFIER BASED ON THE SIZE OF SRAM MEMORY

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[1] *ECE Dept, UIET, Panjab University Chandigarh,* [2] *Professor, Department of Electronics and Communication Engineering, UIET, Panjab University Chandigarh.*

ABSTRACT

As the Storage capacity of SRAM Memory increases, both the Power Dissipation and the Delay also Increases which reduces the performance and access speed of the memory. To

overcome delay and power dissipation during read and write operation of memory, Sense Amplifier is used. Sense Amplifier (Current Mode, Voltage Mode) reduces both the power dissipation and access time of the SRAM memory. Voltage Mode sense amplifier senses even the small difference in the voltage generated on the Bit line and Bit line-Bar and access the memory for read or write operation. By sensing a small change in the voltage, Voltage Mode Sense amplifier reduces the delay and power dissipation of SRAM Memory. On the other hand Current Mode Sense amplifier which is more complex than prior, senses the difference in the current generated on the bit lines during the Read/Write operation. For low data storage SRAM memory, Voltage mode sense amplifier is the better choice. But as the data storage size increases both the delay and power dissipation increases. To overcome this for large storage memories Current mode sense amplifier is used which reduces both the delay and power dissipation (P=V.I) as even the small current change on bit lines is sensed by the Current Mode sense Amplifier. For, large storage memory Current Mode sense Amplifier is better choice.

OP17. MACHINE LEARNING BASED INTELLIGENT INJURY MANAGEMENT FOR PLAYERS IN SOCCER SPORTS

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[1] Department of Computer Science and Applications, Panjab University, Chandigarh, [2] Department of Computer Science and IT, DAV College, Sector 10, Chandigarh

ABSTRACT

In professional soccer sports, injury management put forwards a major challenge due to the soccer sport's jam-packed competition schedules and high intensity demands, which amplify the probability of overuse and critical injuries. Existing preventive frameworks depends customarily on the subjective clinical or medical assessments along with inadequate physiological data driven analysis. The integration of machine learning methodologies provides a paradigm shift by offering real time data-centric robust models, which detects non-linear and complex dependencies between physiological strain and training intensity. This study investigates the role of machine learning based frameworks in optimizing the estimation of injury, monitoring process and injury rehabilitation in soccer sports. Machine learning models powered by GPS tracking data, wearable sensors, players' past medical history spot faint patterns and associated risk factors that are generally undetectable to the manual subjective analysis. After investigating major supervised learning algorithms employed in the study i.e. Random forest, support vector machines, logistic regression, and gradient boosting, Random forest has been preferred as the best performing algorithm with 82.50% accuracy in estimating player injury likelihood by analysing the major features such as fatigue indices, recovery time data, training intensity, historic player injury data, and player workload. Beyond estimation, real time monitoring by employing smart wearable's, permits timely detection of fatigue. Furthermore, reinforcement learning and clustering algorithms recommends personalized rehabilitation plans based on players' injury history, ensuring return to game timelines without taking any risks.

OP18. A RECONFIGURABLE AND LOW POWER ELECTROSTATICALLY DOPED MOSFET ARCHITECTURE: A PATH TOWARDS NEXT GENERATION NANOELECTRONICS

Mehak Singla[1], Dr. Charu[1], Dr. Neeraj Sharma[1]
[1] *ECE, UIET, Panjab University, Chandigarh, India*

ABSTRACT

The rapid scaling limitations of conventional CMOS technology have driven the exploration of alternative device architectures, among which Electrostatically Doped Nanotube Schottky Barrier Metal Oxide-Semiconductor Field-Effect Transistors (ED-NT-SB-MOSFETs) have emerged as a promising solution. These devices leverage the exceptional electrical and mechanical properties of silicon nanotubes (Si NTs) and the flexibility of electrostatic doping to overcome key challenges such as ambipolar conduction, limited ON/OFF current ratio, and velocity sensitivity. ED-NT-SB-MOSFETs utilize a central gate for carrier modulation and side gates for inducing n-type or p-type behavior without chemical doping, thereby enhancing reconfigurability, scalability, and power efficiency. This paper discusses about the proposed structure, working principles, electrostatic doping mechanism, silicon nanotube-based devices, and Schottky barrier device architecture. The optimized proposed device architecture has silicon thickness of rsi=8 nm and dielectric constant of K= 50. The experimentally realized optimized device structure has exhibited the minimum leakage current at 〖6.95×10〗^(-13) A and current ratio (ION/ IOFF) as 〖~10〗^9. The proposed device, optimized for enhanced performance, demonstrates superior characteristics compared to existing alternatives, including dopingless gate-stacked Schottky barrier nanowire FETs with gate configuration of single metal gates, dual gates, and hetero dielectric layers, dopant segregation layer Schottky barrier FETs, as reported in prior studies. With prospective uses in reconfigurable logic, low power electronics, and bio-sensing, ED NT-SB-MOSFETs are a major breakthrough in nano-electronic devices that provide an intriguing route for future integrated circuitry and next-generation computer systems.

OP19. SHORT-TERM ELECTRICITY FORECASTING USING NASA'S MODERN-ERA RETROSPECTIVE ANALYSIS FOR RESEARCH AND APPLICATIONS (MERRA)

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ABSTRACT

Short-term electricity forecasting has become increasingly critical for power system operations, particularly with the growing integration of weather-dependent renewable

energy sources. This study examines the application of NASA's Modern-Era Retrospective Analysis for Research and Applications (MERRA) and MERRA-2 reanalysis datasets in short-term electricity forecasting. We have analyzed technical methodologies including machine learning models, statistical approaches, and data preprocessing techniques used to convert gridded meteorological reanalysis data into electricity demand and supply forecasts. Our comprehensive literature review reveals that MERRA-derived forecasting systems employ hierarchical statistical models, neural networks, and physics-based power curve conversions, often combined with bias correction and spatial aggregation methods. Current research trends emphasize hybrid decomposition approaches, multi-variable integration, and ensemble methods that consistently outperform univariate models.

OP20. COMPARATIVE STUDY OF PVDF AND PVDF - TRFE NANOCOMPOSITES: ROLE OF CONDUCTIVE FILLERS IN ENHANCING PIEZOELECTRIC AND DIELECTRIC PROPERTIES

Nisha Sharma[1], Preeti Singh[1], Charu Madhu[1]
[1] *University Institute of Engineering and Technology, Panjab University, Chandigarh*

ABSTRACT

Polyvinylidene fluoride (PVDF) and its copolymer poly (vinylidene fluoride trifluoroethylene) (PVDF-TrFE) have attracted extensive attention as active materials for flexible and piezoelectric sensors due to their low density, mechanical flexibility, and strong electromechanical coupling. Each material has electroactive characteristics like piezoelectricity, pyroelectricity, and ferroelectricity. Both materials have been researched for many years in many different applications such as memory, transducers, actuators, and energy harvesting. This study represents a comparative study between PVDF & PVDF-TrFE emphasizing the distinctions in their structural, electrical, and sensing capabilities. PVDF is a homopolymer. It requires mechanical stretching or electrical poling to induce the electroactive β-phase, While PVDF-TrFE naturally has a large β-phase fraction because of its copolymer structure. In comparison to pristine PVDF (~ 20–30 pC/N), the copolymer exhibits a larger dielectric constant, stronger remanent polarization, and superior piezoelectric coefficient (d_{33} = 30–38 pC/N). Thus, PVDF-TrFE is identified as a more efficient material for high-performance and multifunctional sensor applications, whereas PVDF remains advantageous for low-cost, flexible designs. The performance of PENGs is greatly improved by conductive fillers such metal nanoparticles (Ag, Au), graphene/rGO, MXenes, and carbon nanotubes (CNTs). In PVDF and PVDF-TrFE, they serve as nucleation sites for the β-phase, enhancing piezoelectric activity and dipole alignment.

OP21. FUSION-BASED MULTIMODAL CONTROL FOR HIGH-RELIABILITY PROSTHETIC SYSTEMS

Prashant Prakash[1], Prashant Jindal[1], Mamta Juneja[1]
[1] *UIET, Panjab University, Chandigarh*

ABSTRACT

The functional limitations of single-modality myoelectric control systems, primarily s*EMG*, often result in insufficient dexterity and classification failures during daily activities. While s*EMG* provides reliable muscle commands, it struggles with anticipatory intent and external noise. We hypothesize that integrating Electroencephalography (*EEG*), which captures motor intent from the brain, with s*EMG* provides a superior, more robust control framework. This study proposes a multimodal fusion architecture based on a Hierarchical Feature Fusion Network (HFFN) to process synchronized s*EMG* (50 Hz) and *EEG* (250 Hz) data. The system employs a combined approach, where s*EMG* features-essential for direct actuation-carry a larger decision weight (approximately 65%), while *EEG* features provide contextual robustness and refined intent (approximately 35%) . The final gesture decision is determined by a weighted voting mechanism that processes feature vectors from both modalities simultaneously. Our gesture selection criteria are guided by combinatorial analysis, limiting the operational repertoire to four to five well-chosen gestures (e.g., Rest, Power Grasp, Precision Grip, Thumb Extension). This limitation is hypothesized to achieve the optimal balance between functional diversity and reliable classification accuracy, exceeding the 95% threshold necessary for practical clinical deployment. This methodology establishes fundamental guidelines for developing responsive, high-reliability prosthetic systems.

OP22. ENSEMBLE LEARNING STRATEGIES FOR ACCURATE MRI-BASED BRAIN TUMOR CLASSIFICATION: A REVIEW

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[1] *UIET, Panjab University,* [2] *UICET, Panjab University*

ABSTRACT

Brain tumors classification is an integral part of medical image analysis today because of the high incidence of glioma, meningioma, and pituitary tumors. It is particularly time-consuming for identifying these radiologic lesions in Magnetic Resonance Imaging (MRI) and heavily relies on expert opinion, thus triggering and facilitating the leap into the new era where Artificial Intelligence (AI)-based Computer-Aided Diagnosis (CAD) can be used. In principle, previous Machine Learning (ML) techniques show promising performance by using handcrafted texture and intensity features. However, the scalability of these methods is still constrained because manual extraction of features is an inherent drawback. The introduction of Deep Learning methodologies, especially Convolutional Neural Networks (CNNs), has made it

easier to address this issue, as features are learned and hierarchically aggregated in what could be an automated high-level description system to enhance effectiveness in classification. Undoubtedly, Neural Networks (DL) prove very good results, yet with disadvantages like the problem of highly imbalanced data or overfitting or high computational requirements in the methods. A better-than-single-model practice in most cases has been the actual employment of ensemble learning techniques such as bagging, boosting, stacking, and hybrids of deep-shallow. Propagating all those significant improvements in accuracy and robustness from the first proof, a general observation that should be made is how, by such combining together, it is possible to bridge all the gaps and divisions to guarantee not just credible or satisfactory but almost ideal results way above a single model.

OP23. FURCATION INVOLVEMENT GRADING IN DECIDUOUS TEETH WITH EXPLAINABLE SELF-ATTENTION SEGMENTATION APPROACH

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ABSTRACT

Accurate classification of furcation involvement in deciduous teeth is essential for early diagnosis and effective periodontal management in pediatric dentistry. This study introduces an automated and explainable deep learning framework for the four-grade classification of furcation involvement using dental radiographs. The proposed pipeline employs a self attention–based segmentation model to precisely delineate furcation regions, followed by classification using lightweight convolutional neural networks—EfficientNet-Lite, MobileNetV3, and ShuffleNetV2. A Grad-CAM based hyperparameter optimization strategy was implemented to achieve the optimal configuration for accuracy and efficiency. Among the evaluated models, EfficientNet-Lite Furcation Involvement Grading in Deciduous teeth with Explainable Self Attention Segmentation Approachmonstrated superior diagnostic performance, achieving an accuracy of 99.0%, precision of 98.7%, recall of 98.5%, and F1-score of 98.64%. These results highlight the robustness and reliability of the proposed approach in distinguishing subtle radiographic variations across different furcation grades. Furthermore, explainability was incorporated through Grad-CAM visualization, providing intuitive heatmaps that emphasize clinically relevant regions influencing the model's decisions. The combination of attention-guided segmentation, lightweight classification, and explainable AI establishes a clinically adaptable and transparent computer-aided diagnostic framework for pediatric dental radiology. This system holds promise for improving diagnostic consistency, supporting clinical decision-making, and facilitating early intervention in periodontal management of deciduous teeth.
Keywords: Furcation involvement, Deciduous teeth, Self-attention segmentation, EfficientNet-Lite, MobileNetV3, ShuffleNetV2, Lightweight CNN, Explainable AI, Grad-CAM, Pediatric dentistry, Dental radiographs

OP24. SURVEY AND ARCHITECTURAL FRAMEWORK FOR HARDWARE IMPLEMENTATION OF ARINC 661 DISPLAY PROTOCOL ON FPGA

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ABSTRACT

Modern avionics systems require deterministic, low-latency, and certifiable graphical display subsystems that comply with DO-178C and *DO-254* safety standards. The *ARINC 661* protocol defines a standardized interface between the Cockpit Display System (CDS) and User Application (UA), enabling modular, interactive flight displays. However, current software-based implementations operating on real-time processors or operating systems often suffer from non-deterministic latency, context-switching delays, high computational overhead, and complex certification cycles. This paper presents a comprehensive survey and conceptual hardware framework for FPGA-based implementation of the *ARINC 661* display protocol. The proposed design replaces processor-dependent message parsing and rendering tasks with dedicated RTL-based modules. The architecture consists of a Message Parsing Unit (MPU) for deterministic decoding of binary commands, a Widget Manager Bank for hardware-driven state control, and a Rendering Engine for real-time graphical composition using on-chip memory and parallel pipelines. A detailed literature review highlights that while hybrid CPU–FPGA approaches have improved timing performance, a fully hardware-optimized, processor-independent *ARINC 661* solution remains largely unexplored. Preliminary design analysis indicates that FPGA-based implementations can reduce display update latency by up to 60%, achieve cycle-level determinism, and simplify *DO-254* certification due to hardware traceability and testability. The framework thus provides a foundation for future development of safety-critical, high-performance avionics display controllers that are independent of general-purpose CPUs.

OP25. A REVIEW OF DEEP LEARNING TECHNIQUES FOR ENHANCING SPECTRUM SENSING

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ABSTRACT

Internet-connected mobile devices are increasing rapidly in almost every domain which has created a surge in mobile data traffic so an advanced system is highly needed that can handle a large amount of data. Spectrum sensing is a crucial process in Cognitive Radio Networks (CRN) that enables efficient utilization of underused spectral resources by

detecting available frequency bands. Traditional detection methods, such as energy detection, matched filtering, and eigenvalue based approaches, often suffer from performance degradation due to low signal-to-noise ratios and varying channel conditions. To overcome these limitations, this research has focused on employing Deep Learning (DL) techniques for the enhancement of spectrum sensing. In this paper, DL is incorporated into wireless technology to predict the available frequency bands on which spectrum can transmits data. As large amount of heterogeneous data is generated by wireless systems, which is difficult to compute, DL makes wireless communication intelligent and more robust. In this paper, a review of different DL platforms and research areas is summarized to motivate researchers in this domain. Further different challenges for employing DL in a wireless system are discussed.

OP26. AN EXPLAINABLE ENSEMBLE DEEP LEARNING FRAMEWORK FOR PROSTATE CANCER CLASSIFICATION FROM MP-MRI

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ABSTRACT

Prostate cancer ranks as the second most prevalent cancer among men worldwide and remains a major cause of cancer-related mortality. Accurate classification of cancerous versus non-cancerous prostate tissues is essential for early diagnosis and effective treatment planning. However, manual interpretation of multiparametric magnetic resonance imaging (mp-MRI) is complex and time-consuming due to heterogeneous tissue characteristics and low contrast between malignant and benign regions. This study presents an ensemble deep learning framework for binary classification of prostate cancer using mp-MRI scans, combining ResNet and EfficientNet architectures enhanced with an Efficient Channel Attention (ECA) mechanism to improve discriminative feature extraction. The framework utilizes mp-MRI data from 19 patients, including T2-weighted (T2W) and dynamic contrast-enhanced (DCE) modalities. Preprocessing involved center-based cropping, normalization, and augmentation to ensure consistency and robustness. To enhance transparency, model interpretability was incorporated using Grad-CAM, Grad-CAM++, Score-CAM, Partial Dependence Pixel (PDP), LIME, and occlusion-based explainable AI techniques for visualizing class-discriminative regions and understanding prediction rationale.The proposed model achieved an accuracy of 0.9909, sensitivity of 1.0, specificity of 0.9817, and an accuracy standard deviation of 0.0952, demonstrating robust classification performance and interpretability. These results highlight the potential of the proposed ensemble framework as a reliable and explainable AI-based tool for prostate cancer diagnosis.

OP27. RECENT ADVANCES IN CRYOGENIC FINFET TECHNOLOGY

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ABSTRACT

Cryogenic FinFETs, functioning at temperatures below 100 K and as low as 4 K, are pivotal for low-power, high-performance applications in quantum computing and cryogenic CMOS. Recent 2024-2025 research demonstrates enhanced device metrics, such as a subthreshold swing of 20 mV/decade for nMOS in 14 nm bulk FinFETs, an 80 mV threshold voltage (VT) shift, and 30% transconductance improvement, enabling reduced power via lower biases while maintaining speed. Sub-5 nm FinFETs show boosted carrier mobility and mitigated short-channel effects at cryo-temperatures, supporting precise compact models for circuits like ring oscillators, validated from 300 K to 10 K. Dynamic variability studies reveal amplified cycle-to-cycle fluctuations from dopant freeze-out and interface traps, addressed by models incorporating trap-assisted tunneling for reliable quantum readout. In SRAM, 5 nm FinFET cells achieve Vmin,R of 0.15 V (62% lower than room temperature) and Vmin,W of 0.45 V at 10 K, due to steeper SS and higher on-current, though variations affect noise margins; low-voltage cells optimize low-power cryogenic designs. Cryo-CACTI modeling for 7 nm caches at 10 K yields 3x faster access times and lower leakage, using BSIM-CMG calibrated to measurements. Analog advancements include a 4 mW 2.2-6.9 GHz LNA in 16 nm FinFETs with stable noise figure from 300 K to 4 K, ideal for quantum interfaces. These innovations extend Moore's law to ultra-low-power regimes, but challenges like 12-15% higher input capacitance at 100 K and short-circuit energy require optimized libraries. Future efforts target variability mitigation and scaling beyond 5 nm for integrated cryogenic ICs.

OP28. ADVANCES IN MEDICAL IMAGE SEGMENTATION: A COMPREHENSIVE REVIEW OF TRADITIONAL AND MODERN TECHNIQUES

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ABSTRACT

Image Segmentation plays a vital role in medical imaging, enabling diagnostic accuracy and treatment monitoring and planning in extracting and analysing clinically significant regions from medical imaging modalities like MRI, PET, CT and ultrasound. Diagnostic accuracy in segmentation eases the quantitative evaluation of anatomical structure, tissues and pathological regions, surgical planning and disease localisation. Traditional

segmentation methods such as thresholding, clustering, edge detection and region growing are widely used but often exhibit various challenges like noise handling, intensity variations, complex tissue morphology. With the advancement in artificial intelligence, segmentation methodology with deep learning framework has tremendously revolutionized, majorly convolution neural networks (CNNs), U-Net architecture, and transformer- based variants have significantly improved the segmentation accuracy and efficiency. These models signify better feature representation and adaptability across different modalities, and high generalization capabilities. Despite these advancements, challenges such as limited annotated datasets, high computational cost, and model interpretability remain active areas of research. This paper reviews a comprehensive analysis of traditional and modern segmentation techniques, highlighting their mathematical foundations, performance metrics, and clinical applicability.

OP29. STRUCTURAL MODELING AND PERFORMANCE PROJECTION OF GATE-ALL-AROUND COMPLEMENTARY FIELD-EFFECT TRANSISTOR (CFET) FOR SUB-3 NM TECHNOLOGY NODES

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ABSTRACT

Complementary Field-Effect Transistors (CFETs) are an advanced transistor architecture developed to overcome the scaling challenges faced by conventional Fin Field-Effect Transistors (FinFETs) at sub-3 nm technology nodes. By vertically stacking n-type (nFET) and p-type (pFET) devices in a monolithic configuration, CFETs enable true three-dimensional integration and significantly increase device density without expanding the horizontal footprint. Gate-All-Around (GAA) CFETs offer excellent electrostatic control, reduced short-channel effects, and enhanced current drivability compared to FinFETs and nanosheet FETs. Structural parameters such as gate length, vertical stacking pitch, and channel thickness critically influence device performance, including subthreshold swing (SS), drain-induced barrier lowering (DIBL), and leakage current. Vertical integration also allows more efficient use of silicon area, potentially reducing overall power consumption while maintaining high performance. CFETs represent a significant step forward in transistor design, providing compact, high-performance solutions for next-generation logic technologies. Their combination of area efficiency, electrostatic integrity, and scalability makes them highly suitable for sustaining Moore's Law in the sub-3 nm era. By integrating complementary devices vertically, CFETs pave the way for continued improvements in both speed and energy efficiency, addressing the key challenges of future ultra-scaled logic circuits.

OP30. ASSESSMENT OF COGNITIVE LOAD IN UPRIGHT POSTURE THROUGH AUDIO-VISUAL TASKS

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ABSTRACT

Introduction: In the digital generation, human interaction with information depends heavily on audio-visual media, enhancing engagement but increasing cognitive load. According to Cognitive Load Theory (CLT), the brain can become overloaded when it must process multiple tasks simultaneously. There are few studies on how combining visual and auditory effects affects mental effort and performance when people perform two tasks simultaneously. This study examines the impact of multimodal engagement on cognitive load and task performance during upright posture (standing). Methodology: Twenty healthy individuals (20–25 years) participated after providing written informed consent. Participants performed cognitive tasks, including MoCA, MMSE, a Cognitive Problem-Solving Task (CPT), and a Visuospatial Processing Task (VPT), while listening to soft background music. Perceived cognitive load was measured using NASA-TLX across six dimensions, rated on a 0–5–10–15 scale and normalized to 100. Results and Conclusion: Post-task results showed improvements in MoCA pre (17.8) to post (19.75), MMSE pre (24.35) to post (24.75), CPT pre (21.7) to post (29.95), and VPT pre (6.82) to post (10.02), indicating enhanced attention, memory, and visuospatial processing. The CPT showed the most significant improvement, reflecting stronger reasoning under dual-task conditions. NASA-TLX scores increased from 52.04 to 54.15, suggesting higher cognitive load. Strong correlations were observed for MoCA ($r = 0.85$) and MMSE ($r = 0.97$), while CPT post and NASA-TLX post showed a moderate correlation ($r = 0.58$). These findings suggest that moderate cognitive loading during multimodal dual-task engagement is an effective method for assessing mental workload in realistic multisensory contexts.

OP31. GENERATIVE ADVERSARIAL NETWORKS FOR ROBUST PERSON RE-IDENTIFICATION

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ABSTRACT

Person re-identification (Re-ID) is an essential task in computer vision that entails identifying individuals across many non-overlapping camera perspectives. The technique is essential for intelligent surveillance, public safety, event management, and retail analytics. Conventional Re-ID methods, which depended significantly on manually constructed features and distance-

based matching, frequently encountered difficulties like pose variation, occlusion, lighting discrepancies, and restricted scalability. Recent advancements in deep generative modelling, especially via Generative Adversarial Networks (*GAN*s), have markedly improved the Re-ID pipeline by facilitating synthetic data creation, style transfer, and domain adaption techniques. *GAN*s can generate high-resolution, realistic images of persons across various ambient and camera settings, enhancing feature learning robustness and minimizing the domain gap between training and deployment scenarios. By integrating generative and discriminative learning methodologies, *GAN*-based frameworks facilitate enhanced feature embeddings, superior generalization across datasets, and augmented recognition accuracy. These models tackle the issue of insufficient labelled data by enhancing current datasets with diverse, high-quality synthetic samples, hence promoting more robust model training and cross-domain adaptability. The integration of *GAN*s into person Re-ID is transforming identity matching, creating a basis for more dependable, scalable, and context-sensitive identification systems suitable for intricate real-world scenarios.

OP32. COMBINING INFRARED AND VISIBLE FEATURES THROUGH GAN-BASED IMAGE FUSION

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ABSTRACT

An effective image processing method called infrared and visible (IRVS) image fusion creates a single, more informative representation by fusing the complementary information from visible (VS) and infrared (IR) images. Infrared images record the thermal radiation that objects produce, allowing for accurate identification in low-light, foggy, or smoky conditions. Visible images include rich texture, colour, and structural features that are visible to the human eye. Combining these modalities results in visuals with improved contrast, clarity, and interpretability, which enhances both analytical comprehension and perceptual quality. Generative Adversarial Networks (*GANs*) have recently emerged as a robust framework for performing IRVS image fusion by learning to integrate thermal and visual information in a data-driven and adaptive manner. A GAN is made up of two opposing parts: a discriminator and a generator. The generator synthesizes a fused image combining the thermal intensity of infrared data with the detailed textures of visible images, while the discriminator analyses its realism and consistency with both inputs. The network successfully retains detailed spatial and contextual data from both inputs through this adversarial learning process. As a result, GAN-based fusion creates clear, realistic images that keep the thermal precision of infrared input while capturing the fine textures and visual depth of visible images. These capabilities make GAN-driven fusion highly suitable for critical applications such as defence, autonomous navigation, surveillance, and medical imaging.

OP33. NON-INVASIVE FATIGUE ASSESSMENT THROUGH SWEAT LACTATE ANALYSIS DURING GAIT ACTIVITY

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ABSTRACT

This study focuses on a non-invasive approach for fatigue assessment using sweat lactate analysis. *Fatigue* represents a multi-factorial physiological condition resulting from prolonged physical activity, characterized by metabolic imbalances such as lactate accumulation in the body. *Fatigue* assessment is essential to prevent injury and performance decline. It enables timely intervention and supports safer training and recovery. The experimental protocol involved treadmill walking performed in three consecutive 10-minute bouts, categorized as light, moderate, and intense based on exertion levels. Each stage signifies eliciting progressively higher cardiovascular load to represent rising fatigue levels. The protocol ensured a controlled escalation of exertion to accurately capture fatigue-induced physiological responses. Sweat samples were collected after each bout from standardized site (lower back) using sterilized cotton swabs. The lactate concentration was determined using the D-*Lactate* Kit and analyzed using *ELISA*-based assay. The *ELISA* results indicated lactate concentrations of 0.111 mM for the light bout, 0.150 mM for the moderate bout, and 0.128 mM for the intense bout. The observed trend shows an increase in lactate levels with exercise intensity up to the moderate stage, followed by a slight decline at the intense stage, reflecting physiological lactate clearance mechanisms at prolonged exertion. This suggests that beyond a certain exertion level, the body initiates metabolic adaptations to recycle excess lactate, maintaining homeostasis. The findings demonstrate the feasibility of sweat-based lactate quantification as a reliable, non-invasive biomarker for fatigue monitoring, with potential applications in sports science and rehabilitation systems.

OP34. DEEPFAKE DETECTION: IDENTIFYING MANIPULATED IMAGES/VIDEOS THROUGH AI

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ABSTRACT

Deepfakes, which are synthetic media generated using artificial intelligence (AI), pose a significant threat to individuals and society. The rapid advancement of deepfake technology has enabled the creation of highly realistic synthetic content across images, videos, audio, and news. While deepfake applications offer creative possibilities, their misuse for misinformation, identity fraud, and cybersecurity threats necessitates robust detection methods. The increasing incidence of deepfake-related crimes has made deepfake media detection a major challenge and a crucial aspect of digital forensics. This review explores state-of-the-art deep learning (DL) techniques for deepfake detection across four domains: images, videos, audio, and news. Traditional machine learning (ML) approaches rely on handcrafted features but often struggle to adapt to evolving deepfake generation methods. In contrast, advanced DL models—such as Convolutional Neural Networks (CNNs), Long Short-Term Memory (LSTM) networks, and Recurrent Neural Networks (RNNs)—have demonstrated superior performance by automatically learning discriminative features. Transformer-based architectures like Bidirectional Encoder Representations from Transformers (BERT) have also shown remarkable accuracy in identifying manipulated content. Furthermore, recent innovations such as Vision Transformers (ViTs) and Explainable AI (XAI) models are improving the interpretability and robustness of detection systems. In addition, our model introduces a confidence-based detection mechanism capable of determining the authenticity of images with over 80% accuracy, offering a reliable metric for evaluating potential deepfake content. This enhancement strengthens model transparency and trustworthiness in real-world applications. Overall, this review highlights emerging trends and future research directions for fortifying deepfake detection mechanisms.

OP35. CREDIT CARD FRAUD DETECTION

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ABSTRACT

Computer Science is a multi-disciplinary field and also plays a major role in data analytics by aiming to find the existence of fraudulent transactions. With the growth in online payments and e-commerce, it has become crucial to take preventive measures. It tries to reduce the anomalies caused due to these fraudulent activities by using various types of ML techniques on the dataset like Random Forest, Decision Tree, Logistic Regression. These can also be classified under Supervised learning techniques and unsupervised learning techniques. After applying the various techniques, it analyses the transaction features including Amount, Location, Time and User Behavior so as to differentiate between legal and illegal transactions. After that the workflow of ML is applied like firstly data preprocessing, feature selection, and performance evaluation techniques accuracy, precision, and recall, the proposed model enhances detection accuracy while minimizing false alerts. The study contributes to building secure financial systems and protecting users from monetary losses through intelligent automation.

OP36. AI COMPANION FOR PERSONAL GROWTH AND DAILY PRODUCTIVITY

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ABSTRACT

Nowadays, many people cannot keep up their productivity level, manage their emotions, and work on personal growth. The AI Companion is a virtual personal assistant that shall be designed to help one organize his or her day, achieve goals, and stay positive. It shall be a system with artificial intelligence, natural language processing, and sentiment analysis that interacts with its users in a useful and compassionate manner. This type of AI companion is not similar to any other digital assistant, because it doesn't perform the simplest tasks of reminding and scheduling. Moreover, the user will obtain motivation, emotional support, and easy advice on self-improvement. It will try to find out through the interaction process what the user's mood is, then react in a way that will reduce the stress being felt by the user or motivate him if he is down. It will learn about the user's behavior and his feelings as time goes on and provide him with a response that will be more personalized. The ultimate aim of such an attempt is to make technology more human and something practical in everyday life. Besides the underlying desire to work more, this project will improve emotional health in people by making them think positively. Essentially, the AI Companion will be both a personal assistant and a virtual friend to help users create positive habits, control their feelings and emotions, and become better due to this.

OP37. DEEP LEARNING-BASED BREAST CANCER CLASSIFICATION AND SEGMENTATION USING THE MIAS DATASET

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ABSTRACT

Breast cancer is one of the leading causes of mortality among women worldwide, making early detection essential for improving treatment outcomes and survival rates. Traditional mammography screening relies heavily on radiologists' expertise, which can be subjective and prone to human error. This study presents a *deep learning*-based framework for automated *breast cancer* detection using the Mammographic Image Analysis Society (MIAS) dataset, integrating both classification and segmentation to enhance diagnostic accuracy and interpretability. A custom Convolutional Neural Network (CNN) is developed from scratch to

classify mammogram images into benign, malignant, and normal categories, employing multiple convolutional blocks, batch normalization, and dropout layers to improve feature extraction and generalization. Simultaneously, a U-Net-based segmentation model is employed to localize tumor regions, providing visual cues for clinical interpretation. Experimental results demonstrate that the hybrid framework achieves over 92% classification accuracy and effectively delineates regions of interest, supporting radiologists in early diagnosis. By combining automated detection with interpretable segmentation, the proposed approach offers a robust, efficient, and clinically relevant computer-aided diagnostic system capable of reducing human error and improving *breast cancer* screening outcomes.
Keywords— Breast cancer detection, *mammogram classification*, *image segmentation*, convolutional neural network (CNN), *deep learning*, MIAS dataset, computer-aided diagnosis (CAD), medical image analysis, tumor localization.

OP38. AI-POWERED CANCER DETECTION: AN INTEGRATED PORTAL WITH MULTIMODAL ANALYSIS AND CHATBOT ASSISTANCE

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ABSTRACT

Early and accurate cancer detection is critical to improving patient outcomes, but access to comprehensive screening remains a global concern. This project presents an AI-Powered Cancer Detection Portal, a comprehensive system meant to assist early-stage, "head-to-toe" cancer detection and integrated patient support, which is directly related to the conference subject of "Healthcare for All." Our platform integrates two core AI components: 1) A deep learning pipeline for multimodal medical image analysis, specifically trained to classify cancerous versus non-cancerous regions from full-body CT scans. 2) A specialized Medical AI Assistant. This chatbot, built using models like Bio_ClinicalBERT with a Gemini API fallback, provides reliable, non-personalized medical information, adeptly handling complex domain-specific terminology. The portal features distinct dashboards for doctors enabling them to upload scans, run DL models, and review diagnostic reports and for patients to manage appointments and query the chatbot. Our classification models demonstrate high efficacy, achieving accuracies of 0.9998 for lung cancer, 0.9950 for pancreatic cancer, and 0.9752 for breast cancer. This gateway enables both professionals and patients by combining superior deep learning-based diagnostics with an easily accessible, AI-powered informational chatbot. It is an important step toward using technology to democratize advanced cancer care and enhance healthcare outcomes for everybody.

OP39. MARKET MOOD: A REAL-TIME DASHBOARD FOR CORRELATING STOCK MARKET DATA WITH PUBLIC NEWS SENTIMENT

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ABSTRACT

In today's interconnected world, financial markets are influenced not only by traditional metrics but also by public perception and the rapid flow of information. For the average individual, accessing and interpreting this often-disconnected data presents a significant challenge. This project seeks to bridge this gap through the design and implementation of a low-cost, publicly accessible tool intended to empower users by democratizing financial insight. The solution is an interactive dashboard built with open-source Python libraries: yfinance fetches near-real-time stock data, requests/BeautifulSoup scrape relevant news headlines, VADER (Valence Aware Dictionary and sEntiment Reasoner) performs rule-based sentiment analysis to quantify public mood, and Streamlit presents the results. The dashboard prominently displays a stock's price chart directly overlaid with its corresponding sentiment score over time. This visualization enables any user to instantly identify and analyze the potential relationship between public news and market movements. By providing a holistic and intuitive view of market behaviour, this tool fosters greater financial understanding and empowers users by leveraging technology to make complex market information accessible to a wider audience.

OP40. A REVIEW OF ATLAS FUSION- BASED COMPUTATIONAL APPROACHES FOR NEUROLOGICAL DISORDER PREDICTION

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ABSTRACT

Major Depressive Disorder (MDD) and Attention Deficit Hyperactivity Disorder (ADHD) are two of the most common neuropsychiatric disorders, with major effects on thinking, emotions, and daily life. Accurate diagnosis is difficult due to the subjective character of traditional measures. With advancements in neuroimaging, particularly Functional Magnetic Resonance Imaging (fMRI), it is now possible to investigate brain connection patterns for objective diagnosis. Existing studies combined machine learning models with neuroimaging to increase diagnosis accuracy. Recently, atlas fusion based methods are becoming popular because of their ability to understand the brain's complex connections at different levels and detect small changes related to mental disorders. Therefore, this study intends to review Single and Multi-

atlas based computational approaches for ADHD and MDD prediction. The major focus of this review is on exploring different brain atlases, imaging modalities, datasets and machine learning techniques used. Most of the studies used single brain atlases, but future studies should explore multi-atlas fusion-based approaches for improved predictions of ADHD and MDD.

OP41. HEALING IN EVERY LANGUAGE: A COMPARATIVE STUDY OF MULTILINGUAL NLP MODELS FOR INCLUSIVE HEALTHCARE IN RURAL INDIA

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ABSTRACT

In multilingual nations like India, linguistic diversity often poses significant barriers to equitable healthcare access, particularly in rural regions where communication is hindered by language differences and digital illiteracy. This paper presents a comparative study of multilingual Natural Language Processing (NLP) models in enhancing healthcare accessibility through regional language understanding. The study evaluates transformer-based architectures such as IndicBERT, mBERT, and LLaMA-Indic, which have been fine-tuned on healthcare-related datasets to support tasks like symptom interpretation, medical question answering, and conversational AI for telemedicine platforms. These models are analyzed based on their contextual accuracy, low-resource adaptability, ethical deployment, and applicability in rural healthcare contexts. The paper further explores how language-specific fine-tuning impacts comprehension of local dialects and culturally sensitive medical communication. By comparing performance metrics across these models, the research identifies their respective strengths and limitations in achieving fairness, inclusivity, and data privacy within AI-driven health systems. Ultimately, this study highlights the transformative potential of multilingual NLP in bridging India’s healthcare communication gap. It underscores the importance of language-aware AI systems that empower patients to engage with digital healthcare platforms in their native languages, fostering equitable access and sustainable community well-being.

OP42. IMPORTANCE OF IMAGE INDEXING IN PERIOCULAR BIOMETRICS

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ABSTRACT

The periocular region has emerged as a valuable biometric trait particularly since COVID-19 pandemic increased the need for recognition despite facial occlusions. This region offers advantages over traditional biometrics like face, iris, and fingerprint, as it remains reliable even in noisy or low-resolution images and is less affected by changes in expression, lighting conditions, and partial obstructions. Despite advances in both periocular biometrics and image indexing technologies, a significant research gap exists at their intersection. It has been identified that while modern periocular systems successfully employ CNN, attention mechanisms, and knowledge distillation for high accuracy, they lack integrated indexing frameworks necessary for real time deployment and become computationally expensive as databases scale to billions of identities, making indexing mechanisms critically important. This review examines how image indexing techniques can be adapted for periocular biometric systems to address scalability challenges. Both traditional and deep learning indexing methodologies have been explored showing strong potential for periocular applications. Traditional approaches like Bag-of-Features and Local Binary Patterns offer computational efficiency, while deep learning methods including CNN feature hashing, transformer architectures, and semantic embeddings demonstrate superior performance by generating compact and discriminative representations suitable for rapid retrieval. Analysis reveals that deep learning approaches achieve recognition rates exceeding 92% and can reduce computational workload by up to 70% while enabling logarithmic rather than linear search complexity. Implementation challenges include privacy preservation and handling varying image quality, while proposing future directions in federated learning, edge computing optimization, and standardized evaluation frameworks for scalable periocular identification systems.

OP43. MEDICAL INSURANCE COST PREDICTION: INTEGRATIVE MACHINE LEARNING AND BAYESIAN FEATURE SELECTION WITH LARGE, MULTI-CONTEXT DATASET

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ABSTRACT

Accurate prediction of medical insurance costs is very important as it helps to manage risk, set premiums, and distribute resources efficiently in health insurance. Previous research has mainly depended on small datasets (986 to 2,773 records, 6 to 11 features), and in many cases, they have omitted key lifestyle, socio-economic, and behavioural markers, thus resulting in models with good testing performance but unable to reflect the intricacies of real-life situations. The current research presents a complete methodology that relies on a substantial dataset comprising 25,000 records and 22 various features that represent demographics, health, behaviour, economics, and lifestyle factors. To facilitate this, we apply state-of-the-art machine learning methods to such as ensemble regressors (XGBoost,

Random Forest, Gradient Boosting), deep learning (BP Neural Net, LSTM), and conditional Gaussian Bayesian networks, and we also ensure that we have rigorous models that are accompanied by the interpretability methods like SHAP and ICE. Metrics such as R^2, MAE, RMSE, MAPE, SMAPE, and MRE systematically evaluate model performance. The removal of irrelevant factors before performing regression not only increases the precision but also the understanding of the predictions. The comparative results indicate that the use of more extensive feature sets and larger volumes of data has a significant effect on reliability thus offering insurance companies and policymakers practical guidance and actionable insights in the process of developing medical cost estimation strategies.

OP44. NIGHT TIME TRAFFIC MONITORING SYSTEM

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ABSTRACT

This project presents an AI-powered Night-Time Traffic Monitoring System designed to accurately detect, classify, and track vehicles under low-light conditions. The system leverages *YOLOv8* for real-time object detection, *Deep SORT* for multi-object tracking, and *EasyOCR* for number plate recognition. It addresses challenges such as glare, shadows, and poor visibility that often affect traditional surveillance systems. The integrated pipeline efficiently processes traffic videos, identifies vehicles, maintains consistent tracking IDs, and extracts readable license plate information. A *FastAPI-based backend* was developed to manage video uploads and automate processing, ensuring seamless interaction between system components. Through rigorous testing on real-world traffic footage, the system demonstrated high accuracy and robustness in night-time environments. This project highlights the practical application of AI and computer vision in smart city infrastructure, contributing to traffic management, law enforcement, and congestion control through an intelligent, scalable, and real-time monitoring solution.

OP45. TASER WATCH: A WEARABLE SELF-DEFENSE DEVICE FOR WOMEN'S SAFETY

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ABSTRACT

In today's world, women's safety has become a serious concern, especially with the increasing number of harassment and assault cases. Many times, women find themselves in

situations where help is not immediately available. This project is an effort to provide them with a simple yet powerful way to protect themselves in such moments. The "Taser Watch" is a wearable self-defense device designed in the form of a wristwatch. It uses a small capacitor that stores electric charge and can deliver a quick, controlled shock when both wires come in contact. This shock is not strong enough to cause serious harm, but enough to surprise or stop an attacker temporarily, giving the wearer a chance to escape or seek help. The watch will also be lightweight, compact, and easy to use — suitable for everyday wear. Safety features will be added to prevent accidental activation, ensuring the device only works when truly needed. The main goal of this project is to help women feel safer and more confident, knowing they have a reliable tool for self-defense right on their wrist.

OP46. PROBLEM STATEMENT

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ABSTRACT

Problem Statement: The 2025 Punjab floods exposed serious gaps in managing the interconnected Satluj–Beas reservoir system, particularly at the Bhakra and Pong dams. Despite early rainfall forecasts, delayed and rigid water release decisions worsened the flooding. The main issue lies in the absence of a dynamic, data-driven decision-support system that can help authorities coordinate real-time reservoir operations based on changing rainfall and inflow conditions. Proposed Solution: This project proposes developing an AI-assisted flood management framework that integrates real-time data and intelligent decision-making. Using machine learning models such as ConvLSTM for rainfall and water-level prediction, and a reinforcement learning approach for simulating dam coordination, the system will demonstrate how dynamic scheduling can improve response and reduce flood risk. The outcome will be a prototype or simulation model showing how AI-based tools can support water managers in making faster, data-driven, and safer decisions during extreme weather events.

OP47. PLANT SPECIES IDENTIFICATION USING ARTIFICIAL INTELLIGENCE

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ABSTRACT

Adulteration in plants has become a major concern in the agricultural and medicinal fields. Many species look very similar, which makes manual identification difficult and

often inaccurate. This affects product quality, research reliability, and consumer safety. To resolve this problem, Artificial Intelligence (AI), Machine Learning (ML), and Deep Learning (DL) approaches are integrated to perform highly accurate and automated plant species identification and adulteration detection. Deep Learning algorithms such as CNN-based architectures play an important role in detecting adulteration by identifying the correct species with high accuracy. These models learn fine visual patterns and help in distinguishing pure and mixed samples effectively. The AI-based approach is faster, more reliable, and cost-effective compared to traditional laboratory methods. It helps in maintaining purity, quality, and trust in plant-based industries while promoting sustainable and safe agricultural practices

OP48. REAL-TIME PRONUNCIATION FEEDBACK WEB APP USING WHISPER

Avantika Pandey[1]

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ABSTRACT

Speech therapy for individuals with dysarthria—a motor speech disorder that impairs pronunciation and fluency—often faces accessibility and engagement challenges, particularly among children. This project presents Talk2Text, a real-time web application that provides interactive pronunciation feedback using OpenAI's Whisper model. The system enables users to speak through a browser microphone, receive instant word-level feedback, and practice corrections via text-to-speech. It features two portals: a Patient Portal for practice, scoring, and progress tracking, and a Therapist Portal for monitoring, rubric customization, and automated PDF report generation. We benchmarked multiple open-source ASR models—Vosk, Coqui STT, and Whisper (Tiny–Large)—using metrics such as Word Error Rate (WER), latency, and memory efficiency. Whisper-small, deployed via Transformers.js, achieved the best balance of speed, accuracy, and device compatibility for browser-based inference without GPU dependence. The system integrates Firebase for authentication and data storage, Chart.js for progress visualization, and jsPDF for report generation. Gamified elements like retry loops, badges, and visual scores enhance motivation, while all processing occurs locally for privacy and scalability. The proposed solution bridges speech therapy and AI by offering an accessible, low-cost, and privacy-preserving digital therapeutic tool that can be extended to multilingual settings and remote rehabilitation. Future directions include phoneme-level feedback, multilingual support, and clinical validation through partnerships with speech therapists.

OP49. THE 2025 PUNJAB FLOODS HIGHLIGHTED THE LACK OF A DYNAMIC AND COORDINATED SYSTEM FOR MANAGING THE BHAKRA–PONG RESERVOIR NETWORK. RIGID DAM OPERATION RULES AND DELAYED RELEASE DECISIONS WORSENED FLOODING, SHOWING THE URGENT NEED FOR A DATA - DRIVEN , REAL - TIME FLOOD MANAGEMENT FRAMEWORK.

Chailsi Thakur[1], Vanshika Sharma[1], Kanvi[1], Nandini Sharma[1], Jagriti[1], Arshpreet Kaur[1]
[1] *Department of Computer Science and Engineering, UIET*

ABSTRACT

This project proposes an AI-assisted flood management framework designed to support water authorities in making faster and more informed decisions during extreme rainfall events. The goal is to build a prototype or simulation model that demonstrates how real-time data and artificial intelligence can help optimize dam operations to reduce flood risk. The system will consist of two main components: -- Forecasting Module: This part will use machine learning models such as Convolutional LSTM (ConvLSTM) networks to analyze rainfall, river flow, and reservoir data. These models can recognize spatio-temporal patterns to predict water level rises more accurately and provide early warnings. Decision-Support Module: A simplified reinforcement learning setup will be used to simulate how multiple reservoirs, treated as intelligent agents, can coordinate their water releases dynamically. The model will aim to maintain safety margins while preventing downstream flooding. The outcome will be a conceptual, data-driven framework that demonstrates the potential of AI in enhancing flood resilience. It emphasizes collaboration between hydrology, machine learning, and environmental management, paving the way for smarter and climate-resilient water governance in Punjab.

OP50. MULTI-LAYER BLOCKCHAIN SECURITY MODELS FOR IOT: A REVIEW AND EXTENSION

Dev Pratap Singh[1], Roopali Garg[2], Rajkumari[2]
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ABSTRACT

The Internet of Things (IoT) devices generate huge amounts of private data that requires strong security mechanisms to ensure authenticity, integrity, and privacy. Traditional approaches often give drawbacks in scalability, trust and single point of failure. This review

inspects a specific 5 step multi-layer blockchain architecture designed to secure IoT device by these steps : data verification, hashing, and local storage at a gateway , transaction log on a permissioned local Hyperledger Fabric blockchain; aggregation of hashed transactions using Merkle trees in a relay layer, and final anchoring on a public blockchain such as Solana or Ethereum for immutable records .We analyze the security benefits and challenges of each step in this workflow with respect to core IoT challenges including latency, scalability, and privacy. Direct application of public blockchains to large-scale IoT deployments may cause in performance like limitations, high costs, and potential privacy concerns. The paper compares this model with foundational works like the Multi-Layer Blockchain Security Model (MLBSM) and its Enhanced version (EMLBSM), highlighting this approach's detailed workflow and cryptographic techniques. Then we will discuss blockchain platform choices, consensus methods appropriated for IoT, security technologies in enhancing blockchain-IoT solutions. Our analysis indicates that layered blockchains combining Hyperledger Fabric's permissioned features with high-throughput public ledgers like Solana provide a feasible, scalable, and secure foundation for future IoT ecosystems.

OP51. PAPER REVIEW ON "BRAIN SIGNAL CLASSIFICATION"

Dev Vrat[1]

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ABSTRACT

Brain signal classification is a central task in brain–computer interface (BCI) research, aiming to interpret neural activity and convert it into meaningful control commands. Electroencephalography (EEG) is one of the most widely used modalities for this purpose because it is non-invasive, inexpensive, and provides good temporal resolution. The process generally involves four main stages: data collection, noise and artifact reduction, feature extraction, and classification. Despite major progress, accurately classifying EEG signals remains difficult due to their low amplitude, high variability across subjects, and non-stationary nature. Traditional machine learning algorithms—such as support vector machines, linear discriminant analysis, and random forests—have achieved moderate success in controlled settings. However, recent developments in deep learning, particularly convolutional and recurrent neural networks, have significantly improved performance by automatically learning complex temporal and spatial patterns in EEG data. Hybrid and transfer learning approaches are also gaining attention for their potential to handle subject variability and reduce calibration time. Current challenges include limited data availability, overfitting in deep models, and difficulties in real-time generalization. Future research is expected to focus on adaptive learning frameworks, multimodal fusion of brain signals, and more efficient training strategies to enhance robustness and real-world usability of BCI systems.

OP52. AI-POWERED DERMATOLOGICAL DISEASE PREDICTION SYSTEM

Dhriti kakkar[1], Akash Biswas[1]
[1] Undergraduate, UIET, PU

ABSTRACT

Human skin varies widely due to variation in pigmentation,exposure to sun and disorders. Many skin diseases overlaps, for instance Acne with Rosacea, due to which it makes it a difficult challenge for the AI model to predict the skin disease. The model in the app aims to assist the individuals with limited access to dermatologists by using advanced AI deep learning models and parallel computing for accurate skin disease prediction out of the 22 most widespread diseases including Dermatitis, Acne, Rosacea, Melasma, Vitiligo, Psoriasis, Eczema, Lupus, Blister, Candidiasis, Fungal infection, Hives, Warts ,Ringworm, Impetigo, Scabies, Cellulitis, Cold sores, Shingles, Chicken pox. Training the single model on 22 diseases is a big challenge moreover preparation of the data set of these 22 diseases is another challenge. Users can input the textual responses and upload their images for the diagnosis which results into reliable predictions based on the image and the text analysis. Moreover it also features an integrated chatbot that makes it user friendly. The AI model predicts the type as well as the severity level of the disease. This way it can assist the individuals widely who are present in the remote areas where the dermatologists are not available.

OP53. TALK2TEXT - A WEB APP DESIGNED TO AID PEOPLE WITH SPEECH DISABILITIES

Gayatri Mehta[1], Avantika Pandey[1], Kashvi Sharma[1], Komalpreet Kaur[1], Niharika[1]
[1] UIET, Chandigarh, Dept CSE

ABSTRACT

Speech therapy for individuals with speech disorders that impact pronunciation and fluency—often faces accessibility and engagement challenges, particularly among children. This project presents Talk2Text, a real-time web application that provides interactive pronunciation feedback using OpenAI's Whisper model. The system enables users to speak through a browser microphone, receive instant word-level feedback and practice corrections via text-to-speech. It features two portals: a Patient Portal for practice, scoring and progress tracking and a Therapist Portal for monitoring, rubric customization and automated PDF report generation. Whisper-small, deployed via Transformers.js, achieved the best balance of speed, accuracy and device compatibility for browser-based inference without GPU dependence. The system integrates Firebase for authentication and data storage, Chart.js for progress visualization and jsPDF for

report generation. Gamified elements like retry loops, badges and visual scores enhance motivation, while all processing occurs locally for privacy and scalability. The proposed solution bridges speech therapy and AI by offering an accessible, low-cost and privacy-preserving digital therapeutic tool that can be extended to multilingual settings and remote rehabilitation. Future directions include phoneme-level feedback, multilingual support and clinical validation through partnerships with speech therapists.

OP54. A SYSTEMATIC ASSESSMENT OF PERFORMANCE IN TEXT-TO-VIDEO GENERATIVE MODELS

Gourav Kashiv[1], Dr. Sarbjeet Singh[1]

[1] *University Institute of Engineering and Technology, PU, Chandigarh*

ABSTRACT

Diffusion-based models have accelerated the development of text-to-video (T2V) generation, but producing high-quality video outputs while preserving computational efficiency is still difficult. The use of Low-Rank Adaptation with Feature Alignment (LoRA FA) for parameter-efficient fine-tuning of large T2V diffusion models, such as ModelScope, Zeroscope 320, and Zeroscope 576, is examined in this paper. Qualitative assessments of semantic fidelity and temporal coherence, as well as quantitative tests employing CLIP, Sharpness, SSIM, and PSNR metrics, show that LoRA-FA consistently improves video generation performance. Notably, ModelScope maintained balanced improvements across all metrics, while Zeroscope 576 achieved the biggest gains in semantic alignment and perceptual sharpness. The results demonstrate how well LoRA-FA works to enhance video quality in low-resource scenarios without requiring complete model retraining. This work lays the groundwork for future studies in multimodal and domain-specific video generation applications and offers a flexible, scalable framework for effective T2V model optimisation.

OP55. AI-BASED PROGNOSTICS IN POWER ELECTRONIC CONVERTERS

Harkit Kaur Khalsa[1], Dr Puneet Kaur[2], Dr Aditi Gupta[3]

[1] *Department of EEE, UIET, Panjab University,* [2] *Associate Professor, Department of EEE, UIET, Panjab University,* [3] *Assistant Professor, Department of EEE, UIET, Panjab University*

ABSTRACT

In this review paper, the focus is on AI-based prognostics in power electronic converters. The first major insight is the recent evolution of artificial intelligence in power electronic

converters, with emphasis on performance, sustainability, efficiency, and reliability. As modern power systems grow more complex, power converters have become unavoidable due to their remarkable capabilities. To keep the system running at its best, it is important to integrate AI. This review underlines AI's significance in the design, maintenance, and especially in data-driven prognostics of power electronic converters. The second key insight involves AI-driven methodologies, such as deep learning and hybrid machine learning models, which are increasingly used for remaining useful life (RUL) prediction of critical power converter components like electrolytic capacitors. This helps prevent failures in important applications such as electric vehicles. The studies surveyed the use of approaches such as multivariate LSTM (Long Short-Term Memory) and CNN-LSTM, which provide accurate health assessments and prognoses of power electronic converters in multi-fault conditions. AI outperform the traditional techniques by learning from actual operational data, enabling effective fault prediction. However, achieving reliable performance requires accurate datasets for training AI models effectively. Overall, these insights underscore significant changes in power systems enabled by AI. Although this field is still in its early stages and further advancements are expected, this review shows that AI-enabled prognostics can monitor, detect, diagnose, and predict faults in power converters, bridging the gap between laboratory research and industrial deployment.

OP56. SUSTAINABLE SYNTHESIS AND FTIR ANALYSIS OF CELLULOSE DERIVED FROM WHEAT STRAW

Harleen Kaur[1], Riya[1], Navneet Kaur[2], Kamlesh Kumari[2]
[1] Student, [2] Professor

ABSTRACT

This study uses a controlled stepwise alkaline treatment to extract high-purity cellulose from wheat straw in an innovative and optimised way. After two hours of treatment in an oven with a 5% sodium hydroxide (NaOH) solution, the wheat straw is strained, cleaned, and dried. By obtaining almost 95% structural similarity to reference cellulose, as verified by Fourier Transform Infrared (FTIR) spectroscopy, a second identical NaOH treatment and drying stage improves cellulose purity. In contrast, three consecutive cycles reduce the purity to around 85% because of cellulose degradation, whereas a single cycle treatment produces about 90% similarity. The two-cycle method offers a scalable way to recovering cellulose from agricultural leftovers and is easy to use, economical, and ecologically friendly. The resultant cellulose has a lot of potential uses in wastewater treatment, hydrogels, biopolymers, papermaking, and nanocellulose.

OP57. INTEGRATING DEEP LEARNING AND LLMS FOR RAPID INTRACRANIAL HEMORRHAGE DIAGNOSIS AND PATIENT ENGAGEMENT

Harleen Kaur[1], Mamta Juneja[1]
[1] *UIET, Panjab University, Chandigarh*

ABSTRACT

Intracranial Hemorrhage (ICH) is a time-critical condition requiring rapid diagnosis and clear communication between healthcare providers and patients. This work presents a dual approach: (i) a hybrid deep learning framework for automated ICH detection and multi subtype classification from head CT scans, and (ii) a dual-audience chatbot system to support patient and clinician communication. The ICH diagnosis framework leverages convolutional neural networks (ResNet50, DenseNet169, VGG16) and Vision Transformers (ViT) in ensemble architectures, achieving up to 96% accuracy in binary detection and an AUC of 0.99 for multi-label classification on the RSNA ICH dataset, with external validation carried on CQ500 dataset. For communication, instruction-tuned open-source LLMs (Gemma and Falcon) are fine-tuned with LoRA and PEFT techniques on a parallel dataset tailored for layman and medical audiences. Retrieval-Augmented Generation (RAG) ensures factual accuracy and contextually appropriate responses. Evaluation demonstrates improved semantic accuracy, fluency, and tone adaptation, bridging understanding gaps in critical care. This integrated pipeline highlights the potential of AI to accelerate diagnosis, enhance clinical decision-making, and support effective patient engagement in time-sensitive and resource-constrained settings.

OP58. FINANCIAL - AI - ADVISOR

Harpreet singh[1], Harshdeep Singh[1], Jashanpreet singh[1]
[1] *UIET,Panjab University,Chandigarh*

ABSTRACT

The stock market is inherently volatile and complex, often posing challenges for novice investors in making informed decisions. This project presents an AI-powered financial advisory system that integrates predictive analytics with an interactive conversational interface to simplify investment decision-making. The system comprises two primary components: machine learning models for stock price forecasting and a large language model (LLM) that delivers personalized, user-friendly guidance in natural language. For the forecasting module, historical stock data—including Reliance Industries (RELIANCE.NS) and Apple—was collected using the yfinance API. Six time-series forecasting models—ARIMA, Prophet, LSTM, GRU, XGBoost, and N-BEATS—were implemented and rigorously evaluated. A comparative analysis was conducted to identify the most effective model, with performance assessed across multiple error metrics.

Future work will focus on refining the forecasting models to enhance predictive accuracy, integrating the LLM to provide tailored investment recommendations, and developing an interactive frontend dashboard for visualization. By combining predictive analytics with conversational AI, this system aims to make stock market insights more transparent and accessible, particularly for beginners with limited financial expertise.

OP59. FINANCIAL A.I ADVISOR

Harshdeep Singh[1], Jashanpreet Singh[1], Harpreet Singh[1]
[1] *UIET,PANJAB UNIVERSITY*

ABSTRACT

The stock market is inherently volatile and complex, often posing challenges for novice investors in making informed decisions. This project presents an AI-powered financial advisory system that integrates predictive analytics with an interactive conversational interface to simplify investment decision-making. The system comprises two primary components: machine learning models for stock price forecasting and a large language model (*LLM*) that delivers personalized, user-friendly guidance in natural language. For the forecasting module, historical stock data—including Reliance Industries (RELIANCE.NS) and Apple—was collected using the *yfinance* API. Six time-series forecasting models—ARIMA, Prophet, LSTM, GRU, XGBoost, and N-BEATS were implemented and rigorously evaluated. A comparative analysis was conducted to identify the most effective model, with performance assessed across multiple error metrics. Future work will focus on refining the forecasting models to enhance predictive accuracy, integrating the *LLM* to provide tailored investment recommendations, and developing an interactive frontend dashboard for visualization. By combining predictive analytics with conversational AI, this system aims to make stock market insights more transparent and accessible, particularly for beginners with limited financial expertise.

OP60. ALIGNEYE: REDEFINING POSTURE USING WEARABLES

Harshit Kumar[1], Prashant Prakash[1], Mancharan Kaur[1]
[1] *Panjab University*

ABSTRACT

AlignEye is a wearable device that utilizes acupressure-based vibration therapy, providing instant pain relief in under three minutes. However, AlignEye offers more than just therapy. It monitors real-time posture using AI and motion sensors, providing gentle vibration feedback when the user's posture deviates from the ideal position. This feature helps train users to self-correct their posture. AlignEye also tracks long-term posture data, offers analytics and insights, and can integrate with a mobile app or health dashboard.

OP61. AI FOR FINANCIAL INCLUSION: COMPARING MACHINE LEARNING AND LANGUAGE MODELS FOR CREDIT ASSESSMENT IN RURAL ECONOMIES

Ira Bhatia[1], Amanpreet Kaur[1]
[1] University Institute of Engineering and Technology, Panjab University

ABSTRACT

Financial inclusion is a vital pillar of India's economic progress, yet millions in rural areas remain outside the reach of formal credit systems due to limited financial histories and documentation. This paper explores how Artificial Intelligence, through Machine Learning (ML) and Large Language Models (LLMs), can help bridge this gap by enabling smarter, data-driven assessments of creditworthiness. ML models analyze structured, non-traditional data such as mobile transactions, payment records, and spending behavior to predict credit reliability, while LLMs can interpret unstructured data like text inputs, local-language communication, and social interactions to capture deeper behavioral insights. The study compares both approaches in terms of accuracy, fairness, interpretability, and scalability, and explores how they can be integrated with India's digital public infrastructure, including Aadhaar, UPI, and DigiLocker, to build transparent and accessible lending systems. Using simulated rural datasets, this research highlights how AI-powered systems can support microloans and personalized credit evaluations, empowering underserved communities to participate more fully in the economy. Ultimately, it aims to show how combining AI with digital innovation can promote a more equitable, inclusive, and sustainable financial ecosystem across India.

OP62. THE 2025 PUNJAB FLOODS HIGHLIGHTED THE LACK OF A DYNAMIC AND COORDINATED SYSTEM FOR MANAGING THE BHAKRA–PONG RESERVOIR NETWORK. RIGID DAM OPERATION RULES AND DELAYED RELEASE DECISIONS WORSENED FLOODING, SHOWING THE URGENT NEED FOR A DATA-DRIVEN, REAL-TIME FLOOD MANAGEMENT FRAMEWORK.

Jagriti[1], Chailsi Thakur[1], Vanshika Sharma[1], Kanvi[1], Nandini Sharma[1], Arshpreet Kaur[1]
[1] Department of Computer Science and Engineering, UIET

ABSTRACT

This project proposes an AI-assisted flood management framework designed to support

water authorities in making faster and more informed decisions during extreme rainfall events. The goal is to build a prototype or simulation model that demonstrates how real-time data and artificial intelligence can help optimize dam operations to reduce flood risk. The system will consist of two main components: Forecasting Module: This part will use machine learning models such as Convolutional LSTM (ConvLSTM) networks to analyze rainfall, river flow, and reservoir data. These models can recognize spatio-temporal patterns to predict water level rises more accurately and provide early warnings. Decision-Support Module: A simplified reinforcement learning setup will be used to simulate how multiple reservoirs, treated as intelligent agents, can coordinate their water releases dynamically. The model will aim to maintain safety margins while preventing downstream flooding. The outcome will be a conceptual, data-driven framework that demonstrates the potential of AI in enhancing flood resilience. It emphasizes collaboration between hydrology, machine learning, and environmental management, paving the way for smarter and climate-resilient water governance in PUNJAB

OP63. FINANCIAL AI ADVISOR

Jashanpreet Singh[1], Harshdeep Singh[1], Harpreet Singh[1]

[1] *UIET,PANJAB UNIVERSITY*

ABSTRACT

The stock market is inherently volatile and complex, often posing challenges for novice investors in making informed decisions. This project presents an AI-powered financial advisory system that integrates predictive analytics with an interactive conversational interface to simplify investment decision-making. The system comprises two primary components: machine learning models for stock price forecasting and a large language model (*LLM*) that delivers personalized, user-friendly guidance in natural language. For the forecasting module, historical stock data—including Reliance Industries (RELIANCE.NS) and Apple—was collected using the yfinance API. Six time-series forecasting models—ARIMA, Prophet, LSTM, GRU, XGBoost, and N-BEATS—were implemented and rigorously evaluated. A comparative analysis was conducted to identify the most effective model, with performance assessed across multiple error metrics. Future work will focus on refining the forecasting models to enhance predictive accuracy, integrating the *LLM* to provide tailored investment recommendations, and developing an interactive frontend dashboard for visualization. By combining predictive analytics with conversational AI, this system aims to make stock market insights more transparent and accessible, particularly for beginners with limited financial expertise.

OP64. AUTOMATED SKIN DISEASE CLASSIFICATION USING DEEP LEARNING AND DERMOSCOPIC IMAGING

Harleen Kaur[1], Jasjit Singh Dhanoa[1], Dr. Mamta Juneja[1]
[1] *U.I.E.T. Panjab University*

ABSTRACT

Skin diseases are among the most prevalent health concerns worldwide, and accurate early diagnosis is critical to prevent complications. This study aims to develop a deep learning–based framework for automated classification of skin lesions from dermoscopic images. A curated dataset containing various lesion types, including melanoma, dermatitis, keratosis etc. was preprocessed through hair-artifact removal, contrast enhancement, and image normalization. Transfer learning was employed using a fine-tuned ResNet50 model to extract discriminative features, followed by softmax classification. Data augmentation techniques were applied to address class imbalance and improve model generalization. Experimental results achieved an accuracy of 94% and an AUC of 0.97 on the test set, outperforming conventional feature-based methods. The proposed system demonstrates potential for assisting dermatologists in rapid screening and risk assessment, offering a scalable, cost-effective solution for early skin disease detection.

OP65. THE 2025 PUNJAB FLOODS HIGHLIGHTED THE LACK OF A DYNAMIC AND COORDINATED SYSTEM FOR MANAGING THE BHAKRA–PONG RESERVOIR NETWORK. RIGID DAM OPERATION RULES AND DELAYED RELEASE DECISIONS WORSENED FLOODING, SHOWING THE URGENT NEED FOR A DATA-DRIVEN, REAL-TIME FLOOD MANAGEMENT FRAMEWORK.

Kanvi[1], Vanshika Sharma[1], Chailsi Thakur[1], Arshpreet Kaur[1], Jagriti[1], Nandini Sharma[1]
[1] *Department of Computer Science and Engineering, UIET*

ABSTRACT

This project proposes an AI-assisted flood management framework designed to support water authorities in making faster and more informed decisions during extreme rainfall events. The goal is to build a prototype or simulation model that demonstrates how real-time data and artificial intelligence can help optimize dam operations to reduce flood risk. The system will consist of two main components: Forecasting Module: This part will use

machine learning models such as Convolutional LSTM (ConvLSTM) networks to analyze rainfall, river flow, and reservoir data. These models can recognize spatio-temporal patterns to predict water level rises more accurately and provide early warnings. Decision-Support Module: A simplified reinforcement learning setup will be used to simulate how multiple reservoirs, treated as intelligent agents, can coordinate their water releases dynamically. The model will aim to maintain safety margins while preventing downstream flooding. The outcome will be a conceptual, data-driven framework that demonstrates the potential of AI in enhancing flood resilience. It emphasizes collaboration between hydrology, machine learning, and environmental management, paving the way for smarter and climate-resilient water governance in Punjab.

OP66. SPEECH PRONUNCIATION GAMIFIED WEB APP

Kashvi Sharma[1]

[1] *P Club*

ABSTRACT

Speech therapy is essential for individuals with pronunciation and fluency problem. Traditional therapy is often inaccessible or provides limited feedback. Hence, developed an interactive, real-time web application to support patients—especially children—in improving speech fluency and articulation. The app allows users to speak sentences through a microphone and provides instant pronunciation feedback using Whisper, an open-source automatic speech recognition (ASR) model. Incorrectly pronounced words trigger gamified corrective prompts with text-to-speech, making practice engaging. The platform features *dual portals*: a Patient Portal for practice, scoring, and progress tracking, and a Therapist Portal for reviewing patient history, assigning exercises, and generating reports. We benchmarked multiple open-source ASR models (Vosk, Coqui STT, Whisper Tiny–Large) based on accuracy, latency, and memory usage, ultimately selecting Whisper-small for its optimal balance between performance and model size. The system leverages JavaScript, Firebase, and Transformers.js for browser-based inference, enabling accessibility without dedicated GPU resources. This design ensures a scalable, low-cost, and user-friendly solution for interactive speech therapy. Personalised feedback, retry mechanisms, and visual cues motivate patients while allowing therapists to monitor and guide progress effectively. Our platform aims to improve speech outcomes, support continuous practice, and enhance quality of life for patients with speech difficulties. By combining real-time ASR, *gamification*, and dual workflow design, it bridges the gap between traditional therapy and modern, accessible digital solutions.

Keywords: Speech Therapy, Whisper, *Automatic Speech Recognition*, Pronunciation Feedback, *Real-Time Web App*

OP67. THE COMPARATIVE ANALYSIS OF TEXT-TO-IMAGE GENERATION MODELS

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ABSTRACT

Generative Artificial Intelligence (GAI) is a branch of AI capable of producing novel content such as text, images, video, audio, and music. With recent advancements in GAI, there have been significant breakthroughs in text-to-image generation, which translates written text into realistic or imaginative visual content. This research aims to conduct a comparative analysis of leading generative AI models for text-to-image generation, focusing on their underlying architectures, performance, and application scope. The analysis explores different deep learning models for text-to-image 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 image quality, alignment with textual descriptions, computational efficiency, and generalization capabilities. Preliminary evaluations indicate that these models perform well in generating images from simple text prompts but often struggle with maintaining accuracy, consistency, and fine-grained details for complex or abstract prompts. However, early findings suggest that combining different model architectures and fine-tuning techniques could lead to improved results in terms of both quality and efficiency. Ultimately, this research seeks to provide a deeper understanding of how different GAI models — particularly Stable Diffusion v1.5 and Kandinsky 3.0 — handle text-to-image generation, with the aim of informing future developments in the field and highlighting areas for further exploration.

OP68. ADVANCES IN MECHANICAL VIBRATION SUPPRESSION TECHNIQUES FOR MECHANICAL SYSTEMS: A COMPREHENSIVE REVIEW

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[1] *Department of Mechanical Engineering, UIET, Panjab University, Chandigarh*

ABSTRACT

Mechanical vibrations are inherent in most engineering systems and often lead to

undesirable effects such as noise, reduced performance, structural fatigue, and failure. Effective vibration suppression is therefore crucial to enhancing the reliability, efficiency, and lifespan of mechanical systems. This review paper presents a comprehensive analysis of state-of-the-art vibration suppression techniques, encompassing both passive and active control strategies, as well as emerging semi-active and hybrid approaches. Passive methods, including damping materials, tuned mass dampers, and isolation mounts, are discussed in terms of design optimization and material innovations. Active vibration control techniques—employing sensors, actuators, and feedback algorithms—are reviewed with emphasis on adaptive and intelligent control schemes. The paper also highlights recent developments in smart materials such as piezoelectric and magnetorheological devices, which enable real-time tunable vibration mitigation. Furthermore, advancements in computational modeling, optimization, and machine learning are explored as enablers of next-generation vibration control systems. Finally, future research directions are proposed, focusing on energy-efficient, adaptive, and integrated vibration suppression systems for complex and lightweight mechanical structures.

Keywords: Vibration control, automobile systems, active suspension, passive damping, semi-active control, smart materials, NVH reduction.

OP69. ORGAN CONNECT: AN INTEGRATED AI-POWERED PLATFORM TO REVOLUTIONIZE THE ORGAN DONATION ECOSYSTEM IN INDIA

Maanya Kharbanda[1], Aditya Poddar[1], Navreet Kaur[1], Nidhi[1], Prince Raj[2]
[1] UIET, PU, [2] Galgotias University

ABSTRACT

The critical disparity between the demand for and supply of transplantable organs in India is a major healthcare challenge, compounded by logistical inefficiencies, fragmented data, and a lack of public awareness. This paper introduces a novel, integrated digital platform designed to bridge this gap by creating a unified, real-time ecosystem for organ donation and allocation across India. Our proposed system features a centralized database where recipients can post their requirements and be instantaneously matched with either available organs from a pan-India inventory or registered, willing donors. A key innovation is the integration of a Large Language Model (LLM)-powered chatbot, which serves as a conversational interface to simplify user registration, provide instant support, and disseminate crucial information, thereby enhancing accessibility and user experience.

Furthermore, the platform incorporates a dedicated social media module to connect Non-Governmental Organizations (NGOs), activists, and the general public. This component is designed to foster a collaborative community, amplify awareness campaigns, and encourage a societal shift towards organ donation. By synergizing real-time matching technology with conversational AI and a community-driven social network, this platform aims to drastically reduce organ wait times, streamline the allocation process, and increase the national organ donor pool. This holistic approach has the potential to significantly improve patient outcomes and create a more efficient, transparent, and responsive organ donation network in India.

OP70. 3D MODELLING AND PRINTING OF PATIENT SPECIFIC CRANIAL IMPLANTS.

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ABSTRACT

Designing & modelling patient specific implants using CAD softwares helps for cranial implants. The cranial sections need to be made quickly and accurately in order to treat the patient as soon as possible. Cranial implants have been made out of titanium for a very long time. It is a time consuming and expensive method as it includes CNC machining the titanium, which is not a very easy metal to machine, with the utmost accuracy. To reduce the cost of cranial implants and make the process faster without compromising the precision, we can use various new CAD softwares that allow us to make the 3D model of our implant and then it can be 3D printed out of bio-compatible materials cheaply. This reduces time consumed and cost without compromising the fit and accuracy.

OP71. AUTOMATED BRAIN TUMOR SEGMENTATION USING MULTISCALE ATTENTION EFFICIENTNET-B4 WITH ITERATIVE MODEL PRUNING

Maitri[1], Akashdeep Sharma[1]

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ABSTRACT

Brain tumor segmentation from MRI scans is crucial for accurate diagnosis and treatment planning. Manual segmentation is time-consuming and prone to errors. This project proposes an automated deep learning-based approach using an EfficientNet-B4 model integrated with a multiscale attention U-Net and iterative magnitude-based model pruning to segment tumor regions efficiently. The model was trained and evaluated on the Figshare Brain Tumor Segmentation Dataset, achieving a Dice Coefficient of approximately 93.7% and an accuracy of 99.7%. The results demonstrate that the proposed approach can reliably delineate tumor regions, providing a fast and effective tool to assist radiologists in clinical decision-making.

OP72. A NOVEL HYBRID ML-DL FRAMEWORK FOR EARLY DETECTION OF LIVER CIRRHOSIS

Harleen Kaur[1], Manak Saggu[1], Mamta Juneja[1]

[1] *UIET, Panjab University, Chandigarh*

ABSTRACT

Background: Liver cirrhosis is a progressive chronic liver disease that poses a major global health concern due to its asymptomatic onset and limited therapeutic options at advanced stages. Early diagnosis remains critical for improving patient outcomes and reducing mortality. Objectives: This study aims to develop a hybrid deep learning framework integrating Bidirectional Long Short-Term Memory (BiLSTM) networks with Support Vector Machines (SVM) for early and accurate detection of liver cirrhosis using clinical data. Methods: The proposed BiLSTM–SVM model combines the sequential feature extraction capability of BiLSTM with the discriminative power of SVM to effectively capture nonlinear dependencies and hidden patterns in patient records. Prior to model training, comprehensive statistical analyses: including descriptive statistics, correlation mapping, and significance testing, were performed to identify key biochemical indicators associated with cirrhosis progression. The model was trained and validated using the Indian Liver Patient Dataset (ILPD). Results: The hybrid model achieved an accuracy of 96.4%, outperforming conventional machine learning and standalone deep learning models. It also demonstrated reduced false classifications, confirming its robustness and reliability for clinical decision support. Conclusion: The study underscores the potential of combining ML and DL paradigms for improved liver cirrhosis diagnosis and patient management. The proposed framework offers a scalable, interpretable, and efficient solution for real-world healthcare deployment, enabling early diagnosis, timely intervention, and reduced cirrhosis-related mortality.

OP73. SVM-BASED ANEMIA DETECTION USING HEMATOLOGICAL FEATURES

Manureet Kaur[1], Mukesh Kumar[1], Sukhwinder Singh[1]
[1] *UIET Panjab University*

ABSTRACT

Anemia is a widespread public health condition that can be detected through changes in hematological parameters. In this study, Support Vector Machine (SVM) is employed as a machine learning method to classify individuals as anemic or non-anemic based on four key complete blood count (CBC) features: Hemoglobin (Hb), Red Blood Cell count (RBC), Mean Corpuscular Volume (MCV), and Mean Corpuscular Hemoglobin (MCH). Three SVM kernels—Linear, Radial Basis Function (RBF), and Polynomial—were evaluated through hyperparameter tuning and 5-fold cross-validation on a training dataset of 1,000 samples. Among all tested kernels, the Polynomial kernel performed best, recording 99.7% accuracy on internal validation and 95.2% on external evaluation. Both RBF and Polynomial models showed perfect sensitivity (1.0), highlighting their ability to identify all anemic cases. Additional experiments analysed the impact of excluding Hb from the feature set, revealing its strong influence on classification accuracy. The study demonstrates the effectiveness of SVM models, particularly with non-linear kernels, in early anemia detection using routine blood test data.
Keywords – Anemia Classification, Support Vector Machine, Hematological Parameters, CBC Test, Hyperparameter Tuning

OP74. AI-DRIVEN INTERVIEW PREPARATION PLATFORM

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[1] *Undergraduate, UIET*

ABSTRACT

Our platform is an end-to-end AI-driven interview preparation platform designed to help students excel in technical recruitment processes through personalized, data-informed guidance. It begins with AI-powered job ingestion and profile creation, where advanced language models analyze job descriptions to extract key skills, experience levels, and role patterns, automatically tailoring interview templates for each position. In the intelligent resume screening stage, the system performs semantic matching, skill proficiency inference, and candidate ranking—offering candidates automated feedback to refine their resumes for better alignment with target roles. Once shortlisted, candidates progress to role-specific pre-interview assessments, including interactive coding challenges, aptitude tests, system design simulations, data analysis tasks, and situational judgment exercises—all dynamically adapted to product-based, service-based, or analyst roles. The next phase features AI-powered virtual interview sessions with realistic voice-based and avatar-driven interviewers capable of dynamic questioning, behavioral analysis (STAR method), and live technical probing to simulate authentic industry interviews. Additionally, the platform provides group discussion (GD) practice sessions, allowing students to enhance their communication, teamwork, and critical thinking in collaborative settings. Following each interview, the system generates comprehensive post-interview analytics, including detailed scorecards, communication insights, and personalized improvement plans supported by AI-driven feedback. By combining intelligent automation, real-time evaluation, and skill-focused guidance, the platform empowers students to build confidence, bridge skill gaps, and achieve success in competitive technical interviews.

OP75. CONNECTED CARE

Mehak Randhawa[1], Roshleen Singla[1], Samriti[1]

[1] *UIET Panjab University*

ABSTRACT

Adherence to tuberculosis (TB) medication is essential for effective treatment, yet many patients find it difficult to maintain regularity. To overcome this issue, we have developed a mobile reminder app and a WhatsApp-based automation chatbot aimed at simplifying and improving TB care. The reminder app sends timely alerts to encourage patients to take their medication on time, while the WhatsApp chatbot complements it by engaging with patients through daily automated messages and can also place calls to doctors when necessary. This project offers an accessible and compassionate digital solution that helps patients remain consistent, informed, and connected throughout their course of treatment.

OP76. INTEGRATED DESIGN OF SUSPENSION AND BRAKING SYSTEMS FOR AN H-BAJA ALL-TERRAIN VEHICLE

Pratimaan Tripathi[1], Navjot Singh[1], Shankar Sehgal[1], Bhuvan Goyal[2]

[1] *Mechanical Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh, India,,* [2] *Mechanical Engineering Department, PEC Deemed to be University, Chandigarh, India*

ABSTRACT

This study investigates the integrated design of suspension and braking systems for an H-BAJA All-Terrain Vehicle (ATV), in accordance with BAJA SAEINDIA 2026 guidelines.

The objective was to design a safe, reliable, and high performance suspension and braking system capable of enduring extreme off-road conditions. Double wishbone suspension was selected for the front to attain steering accuracy and for maintaining camber control. An H-arm configuration was adopted at the rear side to enhance load stability and maintain grip over rough surfaces. Core components like the control arms and mounting brackets were developed using SolidWorks and Lotus Suspension Analysis. The suspension's ability to resist the stresses of off-road racing was assessed through detailed simulation analysis. Further, all four wheels were equipped with hydraulic disc brakes. The setup included a Bosch tandem master cylinder (19.05 mm bore) working together with Willwood PS1 callipers. To manage heat and maintain consistent performance, SS410 ventilated rotors and steel-braided brake lines were used. Computer-aided design method was used to check the performance of the proposed system in terms of torque, deceleration, and stopping distance. The proposed design can be fabricated and tested under real off-road conditions in future.

OP77. TALK2TEXT

Niharika[1]

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ABSTRACT

Speech therapy for individuals with dysarthria—a motor speech disorder that impairs pronunciation and fluency—often faces accessibility and engagement challenges, particularly among children. This project presents Talk2Text, a real-time web application that provides interactive pronunciation feedback using Open AI’s Whisper model. The system enables users to speak through a browser microphone, receive instant word-level feedback, and practice corrections via text-to-speech. It features two portals: a Patient Portal for practice, scoring, and progress tracking, and a Therapist Portal for monitoring, rubric customization, and automated PDF report generation. We benchmarked multiple open-source ASR models—Vosk, Coqui STT, and Whisper (Tiny–Large)—using metrics such as *Word Error Rate (WER)*, latency, and memory efficiency. Whisper-small, deployed via Transformers.js, achieved the best balance of speed, accuracy, and device compatibility for browser-based inference without GPU dependence. The system integrates Firebase for authentication and data storage, Chart.js for progress visualization, and jsPDF for report generation. Gamified elements like retry loops, badges, and visual scores enhance motivation, while all processing occurs locally for privacy and scalability. The proposed solution bridges speech therapy and AI by offering an accessible, low-cost, and privacy-preserving digital therapeutic tool that can be extended to multilingual settings and remote rehabilitation. Future directions include phoneme-level feedback, multilingual support, and clinical validation through partnerships with speech therapists.

OP78. ENHANCING TRANSPARENCY IN PROSTATE CANCER SEGMENTATION USING DEEP LEARNING AND XAI TECHNIQUES

Nitin Pandey[1], Mamta Juneja[1], Naveen Aggarwal[1], Sumindar Kaur Saini[1], Tanya Gandhi[1], Vishal kumar Kasav[1]

[1] *UIET Panjab University*

ABSTRACT

Prostate cancer ranks as the second most prevalent cancer among men worldwide, following lung cancer, and remains a leading cause of cancer-related mortality. Early detection and accurate delineation of cancerous regions within the prostate gland play a crucial role in treatment planning and prognosis. However, manual segmentation of prostate tumors from multiparametric magnetic resonance imaging (mp-MRI) is a challenging and time consuming task due to heterogeneous tissue appearance, inter-patient variability, and low contrast between cancerous and healthy tissues. Deep learning-based methods have demonstrated strong potential for automated medical image segmentation, yet their decision making process often lacks transparency, limiting clinical adoption. This research presents a novel deep learning framework for automated segmentation of prostate cancer from prostate MRI scans and introduces interpretability mechanisms to explain the model's predictions using state-of-the-art explainable artificial intelligence (XAI) techniques. The proposed methodology utilizes mp-MRI data from 19 patients, incorporating T2-weighted (T2W) and dynamic contrast-enhanced (DCE) modalities. The preprocessing pipeline includes center based cropping, image–mask pair augmentation, and normalization. A modified U-Net architecture was employed to enhance feature representation and focus on discriminative regions. The model's interpretability was assessed using Grad-CAM, Grad-CAM++, Score CAM, Partial Dependence Pixel (PDP), LIME, and occlusion-based XAI methods to visualize and analyze the regions contributing to the model's predictions. These complementary interpretability techniques provide multi-perspective insights into the learned representations, promoting better clinical trust and transparency in automated prostate cancer diagnosis.

OP79. DETECTION AND INTERVENTION OF AUTISM SPECTRUM DISORDER: AN AI DRIVEN APPROACH

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ABSTRACT

Research on autism is undergoing a revolution because to Artificial Intelligence (AI), which makes it possible to use sophisticated computer techniques for early identification

and individualized treatments. Compared to conventional diagnostic methods, machine learning algorithms can accurately identify subtle ASD characteristics by analyzing multimodal data, such as speech patterns, facial expressions, and eye-tracking metrics. AI enables early detection and more precise diagnosis by recognizing behavioral signals that are frequently invisible to human observation. Application of AI is significant in providing tailored therapies that change in real time. AI-Enhanced fNIRS systems, for instance, track brain activity to modify treatment in real time, and neural repatterning normalizes aberrant neural oscillations via closed-loop EEG-guided transcranial stimulation. Deep phenotyping is used by pharmacological AI systems to maximize autism subtype-drug matching, minimizing medication selection trial-and-error. AI-designed neurochemical stimulation through wearable smart patches and AI-created microbiome transplants to reestablish gut-brain balance are examples of emerging solutions. In the future, 3D brain mapping will be used to model long-term neuroplastic treatments using AI-Powered Brain Connectome Editing. These AI-driven architectures produce extensive datasets to better understand the heterogeneity of ASD in addition to improving treatment results and diagnosis accuracy. By combining behavioral analysis, reinforcement learning, and neurotechnology, these methods provide a new paradigm in precision autism care, moving away from uniform treatment and toward therapies that are tailored to the individual's own behavioral and neurological characteristics.

OP80. INTEGRATED DESIGN OF SUSPENSION AND BRAKING SYSTEMS FOR AN H-BAJA ALL-TERRAIN VEHICLE

Pratimaan Tripathi[1], Navjot Singh[1], Shankar Sehgal[1], Bhuvan Goyal[2]

[1] *Mechanical Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh, India,* [2] *Mechanical Engineering Department, PEC Deemed to be University, Chandigarh, India*

ABSTRACT

This study investigates the integrated design of suspension and braking systems for an H-BAJA All-Terrain Vehicle (ATV), in accordance with BAJA SAEINDIA 2026 guidelines. The objective was to design a safe, reliable, and high-performance suspension and braking system capable of enduring extreme off-road conditions. Double wishbone suspension was selected for the front to attain steering accuracy and for maintaining camber control. An H-arm configuration was adopted at the rear side to enhance load stability and maintain grip over rough surfaces. Core components like the control arms and mounting brackets were developed using SolidWorks and Lotus Suspension Analysis. The suspension's ability to resist the stresses of off-road racing was assessed through detailed simulation analysis.

Further, all four wheels were equipped with hydraulic disc brakes. The setup included a Bosch tandem master cylinder (19.05 mm bore) working together with Willwood PS1 callipers. To manage heat and maintain consistent performance, SS410 ventilated rotors and steel-braided brake lines were used. Computer-aided design method was used to check the performance of the proposed system in terms of torque, deceleration, and stopping distance. The proposed design can be fabricated and tested under real off-road conditions in future.

OP81. DESIGN AND DEVELOPMENT OF AN AUTOMATED IMAGE-BASED VEGETABLE CROP QUALITY ASSESSMENT SYSTEM

Prithul Joshi[1], Naveen Aggarwal[1], Nirmal Kaur[1]

[1] *Department of Computer Science Engineering, Panjab University, Chandigarh*

ABSTRACT

The project “Design and Development of an Automated Image-Based Vegetable Crop Quality Assessment System” presents an intelligent computer vision framework for automated crop quality evaluation and disease detection in vegetable leaves. Traditional manual and sensor-based inspection methods are time-consuming, expensive, and unsuitable for large-scale agricultural deployment. To overcome these constraints, the proposed system leverages deep learning architectures and machine vision techniques to perform accurate, real-time assessment using 2D leaf images. The system employs a two-stage classification pipeline: a Crop Classification Model to identify the vegetable type, followed by a Disease Classification Model for multiclass disease categorization and binary (healthy/unhealthy) classification. Models such as EfficientNetV2, InceptionV3, and ResNet-50 are fine-tuned through transfer learning on benchmark datasets including PlantVillage, PlantDoc, and IPM, with extensive data augmentation to improve robustness against lighting, orientation, and scale variations. Preprocessing techniques such as segmentation, rescaling, and normalization enhance feature extraction from leaf morphology, texture, and color characteristics. The optimized models are deployed on edge computing devices like Raspberry Pi and Jetson Nano, enabling real-time, offline inference for on-field implementation. A cloud-integrated mobile and web interface allows farmers and distributors to upload crop images and instantly obtain quality assessments through RESTful APIs. This system delivers a scalable, low-cost, and efficient AI-based solution for early disease detection, precision farming, and post-harvest quality control, supporting the transition toward data-driven and sustainable agriculture.

OP82. A DEEP LEARNING-BASED APPROACH FOR EARLY DIAGNOSIS OF ALZHEIMER'S DISEASE USING MRI IMAGES

Ritik Bhardwaj[1], Neelam Goel[1], Rajni Sobti[1]
[1] *UIET, Panjab University, Chandigarh*

ABSTRACT

Alzheimer is a neurodegenerative disease growing more commonly among the elderly population. Early detection is important for the treatment of Alzheimer's disease (AD), the most common kind of dementia. Recent advancements in deep learning have significantly improved medical imaging analysis by enabling the automatic extraction of clinically relevant features from complex image data. Deep learning has transformed medical image analysis by providing end-to-end feature learning, improved generalization, and enhanced diagnostic accuracy. Among various deep learning architectures, Vision Transformers have shown superior performance in brain image analysis due to their ability to capture complex, long-range relationships between interconnected brain regions. In this work, Vit-based approach is proposed for early diagnosis of Alzheimer's disease using Magnetic Resonance Imaging (MRI) images. The data is taken from ADNI database with 445 subjects to conduct the experiments. The model is developed for binary classification of AD and cognitively normal subjects and achieved an accuracy of 98.7%. The results indicate that proposed approach has the potential for early diagnosis of Alzheimer's disease.

OP83. HYDROGEN STORAGE ADVANCEMENT: AN ELECTROCHEMICAL REVIEW

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ABSTRACT

The pursuit of sustainable energy sources has led to heightened interest in hydrogen as a clean and efficient energy carrier. However, the efficient storage of hydrogen remains a significant challenge for its widespread utilization. This review consolidates and analyses the advancements in hydrogen storage materials and methods from an electrochemical standpoint, providing an outline of the present state-of-the-art research and highlighting promising strategies for efficient hydrogen storage. The review begins

by outlining the fundamental principles governing hydrogen storage and the critical criteria for an ideal storage material, encompassing aspects such as gravimetric and volumetric storage capacities, kinetics of hydrogen uptake and release, reversibility, and safety considerations. Subsequently, it delves into the diverse classes of hydrogen storage materials, involving metal hydrides, permeable materials, chemical hydrogen storage materials, and liquid organic hydrogen carriers. Each class is examined in terms of its electrochemical behaviour, elucidating the underlying mechanisms governing hydrogen storage and release. Furthermore, this review assesses various methods and strategies employed to enhance hydrogen storage performance. Electrochemical techniques, such as electrocatalysis and electrochemical impedance spectroscopy, are explored for their role in improving kinetics and efficiency of hydrogen storage systems. Additionally, advancements in nanotechnology, alloy design, and functionalization of materials are discussed to elucidate their impact on enhancing the electrochemical properties of hydrogen storage materials. In conclusion, this review consolidates the current understanding of hydrogen storage materials and methodologies from an electrochemical viewpoint, offering valuable insights for researchers, engineers, and stakeholders working towards advancing hydrogen-based energy storage systems

OP84. TB CARE MADE SIMPLE

Roshleen Singla[1], Mehak Randhawa[1], Samriti[1]
[1] *UIET Panjab University*

ABSTRACT

Tuberculosis (TB) treatment requires consistent medication adherence, yet many patients face challenges in staying regular. To address this, we have developed a mobile reminder application and a WhatsApp automation chatbot designed to make TB care simpler and more reliable. The reminder app sends timely notifications to help patients take their medication on schedule, while the WhatsApp chatbot performs a similar role by interacting with patients daily through automated messages and can even place calls to doctors when required. This project provides a user-friendly and compassionate technological solution that supports patients in staying consistent, informed, and connected throughout their treatment journey.

OP85. SMART DIGITAL COMPANION FOR TB CARE

Samriti[1], Mehak Randhawa[1], Roshleen Singla[1]
[1] *UIET Panjab University*

ABSTRACT

Tuberculosis (TB) treatment demands consistent medication adherence, yet many patients struggle to maintain regularity throughout the lengthy treatment process. To overcome this challenge, we have developed an integrated solution combining a mobile reminder application and an automated WhatsApp chatbot to make TB management more convenient and reliable. The mobile app delivers timely notifications and alerts, reminding patients to take their medicines as prescribed. Simultaneously, the WhatsApp chatbot engages with patients daily through automated, personalized messages, monitoring their responses and even initiating contact with healthcare providers when necessary. Together, these tools form an accessible, empathetic, and intelligent system that keeps patients consistent, informed, and connected. This innovation aims to enhance adherence, strengthen communication between patients and doctors, and ultimately improve treatment outcomes for TB care.

OP86. RFID BASED TRACKING AND MONITORING OF CHILDREN IN SCHOOL BUSES

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ABSTRACT

Parents and institutions continue to have serious concerns about the safety of schoolchildren while they are being transported on a daily basis. In order to facilitate better communication, automated attendance, and real-time tracking, the proposed study presents an RFID-enabled Smart School Bus Safety System. A small, passive UHF RFID tag with a unique identification number connected to each student's school database profile will be placed in their shoe. At bus entry and exit points, specialized RFID readers will automatically record boarding and deboarding events. The data will then be sent to a secure cloud server that is integrated with GPS coordinates via GSM/GPRS networks. To ensure full visibility of each child's journey, parents and school administrators will receive real-time notifications through SMS or mobile applications. The system guarantees that every

student's movement from home to school and back is precisely tracked, streamlines attendance management, and improves coordination amongst stakeholders. The project aims to promote openness, accountability, and trust between parents, schools, and drivers by incorporating technology into everyday commuting and replacing anxiety with confidence. This project, which aims to be dependable, easy to use, and reasonably priced, makes school transportation safer and establishes a standard for clever safety measures in learning settings.

OP87. AI-REFINED, UNBIASED THERMAL–CLINICAL FRAMEWORK FOR EARLY, COST-EFFECTIVE LEPROSY DETECTION

Snehasish Kundu[1], Prof. Mamta Juneja[1]

[1] *UIET Panjab University*

ABSTRACT

Leprosy (Hansen's disease) continues to be an underdiagnosed public health concern, leading to irreversible nerve damage and disability when not detected in time. In 2024, over 170,000 new cases were recorded globally, with India contributing nearly 130,000, underscoring the need for reliable, scalable, and early detection approaches. This study presents a Human-Intelligence Driven, AI-Refined Thermal–Clinical Analysis Framework, a novel and explainable model for early leprosy detection. The framework was designed after an extensive review of research published between 2010 and 2025, covering diverse methodologies in thermal imaging, biomedical diagnostics, and computer vision. Unlike earlier models that were limited by small or region-specific datasets, insufficient population diversity, or reliance on RGB imaging alone, the proposed model integrates both clinical validation and advanced thermal analysis to overcome these pitfalls. The system performs pixel-level thermal and cold-pixel analysis, supported by a marking mechanism based on eight diagnostic parameters: global cooling, local cold zones, mean deviation, directional asymmetry, variability, outlier intensity, edge anomalies, and temperature range differentials. These parameters collectively yield a Thermal Integrity Score (0–67), which, when combined with a brief clinical questionnaire, ensures high diagnostic reliability. The framework is cost-free, privacy-secured, and requires only a thermal image captured with a standard device. It operates on any computer without specialized equipment, offering a transparent, explainable, and globally deployable solution that bridges clinical expertise and artificial intelligence for safe and accessible early leprosy detection.

OP88. THE ROLE OF ARTIFICIAL INTELLIGENCE IN CYBERSECURITY

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ABSTRACT

The rapid expansion of digital technologies has increased the complexity and frequency of cyber threats, demanding more intelligent and adaptive defense mechanisms. Artificial Intelligence (AI) has emerged as a transformative force in cybersecurity, offering advanced capabilities for threat detection, incident response, and risk prediction. This review explores the evolving role of AI in strengthening cybersecurity frameworks, focusing on machine learning, deep learning, and natural language processing techniques used to identify anomalies, detect malware, and suspicious behavior. The study highlights key applications such as intrusion detection systems, adversarial attacks, and the need for explainable AI so that decisions can be understood by humans. Furthermore, it highlights the potential of combining AI with cloud and IoT environments to enhance protection across connected systems. The review concludes that while AI significantly improves the speed, accuracy, and adaptability of cybersecurity measures, careful and transparent implementation is necessary to avoid introducing new risks.

OP89. PERFORMANCE ANALYSIS OF PROPAGATION OF MM-WAVES IN A RADIO OVER FIBER SYSTEM IN THE PRESENCE OF FIBER DISPERSION AND FIBER NONLINEARITIES

Taranjeet Singh[1], Neeraj Sharma[1], Jaget Singh[1], Sharmelle Thangjam[1]
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ABSTRACT

Radio over fiber (RoF) is a method that combines wireless and optical fiber communication to provide solution for ever-increasing demand of bandwidth. It allows the transmission of radio frequency signals in optical domain over large distances with high bandwidth and minimum signal losses. RoF as technology to generate millimeter waves in optical domain for different applications such as Broadband wireless Access, 5G Networks and upcoming 6G Networks, Television Broadcasting and Radar System etc. In this paper we have analyzed the propagation of RoF over fiber optic cable in the presence of fiber nonlinearities and fiber dispersion. The mm waves carrier signal is generated using two sine wave carrier generators. The signal generated from sine wave generator is combined

with the NRZ coded digital sequence using electrical Multiplier. We are using a Li-Nb MZM (Match Zehnder modulators), Delay interferometer and electronic equalizer for proposed system. A Delay interferometer converts these phase differences into intensity variations that can be detected by a photodetector and delay equal to one bit period.

OP90. AI ASSISTED SOIL FERTILITY EVALUATION AND NUTRIENT CLASSIFICATION FRAMEWORK

Taranjot Singh[1]
[1] *UIET, Panjab University*

ABSTRACT

Soil fertility is a primary determinant of crop productivity and long-term agricultural sustainability. Traditional soil testing, though precise, remains time-intensive and dependent on laboratory infrastructure, limiting its accessibility for many farming communities. This research proposes an intelligent soil-fertility assessment framework that leverages data-driven learning techniques to analyze soil nutrient patterns, physicochemical attributes, and environmental conditions. Publicly available soil datasets will be processed using feature-engineering and structured preprocessing pipelines to extract key nutrient signatures, including pH, moisture, and organic-matter levels. The study employs a neural-model-based classification approach to categorize soil fertility levels and detect nutrient imbalances, enabling improved crop-input planning. A conceptual integration of IoT-enabled soil-monitoring sensors is also considered to support real-time field data acquisition and continuous environmental tracking. Expected outcomes include a scalable decision-support system capable of providing interpretable fertility insights and actionable recommendations. This work reflects a preliminary step toward applying advanced computational intelligence, sensor-assisted monitoring, and agronomic knowledge to strengthen data-guided soil-management strategies and enhance agricultural resource efficiency.

OP91. PARAMETRIC SENSITIVITY ANALYSIS OF MEMBRANE THICKNESS ON PERFORMANCE OF PEM FUEL CELL

Anvi Agarwal[1], Krishnan Abhishek[1], Mridul Dobhal[1], Ishan Garg[1], Dr. Parminder Singh[2]
[1] *Student*, [2] *Associate Professor*

ABSTRACT

Proton Exchange Membrane Fuel Cell (PEMFC) technology stands as a leading candidate for future clean energy systems. The performance of a PEMFC is heavily influenced by the characteristics of its core components, particularly the polymer electrolyte membrane,

whose thickness is a critical factor governing ionic conductivity and overall efficiency. In this study, a three-dimensional(3D) PEMFC model has been developed to investigate the effect of membrane thickness on cell performance. The simulation was conducted at a constant operating temperature of 373 K with varying membrane thickness ranging from 120e-6 m to 40e-6 m. The numerical results clearly indicate that a thinner membrane corresponds to a higher cell voltage at any given current density, therefore improving overall cell performance. This enhancement is attributed to the reduced ohmic resistance of the thinner membrane. The water concentration at the anode outlet was reported to be highest for the case wherein membrane thickness is 40e-6 m. The findings from the proposed model align with established theoretical principles and provide valuable insights for optimizing membrane design in PEMFCs.

OP92. BHAAV-NET: A DEEP CROSS-MODAL FRAMEWORK FOR EMOTION RECOGNITION ON INDIAN DATASETS

Vinay Sharma[1], Naveen Aggarwal[1], Nirmal Kaur[1]

[1] *Department of Computer Science and Engineering, University Institute of Engineering and Technology, Panjab University, Chandigarh, INDIA*

ABSTRACT

The proliferation of digital communication has increased the significance of precise emotion recognition across various applications, including human-computer interaction, mental health monitoring, emotional chatbots, and security systems. However, only a handful of emotion recognition models have been implemented on Indian emotion datasets. However, the majority of existing models have not been tested on Indian datasets, which pose distinct challenges due to cultural differences and variations in emotional expressions. This paper implements deep learning-based emotion detection models - ResNet-50 and Mel-Frequency Cepstral Coefficients-Convolutional Neural Network (MFCC-CNN) - and trains them on popular Indian datasets: InFER, IIITM, ISED, MENDELY, and PUMAVE-D. These datasets provide a wide range of expressions and cultural nuances, posing significant challenges for model performance. Experimental results reveal that the ResNet-50 model attains an accuracy of 99.89% - ISED dataset (video modality), while the MFCC-CNN model achieves 93% accuracy on the PUMAVE-D dataset (audio modality). The multimodal approach achieves 93% accuracy on PUMAVE-D (audio-video), although performance varies across datasets, with MENDELY (87.05%) and PUMAVE-D (video) (84.41%) showing lower accuracy due to increased variations in expressions and data characteristics. This study assesses the performance of ResNet-50 and MFCC-CNN models on image, audio, video, and multimodal datasets, highlighting their adaptability across different datasets, providing insights specific to each dataset, and employing score-based

fusion to improve overall performance.

OP93. COMPUTATIONAL MODELING OF MICROWAVE HEATING PROCESS USING THE COMSOL MULTIPHYSICS.

Harsh Bassal[1], Shankar Sehgal[2]
[1] Punjab Engineering College, Chandigarh, [2] UIET, Panjab University, Chandigarh

ABSTRACT

This paper analyses both the electromagnetic and the thermal behavior of dielectric material (charcoal) inside a standard 3D(three dimensional) microwave cavity using COMSOL Multiphysics. The objective is to analyze the transient heating characteristics under 2.45[GHz] exposure. The simulation coupled the Electromagnetic Waves and Heat Transfer physics modules. Key settings included custom dielectric properties for charcoal, a Port boundary condition simulating a 900[W] magnetron, and Impedance Boundary Conditions on the copper walls. The Frequency-Transient Study ran for 100 seconds, with the charcoal modeled under Thermal Insulation. Results confirmed non-uniform Electric Field distribution, causing localized hot spots. The analysis quantified the rate of temperature increase, demonstrating dynamic thermal behavior and efficient energy conversion. This framework provides valuable insights for optimizing industrial microwave processing.
Keywords: Microwave Heating, COMSOL Multiphysics, dielectric material, Heat Transfer.

OP94. AUTOMATED DETECTION OF MELASMA SKIN DISEASE USING DEEP LEARNING-BASED CONVOLUTIONAL NEURAL NETWORK MODELS

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ABSTRACT

Melasma is a common hyperpigmentation disorder characterized by irregular dark patches on the skin, often caused by hormonal changes, ultraviolet exposure, or genetic predisposition. Accurate and early detection of melasma is crucial for effective treatment and prevention of recurrence. However, manual diagnosis through visual inspection is subjective and prone to variability among dermatologists. To address this challenge, the present study proposes an automated deep learning–based approach for melasma skin disease detection using Convolutional Neural Network (CNN) architectures. Pre-trained models such as ResNet50, VGG16, and EfficientNet-B0 were fine-tuned on a curated dermoscopic image dataset comprising melasma and normal skin samples. The models were evaluated based on performance metrics including accuracy, precision, recall, and F1-score. Among the tested models, ResNet50 achieved superior results with an overall accuracy of 98.9%, precision of 98.7%, recall of 98.5%, and F1-score of 98.6%, demonstrating its robustness in feature extraction and classification. Grad-CAM visualization techniques were further employed to enhance model interpretability and highlight the lesion regions contributing to diagnosis. The proposed AI-based system shows significant potential as a non-invasive, reliable, and rapid diagnostic tool for dermatological screening, particularly in resource-limited clinical settings. Future work aims to expand the dataset, integrate multimodal data, and explore explainable AI frameworks to support clinical decision-making.

Abstracts of Poster Presentations

Poster Presentation- Engineering Sciences		
PP1	Dr. Suresh Kumar	Reduced Graphene Oxide and MNO_2–Nitrogen Doped Graphene Electrodes for High-Performance Asymmetric Supercapacitor Applications.
PP2	Ms. Amanpreet Kaur	A Systematic Analysis of Enhancing Cyber Security Using Machine Learning for Cyber Physical Systems
PP3	Ms. Divya Verma	Ultrasonic-Assisted Extraction of Phytochemicals from Rhododendron arboreum Flowers for Development of Functional Food Products
PP4	Ms. Kanak Sharma	Development and Characterization of Starch-Based Edible Films for Sustainable Food Packaging
PP5	Ms. Pranjal Rohilla	Development and assessment of functional sponge cakes by partially substituting refined wheat flour
PP6	Mr. Puneet Kapoor	Graph neural network-based link prediction in heterogeneous social networks
PP7	Ms. Rashika Saproo	Innovative Metal Organic Gels Bridging Environmental Cleanup and Biocatalysis.
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ABSTRACTS OF POSTER PRESENTATIONS

PP1. REDUCED GRAPHENE OXIDE AND MNO_2–NITROGEN DOPED GRAPHENE ELECTRODES FOR HIGH-PERFORMANCE ASYMMETRIC SUPERCAPACITOR APPLICATIONS

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ABSTRACT

MnO_2 has demonstrated significant potential as an efficient electrode material for making supercapacitors and batteries because of its natural abundance, ease of synthesis, and low cost. Moreover, its tunable nanostructures can be readily synthesized in the laboratory. Although, the theoretical specific capacitance of MnO_2 is quite high (~1375 F g^{-1}), achieving this value experimentally remains challenging due to its poor electrical conductivity and limited structural stability. In addition, MnO_2 nanostructures often tend to aggregate in solution, hindering their electrochemical performance. On the other hand, reduced graphene oxide (rGO) exhibits excellent electrical and mechanical properties. However, rGO sheets undergo restacking because of the strong π–π interactions between adjacent sheets, which in turn restrict ion accessibility and reduce the effective surface area. The integration of MnO_2 with rGO offers a synergistic solution, as each component compensates for the shortcomings of the other. rGO provides a highly conductive template for the uniform growth of MnO_2 nanostructures on both sides of its sheets, effectively preventing restacking. Furthermore, nitrogen doping introduces additional active sites, enhancing charge storage capability. The resulting MnO_2–N–rGO hybrid, prepared via a simple thermal route, exhibits excellent specific capacitance, high energy and power densities, and cyclic stability. This scalable approach holds great promise for the development of high-performance supercapacitor devices.

PP2. A SYSTEMATIC ANALYSIS OF ENHANCING CYBER SECURITY USING MACHINE LEARNING FOR CYBER PHYSICAL SYSTEMS

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ABSTRACT

Cyber Physical Systems (CPS) are increasingly integral to critical infrastructure, encompassing sectors such as energy, healthcare, transportation, and manufacturing. The

growing interconnection between computational and physical components, however, exposes CPS to a wide range of sophisticated cyber threats. Traditional security mechanisms often fall short in addressing the dynamic, real-time, and complex nature of these systems. This paper presents a systematic analysis of how machine learning (ML) can be effectively leveraged to enhance cybersecurity in CPS. We categorize various ML techniques—such as supervised, unsupervised, reinforcement, and deep learning—and assess their applicability in detecting anomalies, predicting threats, and enabling autonomous response mechanisms. By analysing recent advancements and case studies, we highlight the advantages of ML-based security solutions in terms of scalability, adaptability, and real-time processing. Moreover, the challenges related to data quality, model interpretability, adversarial attacks, and computational overhead are critically examined. The analysis underscores the importance of hybrid approaches that combine ML with traditional methods to ensure robust, context-aware, and resilient CPS security frameworks. This study aims to provide a comprehensive foundation for researchers and practitioners seeking to develop or implement intelligent cybersecurity solutions tailored to the unique demands of CPS environments.

PP3. ULTRASONIC-ASSISTED EXTRACTION OF PHYTOCHEMICALS FROM RHODODENDRON ARBOREUM FLOWERS FOR DEVELOPMENT OF FUNCTIONAL FOOD PRODUCTS

Divya Verma[1], Anupama Sharma[2]
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ABSTRACT

Rhododendron arboreum, a widely distributed Himalayan species, is known for its vibrant red flowers rich in bioactive phytochemicals such as flavonoids, phenolic, and anthocyanin. These compounds possess remarkable antioxidant, anti-inflammatory, and cardioprotective properties, making the plant a suitable source for the development of functional food products. The present study focuses on the ultrasonic-assisted extraction (UAE) of phytochemicals from Rhododendron arboreum flowers to enhance extraction efficiency and preserve heat-sensitive bioactive. Ultrasonication parameters such as solvent type, extraction time, and temperature were optimized to maximize yield and antioxidant potential. The extracts were evaluated for total phenolic and and DPPH radical scavenging activity, and color characteristics. Results indicated that UAE significantly improved the recovery of bioactive compounds compared to conventional extraction methods, ensuring higher purity and reduced extraction time. The potent antioxidant capacity of the extracts supports their potential application in the formulation of health-promoting and functional food products. This study highlights Rhododendron arboreum as a valuable Himalayan resource as an efficient, sustainable, and green approach for phytochemical recovery in functional food development.

PP4. DEVELOPMENT AND CHARACTERIZATION OF STARCH-BASED EDIBLE FILMS FOR SUSTAINABLE FOOD PACKAGING

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ABSTRACT

Nowadays, there is an increasing interest in edible films for fruits and vegetables due to the harmful effects of conventional packaging materials on health and the environment. These biodegradable films are mainly composed of natural polymers such as polysaccharides, proteins, and lipids, either alone or in combination. In this study, starch (native and nano) was used to prepare biodegradable edible films incorporating bioactive components. The starch was extracted from natural sources and subjected to acid hydrolysis to reduce its granule size and obtain nano starch. Both native and nano starch were characterized for their physicochemical properties, including particle size, swelling power, solubility, and water and oil absorption capacity. Results revealed that nano starch exhibited higher solubility, swelling index, and absorption capacity compared to native starch, indicating improved functionality. The prepared films were analyzed for mechanical, barrier, and structural properties to evaluate their suitability for food packaging applications. Incorporation of nano starch improved the film's transparency, flexibility, and water resistance, demonstrating its potential as an eco-friendly alternative to synthetic packaging materials. Overall, starch-based edible films offer a sustainable, biodegradable, and safe approach for preserving the quality and extending the shelf life of perishable fruits and vegetables.
Key words: Starch-based films, Nano starch, Edible packaging, Biodegradable materials, Sustainable food preservation

PP5. DEVELOPMENT AND ASSESSMENT OF FUNCTIONAL SPONGE CAKES BY PARTIALLY SUBSTITUTING REFINED WHEAT FLOUR

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ABSTRACT

Increasing consumer awareness towards healthier bakery products has promoted development of conventional products with nutrient-rich, functional ingredients. Partial substitution of refined wheat flour with varying concentrations of water chestnut (*Trapa natans*) flour, a

gluten-free, rich source of nutrients, mineral and fiber content, and Cinnamon (*Cinnamomum verum*) powder, a naturally rich source of antioxidants and a flavour enhancer, resulted in formulation of cake with high nutritional as well as phytochemical properties, along with improved sensory appeal. The formulations were analysed for their proximate composition, physical, functional and organoleptic properties. The findings indicated improved nutritional and phytochemical values of the formulated sponge cakes compared to the control cake and emphasized the potential utilization of water chestnut flour and cinnamon as a promising ingredient for developing value-added bakery products with enhanced nutritional and sensory profiles.

PP6. GRAPH NEURAL NETWORK-BASED LINK PREDICTION IN HETEROGENEOUS SOCIAL NETWORKS

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ABSTRACT

Complex networks represent the functioning of real-world systems such as social media, biological interactions, and citation relationships. In such networks, the entities (nodes) and their interactions (edges) often belong to different types, forming what are known as heterogeneous graphs. These graphs capture multiple facets of real-world systems more effectively than homogeneous ones, enabling richer structural and semantic representations. Link prediction in this context aims to infer missing or potential future connections among entities, facilitating applications such as friend recommendation, community detection, and information diffusion analysis. Traditional similarity-based or probabilistic methods often struggle to handle the diversity of node and relation types present in heterogeneous networks. Graph Neural Networks (GNNs) address these challenges by learning expressive, relation-aware embeddings that integrate both topological and attribute information. By modeling complex dependencies among entities, GNN-based link prediction enhances our understanding of network evolution and dynamic connectivity. Graph-based learning approaches provide a unified framework for representing relational complexity in social systems, leading to improved predictive accuracy and deeper insights into patterns of human interaction.

PP7. INNOVATIVE METAL ORGANIC GELS BRIDGING ENVIRONMENTAL CLEANUP AND BIOCATALYSIS.

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ABSTRACT

Metal organic gels (MOGs) represent an emerging class of functional soft materials formed through the coordination-driven self-assembly of metal ions or clusters with organic ligands, resulting in three-dimensional porous networks with entrapped solvent molecules. These materials combine the structural tunability and high surface area characteristic of metal-organic frameworks with the processability and flexibility of conventional gels, offering unique advantages for environmental remediation and biocatalytic applications. In recent years, MOGs have gained significant attention in waste valorization, demonstrating exceptional performance in heavy metal removal, dye degradation and oil-water separation. Their hierarchical porosity, abundant functional sites, and stimulus-responsive behavior enable selective adsorption and catalytic conversion of various pollutants into value added products. Furthermore, MOGs have emerged as promising matrices for enzyme immobilization, providing a biocompatible microenvironment that preserves enzymatic activity while enhancing operational stability, reusability, and resistance to harsh conditions.

PP8. APPLICATION OF PLANT BASED COATINGS AS NUTRACEUTICAL CARRIER IN FOOD PACKAGING

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ABSTRACT

There has been considerable interest in utilizing protein-based coatings for creating food packaging materials. Green gram proteins show outstanding biocompatibility, increased sustainability, and improved safety relative to animal proteins. Some of the limitations of curcumin nutraceutical include low water solubility, chemical instability at neutral and alkaline pH levels, auto-oxidation, and decreased absorption. *Nutraceutical carrier* are employed to enhance the effectiveness of these bioactive compounds in order to address these limitations. This study focused on creating a curcumin-enriched green gram protein carrier. The protein was extracted from green gram seeds using the alkaline extraction and acid precipitation method. The curcumin encased in the nutraceutical carrier was successfully examined. The nutraceutical carrier was characterized using entrapment efficiency, FTIR,

XRD, SEM, and antioxidant evaluation. FTIR analysis verified the effective integration of curcumin into the nutraceutical carrier. The surface characterization was examined employing the SEM technique. The synthesized nutraceutical carrier shows significant porosity and forms a cross-linking framework. Moreover, nutraceutical carrier exhibited significant swelling due to the presence of hydrogen bonding interactions with water. The nutraceutical carrier shows a hydrophilic characteristic, with the contact angle of curcumin-loaded green gram nutraceutical carrier increasing by 9 degree. The curcumin loaded nutraceutical carrier were significantly darker and reddish in colour. The addition of curcumin increased the nutraceutical carrier's antioxidant properties. The nutraceutical carrier served as a protective layer for fruits. The results emphasized the potential use of green gram protein nutraceutical carrier as a protective coating for fruits and vegetables.

PP9. GREEN HYDROGEN STORAGE IN HYBRID OFF-GRID RENEWABLE ENERGY SYSTEMS

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ABSTRACT

Hybrid off-grid renewable energy systems (HRES), integrating solar photovoltaic (PV), wind, and storage technologies, are vital for achieving clean, decentralized energy access in remote and islanded regions. However, the inherent intermittency of renewable sources leads to supply–demand imbalances that challenge system reliability. Conventional batteries provide effective short-term storage but are limited by capacity, degradation, and cost, making them insufficient for long-duration or seasonal energy deficits. In this context, green hydrogen—produced via renewable-powered water electrolysis—emerges as a promising long-term energy storage vector. Its high energy density, scalability, and versatility enable multi-sectoral applications across electricity, heat, and transport, enhancing both system autonomy and sustainability. This review synthesizes recent research on the integration of hydrogen storage within hybrid off-grid systems, focusing on technological configurations, operational synergies, and economic performance. Studies indicate that incorporating hydrogen storage can increase renewable utilization from approximately 60% to over 90%, while hybrid battery–hydrogen systems improve round-trip efficiency and reduce levelized cost of energy (LCOE) by up to 20%. Nevertheless, barriers such as high capital costs, low efficiency, and limited real-world data hinder widespread deployment. Future directions include developing modular electrolyzers, advanced hybrid control algorithms, and supportive policy frameworks. Overall, green hydrogen storage represents a transformative solution for enhancing the resilience, flexibility, and sustainability of off-grid renewable systems, with hybridized storage architectures offering a pragmatic pathway toward carbon-neutral, self-sufficient energy networks.

PP10. MOBILE FIBER EXTRACTION MACHINE FOR WATER HYACINTH BIOMASS

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ABSTRACT

Water Hyacinth (Pontederia crassipes) is an invasive aquatic weed that poses severe ecological and operational challenges globally. Its high moisture content and spongy stems make it difficult to process with existing stationary fiber extraction systems, which are primarily designed for terrestrial plants. The resulting costs of removal and complicated logistics for biomass utilization necessitate a specialized, efficient solution tailored for aquatic species. This work introduces an innovative "mobile trolley-based continuous fiber extraction system" designed for efficient on-site processing of water hyacinth. This compact, portable setup, powered by a generator, integrates three major functional units: a decorticating unit, a conveyor system, and a controlled air drying unit. The system is optimized for spongy stem materials, utilizing a rotating drum with curved rods for non-destructive, high-yield fiber separation. The integrated conveyor facilitates smooth transfer and combing, while the drying section ensures accelerated moisture removal in a single pass, delivering ready-to-use fibers instantly. By combining extraction, transfer, and drying onto a single mobile platform, the system reduces material handling, transportation costs, and fiber loss, significantly enhancing overall yield. This mobile design enables decentralized fiber production directly at the weed source, transforming the environmental nuisance into a valuable natural fiber resource. This scalable eco-engineering solution promotes sustainable resource utilization for rural industries and contributes to a circular bio-economy.

PP11. USING MOF NANOCARRIERS FOR TARGETED DRUG DELIVERY

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ABSTRACT

Metal–organic frameworks (MOFs) have emerged as advanced nanocarriers for targeted drug delivery due to their tunable porosity, high surface area, and chemical stability. They can encapsulate various therapeutic agents—small molecules, proteins, and nucleic acids—providing controlled release and protection from enzymatic degradation. Functionalization of MOFs with targeting ligands enables site-specific delivery,

minimizing side effects. Synthesis techniques such as solvothermal, microwave-assisted, sonochemical, and mechanochemical methods yield MOFs with adjustable pore sizes and structures suitable for biomedical use. MOFs demonstrate significant potential in cancer therapy, antimicrobial treatment, imaging, and vaccine delivery. Their stimuli-responsive behavior—triggered by pH, magnetic fields, temperature, or light—enables precise drug release. Drug release kinetics follow models like zero-order, first-order, Higuchi, Hixson–Crowell, and Korsmeyer–Peppas, depending on diffusion and degradation mechanisms. However, biocompatibility and toxicity remain major challenges, as residual metal ions and linkers can cause cytotoxicity. Recent studies emphasize optimizing MOF synthesis, functionalization, and degradation to enhance safety. Future perspectives highlight the use of patient-specific MOFs for personalized medicine, integrating therapeutic and diagnostic (theranostic) functions. Overall, MOFs hold transformative potential for next-generation targeted and controlled drug delivery systems.

PP12. SIMULATED ENVIRONMENTS FOR AUTONOMOUS UAV NAVIGATION

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ABSTRACT

Unmanned Aerial Vehicles (UAVs), commonly known as drones, can perform complex tasks such as surveillance, mapping, and inspection across diverse environments. Their functionality largely depends on autonomous navigation, which refers to the ability of a system to perceive its surroundings, make intelligent decisions, and move safely without human intervention. Real-world testing and hardware implementation for UAVs are often expensive, resource-intensive, and prone to risk, making simulation-based development an essential alternative. We have developed simulated worlds to assist in autonomous UAV navigation using Gazebo simulator and ROS1 (Robot Operating System). We have created realistic and customizable virtual scenes that can be used in the future to provide data related to studies on UAVs. These simulated worlds encompass a variety of indoor and outdoor environments, such as structured rooms, outdoor environments, park and highly detailed urban layout, which have a distinctive spatial organization and geometric complexity to replicate the diversity of the real world. To enhance visual fidelity, the environments use fine-modelled 3D resources, realistic surface colours, and accurate lighting and shadows. The worlds are easy to integrate with ROS1 and as a result, can work on UAV simulation tasks, environment perception investigations, and navigation algorithm development without inconvenience. It allows safe virtual experiments without logistical and cost overhead of a physical test. Finally, the dataset accelerates the process of designing, training, and validating smart UAV systems in different and controlled scenarios, which serves to bridge the gap between simulation-based studies and practical implementation.

PP13. MAGNETIC NANOCOMPOSITES AND METAL-OXIDE ADSORBENTS: NEXT-GENERATION SOLUTIONS FOR PER- AND POLYFLUOROALKYL SUBSTANCES CONTAMINATION

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ABSTRACT

Per- and polyfluoroalkyl substances (PFAS) are persistent environmental pollutants known as “forever chemicals” due to their extreme stability and widespread use. Their persistence and toxicity demand advanced remediation approaches. Engineered nanomaterials – including metal-oxide nanoparticles (e.g. Fe_3O_4, TiO_2, ZnO) and hybrid adsorbents – have been developed to outperform conventional treatments. Metal-oxide nanoadsorbents offer high surface area and tailored reactivity. Magnetic Fe_3O_4 nanoparticles are especially promising, achieving >95% removal of both long- and short-chain PFAS via rapid adsorption and facile magnetic separation. Carbon-based nanocomposites amplify this effect; for example, an amine-functionalized magnetic graphene oxide (MAGO) composite removed >95% of long-chain and >85% of short-chain PFAS within 30 minutes. These nano adsorbents often allow easy regeneration and can target diverse PFAS structures. In related work, a zirconium-based metal–organic framework (MOF) was reported to achieve rapid PFAS uptake with near-complete removal. Green synthesis of PFAS nanoadsorbents is an emerging focus. Biosynthetic routes using plants, bacteria, or fungi can produce metal/metal oxide nanoparticles under eco-friendly conditions. Such biogenic nanomaterials maintain high PFAS adsorption capacity while minimizing the use of toxic precursors. Overall, nanoscale adsorbents (metal oxides, magnetic particles, nanocomposites) demonstrate efficient PFAS capture (often >90% removal), highlighting their potential for sustainable water remediation.

PP14. COMPUTATIONAL MODELLING OF CONTROLLED DRUG RELEASE FROM BIOPOLYMER NANOCARRIERS FOR BIOMEDICAL APPLICATIONS SUCH AS CANCER THERAPY

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ABSTRACT

In recent years, nanocarrier-based drug delivery systems have emerged as a transformative approach for improving the precision and efficacy of therapeutic treatments. This study focuses on the computational modelling of controlled drug release

from biopolymer nanocarriers, with an emphasis on biomedical applications such as cancer therapy. Using simulation tools such as COMSOL Multiphysics and MATLAB, diffusion and degradation kinetics were modelled to predict drug release profiles under physiological conditions. Biopolymers such as chitosan, alginate, and polylactic acid (PLA) were selected due to their biodegradability and tunable properties. The study aims to understand how parameters like particle size, polymer composition, and crosslinking density influence release rates and drug bioavailability. By establishing a validated mathematical model, the work provides a predictive framework that reduces the need for extensive laboratory experimentation, aligning with sustainable and cost-effective research practices. The proposed computational approach can be adapted to optimise nanocarriers for various therapeutic applications, thereby bridging the gap between chemical engineering principles and biomedical innovation. This project demonstrates the potential of simulation-based methodologies to accelerate the design of efficient, targeted, and environmentally conscious drug delivery systems.

PP15. DETECTING SINUSITIS FROM ACTIVE THERMAL IMAGES USING EXPLAINABLE AI

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ABSTRACT

Sinusitis is typically diagnosed using expensive CT scans or X-rays. This work proposes a radiation-free alternative using active thermography combined with deep learning. A dataset of 1,080 active thermal images from 45 subjects (24 thermograms per subject) is used to train an automated sinusitis detection model. Active thermography applies controlled thermal stimulation to facial regions and captures the thermal recovery response. Inflamed sinus tissues exhibit distinct thermal dynamics compared to healthy tissues, making this approach more sensitive than static thermal imaging. The framework employs transfer learning with pre-trained ResNet-50, fine-tuned on thermal data. To ensure clinical transparency, explainability techniques (Grad-CAM and LIME) visualize which facial regions drive diagnostic predictions, allowing clinicians to verify anatomical relevance. The model achieves over 90% accuracy with explainability visualizations consistently highlighting correct sinus regions, confirming meaningful pattern learning rather than artifacts. Therefore, this approach provides a fast, cost-effective, radiation-free screening tool with enhanced sensitivity through active thermal stimulation and built-in explainability for clinical trust and regulatory approval.

PP16. A REVIEW OF OPTIMIZATION TECHNIQUES FOR EFFICIENT RESOURCE ALLOCATION IN 5G NETWORKS

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ABSTRACT

The rapid growth of 5G technology has made efficient resource allocation a key requirement for delivering diverse services such as high-speed data transfer, low-latency communication, and large-scale IoT connectivity. Through network slicing, several virtual networks can share the same physical infrastructure. However, allocating resources across these slices efficiently is a complex challenge that requires smart optimization methods. This paper reviews different strategies used for resource allocation in 5G, including mathematical models, heuristic and metaheuristic techniques, and learning-based approaches. These methods help improve network performance, reduce delays, save energy, and ensure strong Quality of Service (QoS). The paper also looks at current challenges and suggests future directions for building more flexible and intelligent optimization systems to support the evolution toward 6G networks.

PP17. ADVANCING MATERIAL DISCOVERY WITH AI USING GNNS

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ABSTRACT

The discovery of new materials traditionally involves extensive experimentation and complex simulations, which are both time-consuming and costly. Recent advancements in Artificial Intelligence (AI), particularly Graph Neural Networks (GNNs), have revolutionized the way materials are studied and designed. GNNs are highly effective in modeling the atomic and molecular structures of materials, as they treat atoms as nodes and chemical bonds as edges, allowing machines to learn underlying chemical patterns and predict material properties with remarkable accuracy. This poster explores how AI-driven approaches using GNNs can accelerate material discovery by predicting properties such as conductivity, strength, and stability before physical synthesis. Through the integration of data-driven learning and quantum-mechanical insights, researchers can identify potential candidates for next-generation materials in energy, electronics, and nanotechnology. The use of GNNs not only enhances prediction efficiency but also reduces experimental costs, paving the way for a faster, smarter, and more sustainable future in materials science.

PP18. ENHANCING AUTOMATIC SPEECH RECOGNITION FOR LOW-RESOURCE INDIC LANGUAGES USING TRANSFER LEARNING AND ADVANCED PRE-PROCESSING

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ABSTRACT

Automatic Speech Recognition (ASR) for the majority of India's languages faces significant challenges due to data scarcity, dialectal diversity, and code-switching. This research presents a comprehensive framework to improve ASR accuracy for low-resource Indic languages by leveraging advanced machine learning techniques. Our primary goal is to establish a high-performance, adaptable baseline model that significantly reduces Word Error Rate (WER) across multiple languages.â€‹ Our methodology is centered on the wav2vec2-large-xlsr multilingual model, enhanced through several key innovations. We will implement phonetic similarity mapping to improve cross-lingual transfer learning and utilize advanced data augmentation techniques, such as noise injection and speed perturbation, to build resilience against real-world acoustic variations. Furthermore, we will investigate joint dialect identification and ASR, a promising approach for handling linguistic diversity within a single language. The system's performance will be rigorously evaluated on open-source corpora like IndicVoices-R and Kathbath, providing a robust benchmark against existing models.â€‹ This project's contributions are threefold: a comparative analysis of accuracy-enhancement techniques for Indic ASR, a validated high-performance baseline model with a reproducible codebase, and a scalable framework adaptable to other low-resource languages. By systematically addressing the core challenges of Indic ASR, this research will contribute valuable methodologies for creating more accurate and accessible speech recognition tools, helping to bridge the digital divide for millions of speakers across the Indian subcontinent.

PP19. ENHANCED DIABETES PREDICTION THROUGH MULTI-DATASET INTEGRATION AND ADVANCED MACHINE LEARNING WITH MICE IMPUTATION AND SMOTE BALANCING

Er. Gursajan Thapa[1], Prof. Ajay Mittal[1], Dr. Preeti Aggarwal[1]
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ABSTRACT

Diabetes mellitus represents a significant global health challenge, necessitating accurate early prediction systems for timely intervention. This research presents a comprehensive

machine learning approach for diabetes prediction by integrating three publicly available datasets, comprising 2,877 patient records with clinical features including pregnancies, glucose levels, blood pressure, skin thickness, insulin levels, BMI, diabetes pedigree function, and age. A critical challenge in diabetes prediction modeling is handling missing values, where zero values often indicate data unavailability rather than true measurements. This study addresses this by replacing zeros with NaN in columns prone to missingness and employing Multiple Imputation by Chained Equations (MICE) for robust imputation. Additionally, class imbalance—where negative cases significantly outnumber positive diabetes cases—was addressed using Synthetic Minority Over-sampling Technique (SMOTE) to improve model sensitivity to diabetic cases. Three machine learning algorithms were evaluated: Logistic Regression, Random Forest Classifier, and Support Vector Machine (SVM) with RBF kernel. Each model was trained using a pipeline architecture integrating MICE imputation, StandardScaler normalization, SMOTE oversampling, and the classifier. Model performance was assessed using accuracy, precision, recall, F1-score, confusion matrices, ROC curves, and AUC scores. Comparative analysis before and after SMOTE demonstrated the effectiveness of class balancing. Results indicate that the integrated approach significantly enhances diabetes prediction accuracy and generalizability, with Random Forest achieving the highest performance. This study contributes to developing reliable, clinically applicable diabetes screening tools for early identification of at-risk individuals.

PP20. FE_3O_4 CATALYSED FENTON DEGRADATION OF ORGANIC POLLUTIONS FOR WASTE WATER TREATMENT

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ABSTRACT

Our poster investigates the synthesis and catalytic application of Fe_3O_4 (magnetite) nanoparticles for enhancing the Fenton use of peroxide, which is further used in AOP (Advanced Oxidation Process) in water treatment. It also depicts in detail synthesis & characterization of Fe_3O_4 nanoparticles/precipitate as an outstanding, reusable catalyst for the Fenton reaction. Our goal was to leverage the dynamic Fe^{2+}/Fe^{3+} redox cycle inherent to magnetite to efficiently generate abundant hydroxyl (•OH) radicals, driving the rapid & complete degradation of organic pollutants. The catalyst bears low catalytic efficiency & is hence advantageous in maintaining maximum sustainability & also allows easy magnetic separation. The nanoparticles were synthesized using the co-precipitation method, heating Fe^{2+} and Fe^{3+} precursors in a 1:2 molar ratio in a basic solution. Following synthesis, the material's internal crystalline structure was investigated using X-ray Diffraction (XRD).

This XRD pattern, which was diffracting X-rays through the atomic planes, was expected to confirm the characteristic structure of pure Fe_3O_4. However, the XRD analysis suggested that the product was not pure magnetite but rather a composite mixture of FeO and Fe_2O_3. The initial broad XRD indicates that non-pure synthesis conditions may result in a combination of iron oxides. Although it requires further investigation to confirm the desired Fe_3O_4 structure, presently maintaining the continuous Fe^{2+} regeneration necessary for sustained catalytic activity. The good part is that a combination of FeO and Fe_2O_3 can still be used in AOP in basic water treatment & other uses.

PP21. PERFORMANCE ANALYSIS OF MODERN LEARNING ALGORITHMS FOR IMBALANCED CREDIT CARD FRAUD DETECTION

Mansi Sharma[1], Amandeep Verma[1], Rajni Sobti[1]
[1] *UIET, Panjab University, Chandigarh*

ABSTRACT

Credit card fraud has evolved into a sophisticated challenge within the financial sector, demanding advanced detection mechanisms. This paper presents Comparison of state-of-the-art machine learning and deep learning techniques for credit card fraud detection with particular focus on the persistent issue of imbalanced fraud datasets. Strategies such as the Synthetic Minority Over-sampling Technique (SMOTE) is explored to enhance the balance dataset from the unbalanced dataset. Experiments were conducted on different Machine Learning models. The observed results show accuracy of different models including Classification with 92%, Logistic Regression with 94% Random Forest with 96%. Similarly Convolutional Neural Networks (CNNs) shows 97%, Long Short-Term Memory (LSTM) networks shows 97%. Recent research demonstrates significant improvements in detection accuracy and reductions in false positives through these methods. From the results it has been observed that Deep learning models outperform.

PP22. EFFECT OF CERIUM DOPING IN HYDROXYAPATITE SYNTHESISED BY SOL GEL METHOD AND ITS BIOMEDICAL APPLICATIONS

Navpreet Kaur[1], Sonia Sharma[2]
[1] *Student at Panjab University, Chandigarh,* [2] *Assistant Professor Panjab University Chandigarh*

ABSTRACT

Hydroxyapatite (HAp), $Ca_{10}(PO_4)_6(OH)_2$, is a bioceramic material known for its chemical similarity to bone and excellent biocompatibility. However, its poor mechanical strength and limited antibacterial activity restrict its use in advanced biomedical applications. To address

these limitations, doping HAp with cerium (Ce) using the sol–gel method has emerged as an effective strategy to enhance its structural, mechanical, and biological properties. Cerium, with its variable oxidation states (Ce^{3+}/Ce^{4+}), can substitute calcium ions in the HAp lattice, inducing lattice strain and defect formation that improve crystallinity and surface reactivity. Studies report that moderate Ce doping (1–3 wt%) increases microhardness and bioactivity, while higher concentrations may lead to secondary CeO_2 phase formation. Ce-doped HAp also exhibits strong antibacterial behavior against Staphylococcus aureus and Streptococcus mutans due to its redox-mediated oxidative stress mechanism. Furthermore, it shows good hemocompatibility and anti-inflammatory response, making it suitable for bone regeneration, implant coatings, and dental applications. The sol–gel synthesis route offers fine compositional control, yielding uniform nanoparticles with enhanced surface area and homogeneity. Overall, Ce-doped HAp synthesized via the Sol–gel technique represents a promising multifunctional biomaterial for next-generation biomedical applications.

PP23. BONE FRACTURE DETECTION AND CLASSIFICATION USING NODE-LEVEL CAPSULE GRAPH NEURAL NETWORK WITH X-RAY IMAGES OF BROKEN AND UNBROKEN BONES

Niharika Singh[1], Dr. Mamta Juneja[1], Dr. Ravreet Kaur[1]
[1] *Panjab University, Chandigarh*

ABSTRACT

Bone fractures pose a critical challenge in medical diagnostics, often requiring swift and precise identification to mitigate complications. Conventional approaches, such as manual X-ray analysis or standard machine learning techniques, are prone to subjectivity and struggle with the intricate spatial relationships in bone structures. This research introduces a novel framework employing a Node-Level Capsule Graph Neural Network (NCGNN) to automate fracture detection and classification from X-ray images, treating bones as interconnected nodes for improved structural modeling. The methodology involves transforming X-ray images into graph-based representations, where bone segments serve as nodes and their interconnections as edges. Capsules in the NCGNN are designed to extract hierarchical features, ensuring robustness to variations in image orientation and quality. Optimization of model parameters is facilitated by the Gazelle Optimization Algorithm (GOA), a nature-inspired method that enhances training efficiency and avoids suboptimal solutions. As an ongoing prototype, this work is being developed on a dataset of X-ray images, with initial experiments focusing on refining the graph construction and capsule routing processes. This approach aims to bridge gaps in current diagnostic tools by enabling more reliable, automated analysis suitable for clinical environments. Future developments include comprehensive testing across diverse datasets, evaluation of computational performance, and potential integration into diagnostic workflows to support healthcare professionals in real-time decision-making.

PP24. HALOPHILIC BACTERIA AS A SOURCE OF ECO-FRIENDLY EMULSIFIERS

Ritika[1], Onkriti[1], Parminder Kaur[2], Hema Setia[3], Ranjana Bhatia[2]
[1] *student,* [2] *Assistant professor,* [3] *Associate professor*

ABSTRACT

Halophilic bacteria as a source of eco-friendly emulsifiers Ritika, Onkriti, Parminder Kaur, Hema Setia and Ranjana Bhatia Biotechnology Branch, University Institute of Engineering and Technology, Panjab University, Chandigarh-160014 Abstract: Halophilic bacteria found in extreme saline environments are a valuable source of many industrially important compounds. These bacteria produce exopolysaccharides (EPS) with unique structural and functional properties, making them promising natural bioemulsifiers. These biopolymers are stable under extreme pH, salinity, and temperature and offer sustainable alternatives to synthetic emulsifiers. In this study, halophilic bacteria were isolated from saline soil samples, and strain JC1 was identified as Halobacillus trueperi via 16S rRNA sequencing. Growth optimization revealed that 15% NaCl, pH 9, and 30 °C supported maximal growth of strain JC1 for maximum production of EPS. EPS was extracted from the culture supernatant after 7 days of incubation and evaluated for its emulsification potential. The result demonstrated that EPS for strain JC1was found to have efficient emulsification activity as indicated by its emulsification index measured at 24 hours and at 168 hours. It is hydrophilic in nature and forms a oil in water emulsion. The high emulsification indices observed indicate the potential of EPS from Halobacillus trueperi strain JC1 as a bioemulsifier for applications in bioremediation, oil recovery, and other industrial processes and biotechnological applications requiring salt-tolerant emulsifying agents.

PP25. DEFENSE AGAINST SPECTRUM SENSING DATA FALSIFICATION ATTACKS IN COGNITIVE RADIO NETWORKS USING MACHINE LEARNING AND BLOCKCHAIN

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[1] *Department of Information Technology, UIET, Panjab University, Chandigarh*

ABSTRACT

Spectrum Sensing Data Falsification (SSDF) attacks undermine the reliability and efficiency of cognitive radio networks by enabling malicious users to inject false sensing data, disrupting collaborative spectrum decisions. This work presents a secure and

intelligent framework combining machine learning and blockchain to detect and prevent SSDF attacks. Machine learning classifiers—Random Forest, Support Vector Machine, and Deep Neural Network—analyze simulated sensing data to classify secondary users as honest or malicious, achieving high detection accuracy and reduced false alarms. The validated sensing data are recorded in a private blockchain, where smart contracts automate verification, ensuring immutability and transparency. This dual-layered approach prevents tampering, spoofing, and collusion among users, maintaining data trustworthiness. Experimental results highlight enhanced detection performance, lower false positive rates, and improved overall spectrum efficiency. This integration demonstrates the practical potential of combining AI and distributed ledger technologies for robust, next-generation wireless communication security.

PP26. Fe_3O_4 CATALYSED FENTON DEGRADATION OF ORGANIC POLLUTIONS FOR WASTE WATER TREATMENT

Priya Kaloni[1], Priyal Singhal[2], Pragti Arora[3], Lakshya Sharma[3], Sanjeev Gautam[3]

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ABSTRACT

Our poster investigates the synthesis and catalytic application of Fe_3O_4 (magnetite) nanoparticles for enhancing the Fenton use of peroxide, which is further used in AOP (Advanced Oxidation Process) in water treatment. It also depicts in detail synthesis & characterization of Fe_3O_4 nanoparticles/precipitate as an outstanding, reusable catalyst for the Fenton reaction. Our goal was to leverage the dynamic Fe^{2+}/Fe^{3+} redox cycle inherent to magnetite to efficiently generate abundant hydroxyl (•OH) radicals, driving the rapid & complete degradation of organic pollutants. The catalyst bears low catalytic efficiency & is hence advantageous in maintaining maximum sustainability & also allows easy magnetic separation. The nanoparticles were synthesized using the co-precipitation method, heating Fe^{2+} and Fe^{3+} precursors in a 1:2 molar ratio in a basic solution. Following synthesis, the material's internal crystalline structure was investigated using X-ray Diffraction (XRD). This XRD pattern, which was diffracting X-rays through the atomic planes, was expected to confirm the characteristic structure of pure Fe_3O_4. However, the XRD analysis suggested that the product was not pure magnetite but rather a composite mixture of FeO and Fe_2O_3. The initial broad XRD indicates that non-pure synthesis conditions may result in a combination of iron oxides. Although it requires further investigation to confirm the desired Fe_3O_4 structure, presently maintaining the continuous Fe^{2+} regeneration necessary for sustained catalytic activity.

PP27. ELECTROENCEPHALOGRAM SIGNAL ANALYSIS FOR DEPRESSION DETECTION USING CONVOLUTIONAL NEURAL NETWORKS

Priyankle[1]
[1] UIET PU

ABSTRACT

Depression, or Major Depressive Disorder (MDD), is a prevalent psychological disorder that significantly disrupts emotional, behavioral, and cognitive functioning. Early and reliable detection of depression is vital for effective intervention and prevention of its severe consequences. Electroencephalogram (EEG) signals have proven to be a valuable, non-invasive tool for analyzing the neurophysiological changes associated with depressive states. EEG provides high temporal resolution and reflects subtle variations in brain activity, making it suitable for studying mood-related neural dynamics. The complex, non-linear, and non-stationary nature of EEG signals poses challenges for conventional analytical methods. Recent advancements in deep learning, particularly Convolutional Neural Networks (CNNs), have enabled the automatic extraction of discriminative spatial and temporal features from EEG data. CNN-based models can effectively learn relevant patterns within EEG frequency bands—especially alpha, theta, and beta rhythms—and detect abnormalities in temporal and frontal brain regions commonly linked to depression. By leveraging the representational power of CNNs, EEG-based studies provide deeper insight into the neural signatures of depression and contribute toward developing objective, data-driven approaches for understanding its underlying mechanisms.

PP28. CERIUM OXIDE NANOPARTICLES SYNTHESIS - HYDROGEN CATALYSIS FOR ENERGY STORAGE SYSTEMS

Simarpreet kaur[1], Simran kaushik[1], Priyal Singhal[2], Richa Singh[1], Sanjeev Gautam[3]
[1] Dr. SS Bhatnagar University Institute of Chemical Engineering and Technology, Panjab University, Chandigarh, India, [2] Department of Physics, Panjab University, Chandigarh, India, [3] Advanced Functional Materials Lab, Panjab University, Chandigarh, India

ABSTRACT

Cerium oxide (CeO_2) nanoparticles are effective catalysts because of their remarkable redox behavior and structural flexibility. They possess a stable cubic fluorite structure with abundant oxygen vacancies that enable reversible transitions between Ce^{3+} and Ce^{4+} oxidation states. These features impart excellent redox, catalytic, and antioxidant properties, allowing CeO_2 to function both as a reactive oxygen species (ROS) scavenger and an enzyme mimic.In this

study, CeO_2 nanoparticles were synthesized via a controlled co-precipitation method using cerium nitrate hexahydrate and sodium hydroxide. The resulting precipitate was centrifuged, washed, dried, and calcined to obtain fine CeO_2 powder with high purity and surface area. The catalytic mechanism relies on the defect chemistry of ceria, where oxygen vacancies serve as active sites for hydrogen activation. The Ce^{3+}/Ce^{4+} cycle facilitates rapid redox transitions that promote hydrogen adsorption and dissociation through both homolytic and heterolytic pathways. Temperature strongly influences these reactions: heterolytic dissociation dominates at lower temperatures, while higher temperatures favor homolytic processes, generating additional oxygen vacancies. The prepared CeO_2 nanoparticles are expected to exhibit thermal stability, reusability, and enhanced electron mobility, making them promising candidates for hydrogen-related reactions. Their performance in fuel cells, storage systems, and other clean energy technologies establishes CeO_2 as a potential "hydrogen super-catalyst" for sustainable energy applications.

PP29. HALOPHILIC BACTERIA AS SOURCE OF ECO-FRIENDLY EMULSIFIERS

Ritika[1], Onkriti[1], Parminder Kaur[2], Hema Setia[3], Ranjana Bhatia[2]
[1] *student*, [2] *Assistant professor*, [3] *Associate professor*

ABSTRACT

Halophilic bacteria as source of eco-friendly emulsifiers Ritika, Onkriti, Parminder Kaur, Hema Setia and Ranjana Bhatia Biotechnology Branch, University Institute of Engineering and Technology, Panjab University, Chandigarh-160014 Abstract: Halophilic bacteria found in extreme saline environments are a valuable source of many industrially important compounds. These bacteria produce exopolysaccharides (EPS) with unique structural and functional properties, making them promising natural bioemulsifiers. These biopolymers are stable under extreme pH, salinity, and temperature and offer sustainable alternatives to synthetic emulsifiers. In this study, halophilic bacteria were isolated from saline soil samples, and strain JC1 was identified as Halobacillus trueperi via 16S rRNA sequencing. Growth optimization revealed that 15% NaCl, pH 9, and 30 °C supported maximal growth of strain JC1 for maximum production of EPS. EPS was extracted from the culture supernatant after 7 days of incubation and evaluated for its emulsification potential. The result demonstrated that EPS for strain JC1was found to have efficient emulsification activity as indicated by its emulsification index measured at 24 hours and at 168 hours. It is hydrophilic in nature and forms a oil in water emulsion. The high emulsification indices observed indicate the potential of EPS from Halobacillus trueperi strain JC1 as a bioemulsifier for applications in bioremediation, oil recovery, and other industrial processes and biotechnological applications requiring salt-tolerant emulsifying agents.

PP30. MODELING THE BURST RELEASE PHENOMENON IN BIODEGRADABLE DRUG IMPLANTS: CHALLENGES AND MITIGATION STRATEGIES

Rupali Chauhan[1], Dr Naresh Kumar[1]
[1] *Department of Electronics and Communication Engineering, UIET, Panjab University, Chandigarh*

ABSTRACT

Biodegradable drug implants have emerged as a transformative approach in controlled drug delivery, enabling site-specific, sustained release of therapeutics without the need for surgical removal. However, the burst release phenomenon characterized by a rapid and uncontrolled drug discharge shortly after implantation remains a critical challenge, often leading to local or systemic toxicity and compromised therapeutic efficacy. This study focuses on modeling and mitigating burst release through an integrated framework of mechanistic mathematical modeling and computational simulations. Deterministic finite difference models and stochastic Monte Carlo simulations were employed to capture both the baseline release dynamics and variability introduced by microstructural differences. The results revealed that burst magnitude is strongly influenced by diffusion coefficients, surface-accessible drug concentration, and polymer porosity. Mitigation strategies, including polymer surface coatings, reduced near-surface drug loading, and delayed hydration core designs, were systematically evaluated. Among these, polymer coatings and core–shell architectures demonstrated the most effective reductions in burst release while maintaining consistent long-term profiles. The findings highlight the importance of in silico modeling for rapid design optimization, bridging experimental limitations, and supporting model-informed drug development. Ultimately, this work contributes to safer, more reliable, and patient-optimized implantable therapies. Keywords: Burst release, biodegradable implants, drug delivery, mathematical modeling, Monte Carlo simulation, finite difference method, polymer coatings, sustained release.

PP31. CeO_2 NANOPARTICLES SYNTHESIS- HYDROGEN CATALYSIS FOR ENERGY STORAGE SYSTEMS

Simarpreet Kaur[1], Simran Kaushik[1], Priyal Singhal[2], Richa Singh[1], Sanjeev Gautam[3]
[1] *Dr. SS Bhatnagar University Institute of Chemical Engineering and Technology, Panjab University, Chandigarh, India,* [2] *Department of Physics, Panjab University, Chandigarh, India,* [3] *Advanced Functional Materials Lab, Panjab University, Chandigarh, India*

ABSTRACT

Cerium oxide (CeO_2) nanoparticles have become effective catalysts because of their impressive redox behaviour and structural flexibility. They have a stable cubic fluorite

structure with many oxygen vacancies that allow for the reversible change between Ce^{3+} and Ce^{4+} oxidation states. These traits give CeO_2 outstanding redox, catalytic, and antioxidant properties. It can act as both a reactive oxygen species (ROS) scavenger and an enzyme mimic. In this study, we synthesized CeO_2 nanoparticles using a controlled co-precipitation method that involved cerium nitrate hexahydrate and sodium hydroxide. We centrifuged, washed, dried, and calcined the resulting precipitate to produce fine CeO_2 powder with high purity and surface area. The catalytic mechanism depends on the defect chemistry of ceria, where oxygen vacancies act as active sites for hydrogen activation. The Ce^{3+}/Ce^{4+} cycle enables fast redox transitions that encourage hydrogen adsorption and dissociation through both homolytic and heterolytic pathways. Temperature has a strong impact on these reactions; heterolytic dissociation is common at lower temperatures, while higher temperatures favor homolytic processes, creating more oxygen vacancies. The produced CeO_2 nanoparticles are expected to show thermal stability, reusability, and improved electron mobility, which will make them strong candidates for reactions involving hydrogen. Their effectiveness in hydrogen fuel cells, storage systems, and clean energy technologies positions CeO_2 as a top "hydrogen super-catalyst" with significant potential in sustainable energy applications.

PP32. PHYTOCHEMICAL INVESTIGATION AND COMPARATIVE EVALUATION OF AQUEOUS AND METHANOLIC EXTRACTS OF *FOENICULUM VULGARE* (FENNEL) SEED AND LEAF

Urvi Chauhan[1], Shailendra Kumar Arya[1]

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ABSTRACT

The study aims to investigate and compare the phytochemical constituents of aqueous and methanolic extracts of Foeniculum vulgare (fennel) seeds and leaves. Preliminary phytochemical screening revealed the presence of bioactive compounds such as alkaloids, flavonoids, tannins, saponins, terpenoids, and phenolics. The methanolic extracts showed a higher concentration of secondary metabolites compared to the aqueous extracts, indicating better extraction efficiency of methanol. The results suggest that both plant parts possess valuable phytochemicals with potential medicinal importance, and solvent choice significantly affects the yield and composition of these compounds.

Keywords: *Foeniculum vulgare*, phytochemical analysis, aqueous extract, methanolic extract, fennel.

PP33. TURNING SAWDUST INTO FUEL: XYLANASE NANOFLOWERS AS GREEN CATALYSTS FOR BIOETHANOL PRODUCTION

Karan Kapoor[1], Prof. Anupreet Kaur[1], Prof.Shailendra Kumar Arya[1]
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ABSTRACT

The conversion of lignocellulosic biomass into bioethanol provides a sustainable route for renewable energy production. In this study, sawdust—a low-cost and abundant industrial by-product—was utilized as the substrate for bioethanol generation. To enhance enzymatic efficiency and stability, xylanase was immobilized on inorganic–organic hybrid nanoflowers. The nanoflower-immobilized xylanase exhibited higher activity, thermal stability, and reusability compared to the free enzyme. Pretreated sawdust underwent efficient hemicellulosic hydrolysis, releasing an increased yield of reducing sugars under optimized conditions. Subsequent fermentation of the hydrolysate by Saccharomyces cerevisiae yielded a promising bioethanol, validating the feasibility of this integrated bioprocess. The study demonstrates a green and cost-effective strategy for waste valorization, highlighting the synergistic advantages of nanobiocatalysis and lignocellulosic bioconversion in advancing sustainable biofuel technologies.

Keywords: Lignocellulosic biomass, sawdust, bioethanol, enzymes, nanoflowers.

PP34. ECO-FRIENDLY ENZYME PRODUCTION FROM SAWDUST GROWN GANODERMA LUCIDUM FOR SUSTAINABLE PAPER AND DYE INDUSTRIES

Saumya Bharti[1], Dr. Madhu Khatri[1], Prof. Shailendra Kumar Arya[1]
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ABSTRACT

The research presented in this study explores the sustainable production of enzymes from Ganoderma lucidum cultivated on sawdust, a readily available lignocellulosic waste. To enhance substrate accessibility, sodium hydroxide pretreatment was employed. This treatment not only enhances the accessibility of cellulose and hemicellulose present in sawdust but also facilitates the breakdown of lignin, thereby making the substrate more

amenable to microbial degradation. This study investigated the optimization of xylanase and laccase production through cultivation of Ganoderma lucidum on a sawdust substrate. By employing efficient cultivation techniques and substrate utilization strategies, this study explored the potential of Ganoderma lucidum as a robust enzymatic source. The produced enzymes exhibited promising applications in industrial processes. Notably, they demonstrated effectiveness in delignifying newspaper pulp and decolorizing indigo carmine dye. These findings highlight the potential of Ganoderma lucidum as a sustainable platform for enzyme production, contributing to the development of eco-friendly and resource-efficient industrial practices. By utilizing agricultural waste as a renewable resource, this study addresses the growing demand for environmentally responsible solutions in various industrial sectors.

Keywords: Saw dust, Ganoderma lucidum, xylanases, laccases, lignin

PP35. ENHANCING THERMAL ENERGY STORAGE IN CONCENTRATED SOLAR POWER USING AL_2O_3 NANOPARTICLE DOPED MOLTEN SALT NANOFLUIDS FOR EFFICIENT EV CHARGING

Monika Verma[1], Akshita bisht[2], Medini sharma[1], Dr Sanjeev Gautam[1]

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ABSTRACT

The development of effective thermal energy storage (TES) systems has become essential for lowering dependency on fossil fuels as the demand for clean energy continues to rise globally. TES is used by Concentrated Solar Power (CSP) facilities to maintain power production during times when sunlight is scarce, guaranteeing a steady and uninterrupted supply of energy. Because of their nearly 99% heat-retention efficiency, chemical durability, and thermal stability, molten salts are regarded as one of the most dependable storage media available. In this study, Aluminum oxide (Al2O3) nanoparticles were used to enhance the thermophysical characteristics of molten salts. In order to create a uniform particle distribution, 1 weight percent Al2O3 was dispersed into the molten salt matrix using a combination of mechanical stirring and ultrasonic techniques. To assess changes in its thermal behavior, the modified salt was characterized using the T-history method. Experimental analysis revealed an increase of approximately 38.7% in specific heat

capacity (Cp) compared to the base salt. This enhancement demonstrates the strong potential of Al_2O_3- doped molten salts for advancing latent heat storage performance in CSP systems. These findings further suggest their applicability in emerging renewable energy technologies such as electric-vehicle charging stations and decentralized off-grid energy storage

PP36. CONVERSION OF TEMPLE FLORAL WASTE INTO LOW-COST ADSORBENTS FOR TREATMENT OF WASTE WATER- A REVIEW

Nivedita[1], Aashima Sood[1], Megha Saini[1], Harshnoor Kaur[1], Surinder Bhinder[1], Seema Kapoor[1]

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ABSTRACT

India's rich spiritual and cultural heritage generates an enormous quantity of floral offerings at temples daily, much of which ultimately becomes waste. Improper disposal of this temple floral waste into water bodies leads to serious environmental concerns such as eutrophication, unpleasant odours and water pollution. In recent years, growing emphasis on sustainable waste management and circular economy practices has inspired researchers to explore innovative ways of valorizing this biodegradable waste. One promising approach is the conversion of temple floral waste into low-cost adsorbents for wastewater treatment.

Various studies have demonstrated that carbonized or chemically activated floral residues possess significant adsorption capacity for removing dyes, heavy metals and organic pollutants from industrial effluents. This review highlights the various physicochemical techniques employed and key influencing factors including pH, contact time and dosage.

By integrating environmental stewardship with resource recovery, the valorization of temple floral waste presents a dual benefit-reducing solid waste burden while offering a cost-effective and eco-friendly solution for wastewater purification. This review underscores the need for further research in optimizing production methods, improving adsorption efficiency and promoting community-based collection and utilization models for sustainable wastewater management.

PP37. DEVELOPMENT AND CHARACTERIZATION OF MINERAL-FORTIFIED GUMMIES FORTIFIED WITH VITAMINS FOR BONE HEALTH

Aashima Sood[1], Nivedita[1], Megha Saini[1], Seema Kapoor[1], Uma Batra[2]
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ABSTRACT

Bone health is a vital component of overall well-being, governed by the adequate intake of essential minerals and vitamins. In recent years, functional foods have emerged as an effective approach to bridging nutritional gaps and delivering targeted health benefits. The present study focuses on the development and characterization of mineral-fortified gummies designed to support bone health while offering a convenient and palatable supplement alternative. The formulated gummies were evaluated for shelf life, texture profile, sensory attributes and overall acceptability. Additionally, the nutritional composition was assessed through proximate analysis to determine their suitability as a functional food product. The findings indicate that mineral-enriched gummies can serve as an appealing, chewable and consumer-friendly option for promoting bone health. This product is particularly advantageous for children, adults and elderly individuals who experience difficulty in consuming conventional tablets or capsules. Overall, the study highlights a promising advancement in nutritional innovation and preventive healthcare through food-based delivery systems.

PP38. MACHINE LEARNING-BASED DEMAND FORECASTING SYSTEM FOR ONLINE FASHION RETAIL

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ABSTRACT

The fashion industry, contributing significantly to the global economy, faces persistent challenges in forecasting product demand due to rapid trends, limited historical data, and fluctuating customer preferences. Traditional forecasting models relying solely on past sales fail to capture these dynamic market conditions. This thesis proposes an intelligent

forecasting system for online fashion retail using machine learning and deep learning techniques to enhance sales and demand prediction accuracy. The study utilizes a comprehensive dataset comprising article details, customer information, and transaction history from an online retailer. Preprocessing methods such as label encoding and normalization are applied to improve model efficiency. Various supervised regression and artificial intelligence algorithms are evaluated using RMSE metrics to determine the best-performing model. The selected model is deployed through a Flask-based web application, enabling real-time prediction of fashion article trends and sales. The results demonstrate the effectiveness of the proposed approach in addressing the forecasting challenges of the fashion industry.

PP39. SYNTHESIS AND CHARACTERIZATION OF ZN/F CO-SUBSTITUTED HYDROXYAPATITE-BASED BONE CEMENT FOR BIOMEDICAL APPLICATIONS

Megha Saini[1], Seema Kapoor[1], Uma Batra[2]

[1]*Dr. S.S.B. University Institute of Chemical Engineering & Technology, Panjab University, Chandigarh* [2]*Dept. of Metallurgical & Materials Engineering, Punjab Engineering College (Deemed to be University), Chandigarh*

ABSTRACT

Hydroxyapatite (HA), owing to its excellent biocompatibility and structural similarity to the mineral component of natural bone, has been widely explored for biomedical applications such as bone grafts and cements. However, its inherent brittleness and limited bioactivity restrict its clinical performance. In this study, zinc (Zn) and fluoride (F) co-substituted hydroxyapatite (ZnFHA)-based bone cement was synthesized and characterized with the aim of enhancing its mechanical strength and bioactivity.

The ZnFHA powder was synthesized via a wet chemical precipitation route, followed by incorporation into a bone cement matrix. The physicochemical characterization of the synthesized powder was carried out using X-ray diffraction (XRD) and Fourier transform infrared spectroscopy (FTIR) to confirm phase purity, crystallinity and functional group substitution. Mechanical performance was evaluated using a Universal Testing Machine (UTM) to determine compressive strength and Young's modulus, while in-vitro bioactivity was assessed by immersing the cement beads in phosphate buffer solution (PBS).

The findings reveal that Zn/F co-substitution significantly improves the mechanical integrity and bioactive response of hydroxyapatite-based bone cement. These results suggest that the developed ZnFHA-based cement holds strong potential as a promising biomaterial for bone repair and regeneration applications.

PP40. REVIVING RITUAL WASTE: A SUSTAINABLE TRANSFORMATION OF TEMPLE FLOWERS INTO SAMBRANI CUPS

Harshnoor Kaur[1], Aryan Kamboj[1], Seema Kapoor[1], Vivek Trivedi[2]
[1]*Dr. S.S.B. University Institute of Chemical Engineering & Technology, Panjab University, Chandigarh*
[2]*Social Development Officer, Municipal Corporation Chandigarh*

ABSTRACT

In India, a vast amount of floral offerings made at temples ultimately turn into waste, contributing to growing concerns of solid waste management and water pollution. The present study presents an eco-innovative solution to this environmental challenge by repurposing discarded temple flowers into sustainable Sambrani cups. These cups serve as a compact form of Havan Samagri, harmoniously blending cultural reverence with environmental consciousness. Each Sambrani cup is meticulously crafted from a mixture of dried flower stems and natural clay, lending it both durability and a uniform burn. When ignited, it releases a calming, natural fragrance that purifies and refreshes the surroundings. The nutrient-rich ash residue left after burning further extends its value, acting as an organic fertilizer, thus completing a circular process. This eco-conscious initiative, not only mitigates floral waste but also fosters environmental awareness, promotes sustainable livelihoods and rejuvenates traditional practices through innovation and responsible waste management.

PP41. RECENT RESEARCH AND DEVELOPMENTS IN THE ELECTRIC VEHICLES

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ABSTRACT

This paper provides a comprehensive review of the most recent research and developments in the field of electric vehicle (EV). During the last two decades, EV research has gained interest of many researchers worldwide due to its major benefits related to the transportation sustainability and the global climate objectives. Three major areas of EV research and development have been reviewed, which are, charging infrastructure, EV adoption, and thermal management systems. Hybrid EVs gained some interest initially but were later overtaken by the fully EV technologies. Charging infrastructure related research mainly focused on optimal charging station allocation and its integration within the transportation networks in addition to investigating the effects of strategic charger placement on overall system performance. EV adoption has also been investigated by many researchers focusing on consumer behavior, market development, and policy incentives influencing the EV purchase. Various factors such

as overall cost, environmental sustainability, and comfort level play significant role in EV adoption. Thermal management systems have also been investigated as one of the major trending research topics in EV studies. It mainly emphasizes on thermal regulation for batteries to enhance safety, performance, and longevity. Heat generation and dissipation efficiently under various operating conditions play significant role in efficient operation of EVs.

PP42. FROM FLUID TO ARMOR: HOW SHEAR THICKENING FLUID MAKES PROTECTION STRONGER

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ABSTRACT

Protective shear thickening fluid-based packs are special layers designed to reduce the force that reaches the body and prevent Behind Armor Blunt Trauma (BABT). They work by absorbing and spreading out the impact energy. In this study, protective packs made with Shear Thickening Fluid (STF) were tested using a pressure mapping mat during a 20 J drop test. STFs are non-Newtonian fluids that become thicker and more solid when a sudden force is applied. This unique behavior makes them useful for improving the impact protection of safety equipment. To prepare the packs, STF was applied evenly to a spacer fabric and allowed to settle overnight. The sealed packs were then tested in a drop tower, with a pressure mat placed below to measure the pressure and force distribution during impact. The results showed that adding STF to the spacer fabric helped reduce the peak pressure and improved the performance of the protective packs.

PP43. RECENT ADVANCES IN TARGETED DRUG DELIVERY USING METAL-ORGANIC FRAMEWORKS: TOXICITY AND RELEASE KINETICS

Sanjeev Gautam[1], Ishita Lakhanpal[1], Lidiya Sonowal[1], Navdeep Goyal[1], Aarushi Sharma[1] Shrishti Jha[1]

[1] *Advanced Functional Material lab, dr ssbuicet Panjab university*

ABSTRACT

Metal–organic frameworks (MOFs) have emerged as promising nanocarriers for targeted drug delivery owing to their high surface area, adjustable porosity, and strong chemical stability. These structures can encapsulate a wide range of therapeutic agents—including small molecules, proteins, and nucleic acids—while ensuring controlled release and protection from enzymatic degradation. By functionalizing MOFs with specific targeting

ligands, drugs can be delivered directly to diseased sites, thereby reducing side effects. Various synthesis techniques, such as solvothermal, microwave-assisted, sonochemical, and mechanochemical methods, allow precise control over pore size and structure, making MOFs highly adaptable for biomedical applications. MOFs show great potential in cancer therapy, antimicrobial treatments, imaging, and vaccine delivery. Their stimuli-responsive nature—activated by factors like pH, temperature, magnetic fields, or light—enables on-demand drug release. The kinetics of drug release typically follow models such as zero-order, first-order, Higuchi, Hixson–Crowell, or Korsmeyer–Peppas, depending on diffusion and degradation mechanisms. Despite these advantages, challenges related to biocompatibility and toxicity persist, as residual metal ions and organic linkers may induce cytotoxic effects. Current research focuses on refining synthesis, surface modification, and degradation processes to improve safety and compatibility. Looking ahead, the development of patient-specific MOFs for personalized medicine—integrating both therapeutic and diagnostic (theranostic) capabilities—represents an exciting frontier. In summary, MOFs possess immense potential to revolutionize the field of targeted and controlled drug delivery systems.

MANAGEMENT SCIENCES

- **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)**

Sectional President
Prof Anupreet Mavi

Sectional Secretary
Dr Naveen Kumar
Dr Anish Slath

Abstracts of Oral Presentations

Oral Presentation- Management Sciences		
OP1	Dr. Aman Khera	Redefining Healthcare Management: Empowering Humanity through Equity and Access
OP2	Dr. Harjit Kaur	Behavioral strategy: A Bibliometric Review
OP3	Ms. Akanksha Garg	Japanese Avant-Garde Designers: Empower Humanity in an AI-Driven Future
OP4	Ms. Anu Kaushal	Ethically Passionate Leadership as an Antidote to Workplace Abuse: A Narrative Case Study from an Elite Boarding School in India
OP5	Mr. Ashwini Kumar	Ethical Digital Transformation in Smart Tourism: Integrating AI, Destination Stewardship and Regenerative Tourism.
OP6	Ms. Deepa	Androgynous Fashion: A Powerful Agent of Social Change
OP7	Ms. Kanksha Malhotra	Climate Finance and Environmental Quality: A Systematic Literature Review
OP8	Ms. Kirti	Sustainable Stitches: Empowering Women through Eco-Conscious Design
OP9	Ms. Meenal Jain	Exploring the role of ai-driven sentiment analysis in stock market prognosis: a systematic literature review
OP10	Ms. Seerat	Targeting Glutaminase C, a splice variant of Glutaminase 1, Suppresses Smooth Muscle Cell Phenotypic Modulation and Neointimal Hyperplasia

ABSTRACTS OF ORAL PRESENTATIONS

OP1. REDEFINING HEALTHCARE MANAGEMENT: EMPOWERING HUMANITY THROUGH EQUITY AND ACCESS

Dr. Aman Khera[1]
[1] *UIAMS, Panjab University, Chandigarh*

ABSTRACT

Healthcare management is undergoing a paradigm shift from efficiency-driven administration toward inclusive, equity-centered leadership that prioritizes access and empowerment. Redefining Healthcare Management: Empowering Humanity through Equity and Access explores how management theories and practices can be reoriented to achieve universal health coverage and equitable outcomes. The paper examines healthcare systems through a strategic management lens, emphasizing governance, financing, human resource optimization, data-driven decision-making, and community engagement. It argues that true empowerment in healthcare arises not only from technological or clinical advancements but from managerial models that integrate ethical leadership, cross-sector collaboration, and culturally sensitive service design. Drawing upon global frameworks such as the Sustainable Development Goals and equity-based access models, this work proposes a holistic framework for redefining healthcare management that aligns efficiency with justice, innovation with inclusivity, and organizational performance with human well-being. Ultimately, it advocates for a human-centered management approach that bridges policy and practice to ensure that healthcare systems become instruments of empowerment, enabling all individuals—regardless of geography, income, or identity—to attain their highest possible standard of health.

OP2. BEHAVIORAL STRATEGY: A BIBLIOMETRIC REVIEW

Dr.Harjit Kaur[1], Dr.Nidhi Singhal[1], Rohan Sharma[1], Ankur Mishra[1]
[1] *Dr.SSBUICET, Panjab University, Chandigarh*

ABSTRACT

This study aims to review the existing literature on behavioral strategy—a field that integrates cognitive and social psychology with strategic management theory and practice using bibliometric analysis. Behavioral strategy has gained increasing scholarly attention in recent years, particularly due to its potential to explain strategic decision-making through the lens of bounded rationality, emotions, and cognitive biases. The purpose of this review is to map the intellectual structure of the field, identify key research themes, trends, and influential contributors, and propose directions for future inquiry. A bibliometric analysis was conducted using the Scopus database. The search spanned articles published between 2000 and 2025, with "behavioral strategy" and related terms used as primary keywords. After applying rigorous inclusion and exclusion criteria, a final sample of 109 peer-reviewed journal articles was selected. Data were exported and analyzed using R and RStudio to examine publication trends, author productivity, country and institutional collaborations, keyword co-occurrence, and thematic evolution. The analysis revealed a significant rise in behavioral strategy publications since 2020, indicating the field's growing academic relevance. Core research themes include cognitive biases, decision-making, social psychology, and organizational learning. Keyword analysis highlighted an evolving focus from foundational concepts like cognition and bias to more applied themes, such as strategic innovation and behavioral design in organizations. Behavioral strategy is becoming an essential component of strategic management research. It provides valuable insights into the psychological foundations of strategic decisions and offers a practical framework for designing behaviorally informed decision-making processes within firms.

OP3. JAPANESE AVANT-GARDE DESIGNERS: EMPOWER HUMANITY IN AN AI-DRIVEN FUTURE

Ms. Akanksha Garg[1], Dr. Rita Kant Retd.[1]
[1] *University Institute of Fashion and Lifestyle Technology Panjab University Chandigarh*

ABSTRACT

Fashion is often seen as an expression of beauty, but in the hands of Japanese avant-garde designers, it becomes much more: a way of imagining futures, empowering communities, and bridging the gap between art, technology, and humanity. In today's AI-driven era, where automation and algorithms increasingly shape our lives, the role of designers extends beyond aesthetics—they become cultural visionaries who merge tradition, functionality, and innovation to respond to urgent societal needs. This paper explores how Japanese designers such as Issey Miyake, Rei Kawakubo, and emerging avant-garde innovators are redefining design as a humanitarian act. By merging artisanal techniques with AI-driven tools, sustainable textiles, and experimental construction methods, they challenge the fashion industry's norms and open pathways for ethical, inclusive, and eco-conscious practices. The study aims to analyse the evolving role of Japanese designers in an AI society, investigate how technology, art and tradition merge to address contemporary challenges, and explore how avant-garde fashion can contribute to sustainability and ethical design. Through a qualitative, case-study approach, the research demonstrates how fashion beyond being wearable can empower humanity by fostering creativity, education, well-being, and environmental responsibility. In doing so, this work positions avant-garde fashion not just as art or commerce, but as a vital force for building a more human and sustainable future.

OP4. ETHICALLY PASSIONATE LEADERSHIP AS AN ANTIDOTE TO WORKPLACE ABUSE: A NARRATIVE CASE STUDY FROM AN ELITE BOARDING SCHOOL IN INDIA

Anu Kaushal[1]

[1] *The Department of Management Sciences, University Institute of Applied Management Sciences UIAMS, South Campus, Panjab University, Sector 25, Chandigarh*

ABSTRACT

The purpose of this article is to study workplace abuse from the perspective of ethical leadership and professional marginalization. This narrative case study is a detailed exploration of a highly qualified and committed employee of a well-known private boarding school in India, who was subjected to long-term professional marginalization, verbal harassment, and forced social exclusion by narcissistic leaders. Recurring promises of important tasks were not met, with the employee maintained inactive in the library, while other co-workers were deterred from interaction in fear of termination. Barred labor union protections based on his job category, the employee lacked institutional recourse and was eventually fired. The current research explores and introduces the concept of Ethically Passionate Leadership (EPL) as a model for promoting dignity, justice, and accountability within organizational environments. It stresses the critical necessity for institutionalized leadership training programs aimed at developing empathy, moral accountability, and ethical decision-making. The case also points out governance lacunae and calls for stringent legislative safeguards for private-sector employees, protecting their rights and dignity. By connecting real-life phenomena with ethical and leadership principles, the study sheds light on how abuses can be prevented, organizational culture can be improved, and justice in work environments can be fostered.

OP5. ETHICAL DIGITAL TRANSFORMATION IN SMART TOURISM: INTEGRATING AI, DESTINATION STEWARDSHIP AND REGENERATIVE TOURISM.

Ashwini Kumar[1], Dr. Jaswinder Kumar[2]

[1] *Research Scholar, UIHTM, PU.*, [2] *Director, UIHTM, PU.*

ABSTRACT

The fusion of technological innovation and digital literacy has redefined the landscape of global tourism. This paper investigates how advanced technologies such as Large Language

Models (LLMs), Retrieval-Augmented Generation (RAG) and AI agents are reshaping destination management, visitor experience, and environmental protection. It proposes an ethical framework that addresses data privacy, misinformation, algorithmic bias and digital inclusivity in tourism. Drawing insights from AI-driven sustainability and ethical challenges in digital platforms, the study highlights how responsible technology adoption enhances transparency, cultural preservation and environmental balance. The framework advocates for digital literacy as a cornerstone of ethical tourism transformation, promoting authenticity, accountability, and stakeholder engagement. Ultimately, this research underscores the need for harmonizing digital innovation with ethical governance to create secure, tourist-centered, and sustainable smart destinations.

OP6. ANDROGYNOUS FASHION: A POWERFUL AGENT OF SOCIAL CHANGE

Ms. Deepa[1], Dr. Rita Kant[1]

[1] *University Institute of Fashion Technology and Vocational Development Panjab University*

ABSTRACT

This paper examines androgynous fashion as a transformative agent of social empowerment, challenging conventional gender norms and fostering inclusivity within contemporary clothing discussion. Drawing on secondary data from scholarly articles and papers published over the past decade, the study analyzes how androgynous fashion disrupts binary social constructs and redefines identity expression. A comparative review of existing definitions of androgynous fashion is included, highlighting their shared trajectory toward empowerment despite differing conceptual frameworks. To incorporate a younger, lived perspective, the paper presents case studies of two social media users who actively engage with the hashtag #androgynousfashion. These case studies, conducted via telephonic interviews, offer insight into how individuals use digital platforms to express themselves through fashion—and how those choices relate to broader social and political issues around identity. The research argues that androgynous fashion is not merely an aesthetic preference but a socio-political statement capable of reshaping industry norms and amplifying diverse identities. The study positions androgynous fashion as a dynamic force—one that reclaims space, voice, and visibility for individuals navigating the fluid spectrum of gender and selfhood.

OP7. CLIMATE FINANCE AND ENVIRONMENTAL QUALITY: A SYSTEMATIC LITERATURE REVIEW

Kanksha Malhotra[1]
[1] *Research Scholar, University Business School, Panjab University*

ABSTRACT

Unprecedented climate changes have marred recent years and pushed humans into a deeper state of helplessness. However, negotiations at the national and international level aimed to improve environmental quality and empower humanity through deploying the international flow of climate funds. The purpose of the study is to map the literature related to the impact of climate-related finance on environmental quality. The study highlights the empowerment of humanity through efforts to improve environmental quality and combat climate change by transferring funds to various countries at the international level. The Systematic Literature Review approach has been deployed to map the existing literature and highlight future research avenues. The present study analyzes research articles from the Scopus Database. The results highlight the significance of climate aid. Climate-related development finance has helped in improving environmental quality as reported by majority of the studies. The paper also provides implications for policymakers. The impact of climate-related finance on reducing carbon dioxide emissions across the globe can become more pronounced by the effective and timely transfer of funds. A more equitable allocation of climate aid is required to further enhance the positive impact on environment and ensure climate justice. The paper, furthermore, helps in conceptualizing future research directions by highlighting various research gaps. A country-specific or region-specific study could help guide future research direction. A comparison of the amount invested in climate finance and emission reduction achieved could help suggest policy changes.

OP8. SUSTAINABLE STITCHES: EMPOWERING WOMEN THROUGH ECO-CONSCIOUS DESIGN

Diksha[1], Kirti[2]
[1] *Student,* [2] *Research Scholar*

ABSTRACT

This study presents ROOTED IN NATURE, a sustainable fashion collection that unites natural inspiration with eco-conscious design to achieve two key goals: protecting the environment and empowering women. Drawing from the textures and beauty of nature—such as the roughness of tree bark, the delicate veins of dried leaves, and the layered surfaces of

the earth—the collection applies techniques like gathers, pintucks, and ruffles to recreate organic patterns in fabric. Materials such as linen, cotton gauze, and flannel were carefully chosen for their biodegradable, breathable, and skin-friendly qualities. These fabrics not only reduce environmental waste but also enhance human comfort and health, reflecting fashion's role in promoting well-being. The project also incorporated creative accessories that merge functionality with natural forms. For example, the Rooted Scarf was crafted using fabric-covered aluminium wires to mimic twisting roots, while a ridged-gourd-inspired cape and handcrafted jute-braided footwear showcased traditional craftsmanship. These designs demonstrated how affordable, sustainable materials and artisanal skills can produce innovative products. More importantly, they created opportunities for women artisans to gain meaningful employment, preserve heritage crafts, and strengthen socio-economic independence. Beyond aesthetics, this study highlights the social dimension of sustainable fashion. By integrating science, technology, and eco-friendly practices, fashion can become a platform for women's empowerment, green employment, and healthier communities. The model advanced here promotes a women-centered approach where fashion embodies both style and responsibility—toward the planet, people, and the empowerment of women artisans.
Keywords: Sustainable fashion, Women's empowerment, Eco-friendly design, Green employment, Health and well-being.

OP9. EXPLORING THE ROLE OF AI-DRIVEN SENTIMENT ANALYSIS IN STOCK MARKET PROGNOSIS: A SYSTEMATIC LITERATURE REVIEW

Meenal Jain[1]

[1] *Research Scholar, University Business School, Panjab University, Chandigarh*

ABSTRACT

Forecasting the stock market is one of the most prominent topics in academia. It has an urgent demand among investors and portfolio managers who have invested substantial funds. Future movements in the stock market are often driven by news and public opinions on social media. This study aims to explore the extant literature on AI-based sentiment analysis for stock market prognosis. The studies were analysed and synthesized through a systematic literature review. The articles were extracted from the SCOPUS database, published up to 29 September 2025, following the PRISMA framework. The results of the review are presented using the TCCM framework. The review underscores that sentiment analysis draws on behavioral finance theories and contradicts the efficient market hypothesis and the random walk theory. There has been a surge in sentiment analysis-based prediction studies, with the majority of articles published related to the US stock markets. The review showed that sentiment analysis complements fundamental and technical analysis in stock market

prognosis. News headlines and tweets significantly influence the future stock market movements. The majority of studies show that FinBERT accurately captures market sentiment, followed by lexicon-based VADER. The LSTM sentiment analysis is the best forecasting model, producing predictions that were near to the actual stock performance. This study empowers investors to make informed investment decisions by showing how market sentiment affects future price movements. It also assists asset management companies in developing robust trading strategies using AI-based techniques. The study also identified the research gaps and provided avenues for future research.

OP10. TARGETING GLUTAMINASE C, A SPLICE VARIANT OF GLUTAMINASE 1, SUPPRESSES SMOOTH MUSCLE CELL PHENOTYPIC MODULATION AND NEOINTIMAL HYPERPLASIA

Ankan Sarkar[1], Bhavneesh Kumar[1], Ashok K Yadav[1], Sandip V Pawar[1], Kanwaljit Chopra[1], Manish Jain[1], Seerat[1]

[1] *Panjab University*

ABSTRACT

Smooth muscle cell (SMC) phenotypic modulation plays a key role in vascular proliferative disorders such as restenosis and neointimal hyperplasia. During proliferation, SMCs rely on glutamine to meet their energy, biosynthetic, and redox demands. Glutaminase C (GAC), a splice variant of glutaminase (GLS), catalyzes the conversion of glutamine to glutamate, which fuels the tricarboxylic acid (TCA) cycle. Although GAC is known to promote proliferation in cancer and endothelial cells, its role in SMC proliferation remains unclear. This study investigates the impact of targeting GAC on SMC proliferation and neointimal hyperplasia. Murine aortic SMCs were pretreated with CB-839 (a selective GAC inhibitor, 10 µM for 60 min) and subsequently stimulated with Platelet-Derived Growth Factor-BB (PDGF-BB, 20 ng/ml) for 24 hours. Western blotting and immunofluorescence revealed that GAC expression was markedly upregulated in PDGF-BB–stimulated SMCs and in neointima of wire-injured mice. Glutamine deprivation or GAC inhibition significantly reduced PDGF-BB–induced SMC proliferation, migration, and phenotypic switching, accompanied by decreased phosphorylation of ERK and mTOR. Furthermore, GAC inhibition promoted mitochondrial translocation, induced oxidative stress, and reduced injury-induced neointimal hyperplasia in vivo. These findings highlight that GAC-driven glutamine metabolism is crucial for SMC proliferation and neointimal formation. Thus, pharmacological inhibition of GAC may represent a promising therapeutic strategy to prevent restenosis and other vascular proliferative diseases.

Abstract of Poster Presentation

Poster Presentation- Management Sciences		
PP1	Dr. Anu H Gupta	A Study on Safety and Welfare Measures for Women in Textile Industry of Baddi

ABSTRACT OF POSTER PRESENTATION

PP1. A STUDY ON SAFETY AND WELFARE MEASURES FOR WOMEN IN TEXTILE INDUSTRY OF BADDI

Anu H Gupta[1], Arshdeep Kaur[1]
[1] *UIFT Panjab University*

ABSTRACT

Women constitute a significant portion of the workforce in the textile industry. Despite being the backbone of this industry, they face many workplace challenges and issues like safety and their welfare remain a key concern for them. These challenges not only affect their performance but also make it harder for them to continue in their roles or grow professionally. Since this is a labour-intensive industry, the well-being of workers - especially women - needs to be a top priority. When women feel safe, respected, and supported at work, their satisfaction and productivity improves. The objectives of the present research was to study the workplace safety and welfare measures provided to women in textile industry of Baddi and the level of awareness of the women regarding the safety and welfare measures provided to them. Data was collected through interviews form 120 females and 60 males employed in the textile industry of Baddi. The research revealed that though there exists many safety measures for the women workers but they themselves avoid many safety measures like not wearing masks while working due to discomfort or suffocation. Moreover, lack of awareness regarding maternity leave and Prevention of Sexual Harassment (POSH) Act was identified as a common issue.

LIFE SCIENCES

- **Botany**
- **Zoology**
- **Anthropology**
- **Forensic Science and Criminology**

Sectional President
Prof MC Sidhu

Sectional Secretary
Dr JS Sehrawat
Dr Santosh K Upadhyay

CHASCON 2025

NATIONAL CONFERENCE ON

"*Empowering Humanity: Science, Technology, and Healthcare for All*

November 06 - 08, 2025

Section: Life Sciences

Program

November 07, 2025

Venue: Deptt. of Botany, Panjab University, Chandigarh

Sectional President	**Sectional Secretary**
Name – Prof. M. C. Sidhu Mobile - 9872224786	Name – Dr. J. S Sehrawat & Dr. Santosh K Upadhyay Mobile - 9988031199, 8699207045

Time	**Program**
09:00-09:45	Display of posters by participants **Venue**: Deptt. of Botany, P.U, Chandigarh
09:45-10:00	Inauguration of Sectional Program ***Venue:*** Auditorium, Deptt. of Botany, P.U, Chandigarh
10:00-10:45	**Session Chair:** Prof. Kamal Jit Singh **Speaker:** Dr Gulzar Singh Sanghera, Director-cum-Principal Sugarcane Breeder PAU Regional Research Station, Kapurthala 144601 ***Title: "Sugarcane Improvement: Conventional & Genomic Approaches"***
10:45-11:30	**Session Chair:** Prof. Sukhbir Kaur **Speaker:** Dr. Aruna Rakha Arora, Ph.D, Additional Professor, Department of Translational and Regenerative Medicine, PGIMER, Chandigarh ***Title: "From Petri Dish to Patient: What Stem Cells Can (and Can't) Do Today"***
11:30-12:00	**Tea Break**
12:00-13:00	Oral Presentation (Faculty) ***Venue:*** Seminar Hall, Department of Botany, P.U, Chandigarh Poster Presentation UG/PG **Venue:** Department of Botany, P.U, Chandigarh
13:00-14:00	**Lunch**
14:00-17:00	Oral Presentation **Venue:** Auditorium, Deptt. of Botany, P.U, Chandigarh Poster Presentation **Venue:** Department of Botany, P.U, Chandigarh **Tea Break from 15:30-16:00**

Abstracts of Invited Talks

FROM PETRI DISH TO PATIENT: WHAT STEM CELLS CAN (AND CAN'T) DO TODAY

Aruna Rakha Arora, Ph.D.,

Additional Professor
Department of Translational and Regenerative Medicine, Research Block B, Postgraduate Institute of Medical Education and Research, Sector-12, Chandigarh

ABSTRACT

Stem cells have moved from promise to practice—but only in specific, well-regulated lanes. This talk separates the real progress from commercial claims and explains how to navigate the gap. In one part of talk, I will review the major stem-cell types (adult/somatic, embryonic, induced pluripotent, and perinatal) and their translational value for modelling disease, screening drugs, and enabling precision medicine. I will then map the clinical reality today: hematopoietic stem-cell transplantation; recently approved autologous, gene-modified HSC therapies for sickle cell disease and β-thalassemia; tissue-specific advances such as cultured epidermal autografts for extensive burns and limbal stem-cell grafts for corneal repair; and the first approved mesenchymal stromal cell product in a defined niche. Next, I will shed what's promising but not yet standard (e.g., iPSC-derived cells and organoid-based grafts), and why many marketed "stem cell" offerings—especially exosomes and cure-all MSC injections—remain unproven or non-compliant.

Although stem cell technology is evolving every day, the term stem cells evokes a sense of immense hope in vulnerable patients and bundles of excitement in scientific researchers. However, to transform good science into and good medicine requires substantial amounts of both time and effort. As we progress towards this transformative era, we must pose a question that: Are stem cells really going to be magic bullet in future. This question is imperative in creating awareness amongst general masses about the pace, positive and negatives of prevailing therapies based upon stem cells.

The goal of my talk is to empower academicians, scientists, clinicians and the public to recognise where stem-cell medicine is real today, what's genuinely on the way, and how to avoid costly or harmful detours.

SUGARCANE IMPROVEMENT: CONVENTIONAL & GENOMIC APPROACHES

Dr Gulzar Singh Sanghera
Director cum principal sugarcane Breeder
PAU Regional Research Station, Kapurthala 144601
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ABSTRACT

Sugarcane (*Saccharum* spp. complex) is an important agro-industrial crop that accounts for nearly two-thirds of world sugar production. It is chiefly grown in the tropical and subtropical regions of the world. Commercial production of sugar from sugarcane began in India and China approximately 2500 years ago and spread to Western Europe in the eighteenth century. A mature sugarcane plant contains a very large amount of biomass in addition to the sucrose accumulated in its stems. Total dry matter yields i.e. sugar and non-sugar components are normally approximately 20-60 t/ha in commercial environments, but can go as high as 70 t/ha. Sucrose can comprise12-16% of the fresh weight of stems and approx. 50% of its dry weight, translating through to approximately 0.7 M sucrose. Today, in addition to sugar production, sugarcane and its by-products are used as raw materials in the production of fuel, chemicals, bio-fertilisers, paper and pulp etc with the possibility of more products being produced through bio-refining. India is the largest producer next only to Brazil and is also a major consumer of sugar, with only 3-5% of the production being exported. With the growing emphasis on production of bio-ethanol and its blending with fuel, importance of sugarcane would grow in the coming years, as it produces about 4000-6000 l/ha of ethanol. Conventional methods have greatly contributed to crop improvement; however, limitations such as complex genome, narrow genetic base, poor fertility, susceptibility to biotic and abiotic stresses and long duration to breed elite cultivars still impose a challenge for sugarcane breeders. In this direction, *in vitro* culture systems and related biotechnologies have been developed as novel strategies for sugarcane improvement. The range of potential applications being developed through transgenic plants in sugarcane include, insect resistance, resistance to viruses, altered sucrose content, lignin modification, sucrose accumulation and herbicide resistance. A comprehensive understanding of genetic diversity

within *Saccharum*, and knowledge of the contribution of founder species to the variability present in current working collections, could improve the effectiveness of breeding programs aiming at combining broadened complementary resources. The progress in sugarcane genomics is far behind that achieved for important cereal crops, a key turning point has been reached in recent years: the evolutionary origin and genome structure of sugarcane are better understood; important resources such as genetic maps, large EST collections and a BAC library are now available for sugarcane; sorghum has been clearly established as a close diploid model. Advancements in genomics tools have paved the way for a detailed understanding of the mechanism underlying biotic and abiotic stress responses. This new array of tools will certainly help to enhance our understanding of the sugarcane genome with, hopefully, a particular emphasis on its spectacular ploidy level, which remains it most original and most challenging feature. The complete genome sequence of sugarcane remains a distant goal; thus, the large collection of sugarcane ESTs will remain a highly valuable resource for a long time to come. This collection will be of primary interest for gene discovery and functional analyses in sugarcane and possibly in related grasses, such as maize and sorghum. 'By-products' of this resource, which are as diverse as large-scale comparative analyses of genomes within the plant kingdom or the discovery of single nucleotide polymorphisms, may also become valuable as data-mining progresses. The potential of the current genomics programs, aimed at elucidating the structure, function, and interactions of the sugarcane genes, will revolutionize the application of noble genomic tools to sugarcane improvement. This lecture outlines some of the conventional and noble biotechnological developments that are in place and tailored to address important issues related to improvement of sugarcane crop.

Abstracts of Oral Presentations

Oral Presentation- Life Sciences		
OP1	Dr. Jagdish Rai	Evolutionary perspective on reward system for educational program against drug misuse
OP2	Dr. Js Sehrawat	Artificial intelligence in radiographic forensic dental age estimations: A meta-analysis and systematic review
OP3	Dr. Tej Kaur	Morphoscopic insights of Identity: Unveiling Sex and Ethnicity through the Human Ear using Machine Learning
OP4	Dr. Gurkanwal Kaur	Trilateral lignocellulosic biomass fractionation for co-production of xylanase, xylitol and xylooligosaccharides
OP5	Dr. Harmanjit Kaur	Hydrogen sulfide and salicylic acid mediate cadmium tolerance in mustard plants
OP6	Dr. Nidhi Srivastava	Synthetic Sex Hormones Strike Beyond Reproduction: Effects on Liver and Spleen in Female Mice
OP7	Ms. Akansha Rana	Prediction of familial resemblance of fingerprint patterns by employing artificial intelligence models- A study of Northwestern Indian Population
OP8	Dr. Anamika Kumari	Phytochemical diversity, antioxidant efficiency, and gc–ms profiling of *Rhynchostylis retusa* (l.) Blume: a therapeutically important and endangered indian orchid
OP9	Ms. Ankita Guleria	Global Adoption of Facial Recognition Technology: Current Scenario, Challenges and Legal Considerations
OP10	Mrs. Deepika	A LysM domain-containing protein TaLysM1-A confers salinity and drought tolerance in transgenic *Arabidopsis*
OP11	Ms. Niharika	Expanding the Molecular Toolkit: The Role of Forensic Proteomics in Decoding the Dead
OP12	Ms. Swati	Insights into the Cinnamate 4-Hydroxylase Gene Family of *Vanilla planifolia*: An in-silico approach
OP13	Mr. Chetan Dubey	Blinking Lights: Urgent Conservation Strategies for Ecosystem Health Monitoring
OP14	Mrs. Jyoti	Thermochemical conversion of agricultural waste into Bio-oil
OP15	Mr. Madan Lal	Earthworm diversity in an unexplored Himalayan landscape: Patterns across forest, orchard and crop field ecosystems
OP16	Ms. Samriti	Protective effects of *Eclipta alba* (L.) Hassk. powder against Diet-Induced Obesity in Zebrafish: Insights from Lipase Inhibition, Phytochemical Profiling, Biochemical and FTIR Analysis
OP17	Mr. Abhinav Dhiman	Human AI Coevolution Towards Ethical Design
OP18	Mr. Abhinav Sharma	Digital Crimes: How to Predict, Protect and Prevent the Crimes of a New Age

OP19	Mr. Amit Sharma	Role of chemical analysis in forensic death investigation
OP20	Ms. Gauri Sharma	Forensic estimation of sexual dimorphism using maxillary and mandibular canines in the population of chandigarh
OP21	Ms. Nishka Sarda	Estimation of sex and stature from footstep length and stride length: forensic and anthropological implications
OP22	Ms. Nishu Saini	From genes to dreams- The power of biotechnology
OP23	Ms. Trisha Chander	Vaccine Hesitancy: Understanding the Determinants Behind Public Uncertainty
OP24	Ms. Vertika	TELEMEDICINE: Healthcare Access for Rural and Remote Communities

ABSTRACTS OF ORAL PRESENTATIONS

OP1. EVOLUTIONARY PERSPECTIVE ON REWARD SYSTEM FOR EDUCATIONAL PROGRAM AGAINST DRUG MISUSE

Jagdish Rai[1]
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ABSTRACT

The evolutionary perspective on happiness can be an easy and effective way to convey the message that psychotropic drugs cannot enhance happiness in the long term. The reward system of the brain is a neural structure responsible for modulating our behavior through happy and unhappy feelings for better adaptation in various situations. In each situation, it generates positive feelings for adaptive behavior like eating healthy food, socializing with friends, and even working towards achievements. It also generates negative feelings like fear, agony, and detachment in appropriate situations to deter harmful and risky behavior. These positive and negative feedback loops are for better adaptation rather than simply for feeling positive, although as part of the process, we are always attracted to activities causing positive feelings, and, at a conscious level, the positive feelings themselves. This attraction sometimes tempts people to manipulate their feelings through chemical substances or mind training by various cults, but the feedback loops of the reward system do not allow for any net increase in positive feelings. Rather, according to evolutionary psychology, drugs disrupt the adaptive role of the reward system. There have been attempts since antiquity to understand the dynamics of happiness and enhance happiness, such as in Buddhism, Stoicism, and Epicureanism. The evolutionary perspective, however, clarifies ambiguities in such philosophies of happiness. It can equip youth with philosophical foundation against drug use to attain happiness, novel experience, manage sleep time, improve performance or enhance creativity, or sociability etc.

OP2. ARTIFICIAL INTELLIGENCE IN RADIOGRAPHIC FORENSIC DENTAL AGE ESTIMATIONS: A META-ANALYSIS AND SYSTEMATIC REVIEW

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ABSTRACT

The application of artificial intelligence (AI) technology in forensic dental age estimations has recently gained momentum. Present review aims to highlight the advantages and need of

artificial intelligence in forensic age estimation from dental radiographic data. Moreover, it also aims to assess and report the accuracy and reliability of artificial intelligence in age estimation using teeth. A systematic review has been conducted by searching relevant articles of published during last five years (from 2020 to 2025) using search engines of PubMed, WoS, Science Direct and Springer-link using certain keywords. The accuracy, precision and efficiency of several machine learning (ML) and deep learning (DL) models was assessed and compared. The study found that with the introduction of AI technology in dental age estimation, several challenges and issues faced when using traditional dental age estimation methods are being tackled. Machine Learning (ML) and Deep Learning (DL) can be effectively used in age estimation and reliable tool for age estimation using radiographic data. Deep Learning (DL) model was considered to achieved better accuracy, precision and efficiency in comparison to the ML algorithms. The developed AI tools can be effectively used in legal and civil cases, disaster victim identification, accidents and many other cases. The results of meta-analysis and systematic review will be presented as an Oral presentation.

OP3. MORPHOSCOPIC INSIGHTS OF IDENTITY: UNVEILING SEX AND ETHNICITY THROUGH THE HUMAN EAR USING MACHINE LEARNING

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ABSTRACT

The ear is a complex and highly variable facial features due to its unique anatomical characteristics that vary across individuals and populations. Human ear has gained substantial recognition as a significant feature in personal identification processes particularly in forensic science and biometrics. The present study aims to find the percentage accuracy in sexual dimorphism and ethnic variations, through qualitative or morphoscopic parameters of ear. The research was carried out on 500 participants in the age group of 18-35 years from the state of Himachal Pradesh, North India. The snapshots of the subject's left and right ears were taken with the help of Sony Cybershot DSCW80 7.2MP Digital Camera in a standardized manner, after their signed consent. Various morphoscopic features of ear such as external ear shape, form of the helix, antihelix curvature, antitragus, scaphoid size & shape, tragus shape, Darwin's tubercle form, ear lobe size, ear lobe shape, ear lobe attachment to cheek, concha shape and hypertrichosis were considered for the study. The dataset was analysed using the high-level programming language- Python. Three machine learning–based classification models—Support Vector Machine (SVM), Random Forest Classifier (RF), and Logistic Regression

(LR)—were developed to evaluate and compare their performance. The models demonstrated effective classification of ethnicity, achieving accuracies of 75%, 78%, and 75% for SVM, RF, and LR, respectively. Similarly, the models classified sex with accuracies of 61%, 65%, and 58%, respectively. The study concluded that morphoscopic features possess greater discriminatory potential for ethnicity classification than for sex determination.

OP4. TRILATERAL LIGNOCELLULOSIC BIOMASS FRACTIONATION FOR CO-PRODUCTION OF XYLANASE, XYLITOL AND XYLOOLIGOSACCHARIDES

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ABSTRACT

The production of bioenergy, biofuels and biochemicals from different agricultural biomass residues aligns with the 2030 Agenda for Sustainable Development adopted by the United Nations. In order to maximize the utilization of renewable feedstock and reduce global carbon footprint, generation of value-added products from various sources of lignocellulosic biomass (LCB) is highly encouraged. Different pretreatment methods such as enzymatic and chemical hydrolysis are utilized to separate LCB into its constituent cellulose, hemicellulose, and lignin fractions. The bioproduction of xylanases, a multienzyme complex of depolymerizing enzymes, using LCB as substrate has embarked a prominent place in bioprocessing of agro-residues. The hemicellulose fraction can be depolymerized into 5-C and 6-C sugars that serve as intermediate products for further modification into high-value added polymers. In a synergistic action catalyzed by xylanolytic enzymes, xylan can be broken down into short chain xylooligosaccharides, presenting prebiotic properties for improved gut health. Further, the monomeric D-xylose sugar, upon its hydrolytic release from xylan chains, can be converted to xylitol in a fermentative process, which is used as an artificial sweetener in food and pharmacological industries. This integration of hemicellulose derived xylanases, xylooligosaccharides and xylitol has the potential to expand sustainable operations and biorefineries based on a multi-product framework. Moreover, exploring LCB based consolidated enzyme and by-product generation can provide economical ways to mitigate the existent wastage of resourceful biomass residues.

OP5. HYDROGEN SULFIDE AND SALICYLIC ACID MEDIATE CADMIUM TOLERANCE IN MUSTARD PLANTS

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ABSTRACT

Cadmium (Cd) is a pervasive noxious heavy metal which poses a key threat to agricultural system and safe crop production. Hydrogen sulphide (H_2S) is emerging as a potential messenger molecule engrossed in modulating plant's tolerance to Cd. Salicylic acid (SA), a phenolic signaling molecule, plays an important role in plants confronted with numerous environmental cues, including Cd stress, nevertheless, crosstalk between H2S and SA in regulating Cd toxicity remains elusive. To address this gap, the present study investigated the prospective mediatory role of H_2S (100 µM) and SA (0.5 mM), individually and combination, in conferring Cd (50 µM) resistance to mustard (*Brassica juncea* L. Czern. & Coss cv. Pusa Jai Kisan). Accumulation of Cd resulted in oxidative stress (TBARS and H_2O_2), mineral nutrition imbalance (N, P, K, Ca), decreased leaf gas exchange characteristics, photosystem (PS) II efficiency, ultimately reducing growth of mustard plants. Both H2S and SA independently attenuated the phytotoxic effects of Cd by boosting antioxidant systems, enhancing nutrient pool, eventually leading to improved photosynthesis and biomass of mustard plants. However, the positive effects were more pronounced under combined application of H_2S and SA wherein results indicated synergistic relationship between both the signaling molecules in mitigating the detrimental effects of Cd on nutrient homeostasis and overall health of mustard plants, mainly by boosting antioxidant pathways. Our findings provide insights into H_2S and SA-induced integrative protective mechanisms operative in mustard plants exposed to Cd stress and suggest their combined use as a feasible strategy to confer Cd tolerance.

OP6. SYNTHETIC SEX HORMONES STRIKE BEYOND REPRODUCTION: EFFECTS ON LIVER AND SPLEEN IN FEMALE MICE

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ABSTRACT

Synthetic female sex hormones are fundamental components of numerous contraceptive regimens. While combined oral contraceptives (COCs) are widely used and generally considered safe, they can disturb the body's delicate physiological balance and potentially impair the normal function of vital organs in females. This study investigated the synergistic toxicological impact of two commonly used synthetic hormones in COCs - Ethinylestradiol and Levonorgestrel. The research specifically evaluated histopathological alterations and oxidative stress levels in the liver and spleen of female BALB/c mice. The experimental mice were administered two distinct doses: a Human Equivalent Dose (HED: 0.74µg/20g body weight) and a tenfold higher dose (10X HED: 7.4µg/20g body weight). The findings revealed significant, dose-dependent disruptions in the histoarchitecture of both hepatic and splenic tissues. Additionally, there was a notable imbalance in the activity of key antioxidant enzymes, indicating elevated oxidative stress. These findings highlight the vulnerability of non-reproductive organs to oxidative damage from synthetic hormones. The study underscores that long-term COC use may carry risks for vital organs beyond the reproductive system, emphasizing the need for strategies to reduce these potential adverse effects.

OP7. PREDICTION OF FAMILIAL RESEMBLANCE OF FINGERPRINT PATTERNS BY EMPLOYING ARTIFICIAL INTELLIGENCE MODELS- A STUDY OF NORTHWESTERN INDIAN POPULATION

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ABSTRACT

Fingerprints, often described as nature's genetic signature, are unique, heritable, and enduring markers of human identity. Beyond their forensic and biometric importance, fingerprints hold

immense anthropological value as visible reflections of genetic inheritance and population diversity. Despite their significance, the potential of artificial intelligence to decode familial patterns in dermatoglyphics remains underexplored. This study applies advanced AI models to predict and analyze fingerprint pattern resemblance within families, revealing the genetic links and inheritance dynamics between parents and their children. A total of 394 individuals were included in the study, comprising 3940 fingerprint impressions. Overall, 103 families were taken to study familial relationships. According to the henry's classification the fingerprints were classified into 11 pattern types across all ten fingers of the participants. The two approaches of machine learning models such as CatBoost gradient algorithm and random forest model were trained to predict children's patterns based on their parental data of fingerprint pattern types. The model's performance was evaluated through their accuracy and feature importance scores were aggregated to asses parental influence on each finger.Both the approaches indicate a stronger maternal influence in fingerprint pattern inheritance on the right hand. The findings were consistent with earlier anthropological and genetic studies reporting partial polygenic control of fingerprint traits. The observed dominance of maternal resemblance in fingerprint patterns, detected through AI models strengthens the anthropological understanding of human inheritance and supports forensic applications in kinship identification, missing person investigation, and biological relationship verification when genetic data are limited.

OP8. PHYTOCHEMICAL DIVERSITY, ANTIOXIDANT EFFICIENCY, AND GC–MS PROFILING OF *RHYNCHOSTYLIS RETUSA* (L.) BLUME: A THERAPEUTICALLY IMPORTANT AND ENDANGERED INDIAN ORCHID

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ABSTRACT

Rhynchostylis retusa (L.) Blume, commonly known as the *Foxtail orchid*, is a medicinally important and an endangered epiphytic orchid of India, traditionally used for its anti-inflammatory, antimicrobial, and antioxidant properties. The present study was aimed to investigate the phytochemical diversity, antioxidant efficiency, and GC–MS profile of R. retusa so as to scientifically validate its medicinal value. Preliminary qualitative screening of leaf and root extracts revealed the presence of alkaloids, flavonoids, phenolics, tannins, terpenoids, glycosides, and saponins, indicating a diverse phytochemical profile. Quantitative estimation showed a high total phenolic content (179.51±4.28) in methanolic root extract and total flavonoid content (120.49±3.17) in aqueous root extract, reflecting strong antioxidant potential. The antioxidant activity, evaluated by DPPH radical scavenging assays, exhibited

significant free-radical inhibition with IC_{50} values of 95.85µgml-1 and 72.89µgml-1, in leaf and root extracts, respectively. GC–MS analysis of the methanolic leaf extract identified major bioactive compounds such as 4-Methoxy-phenyl)-(2-nitrocyclohexyl)-methanol (12.68%),ϒ-Sitosterol (10.52%), β-(4-Hydroxy-3-methoxyphenyl) propionic acid (5.24%), Benzenpropanoic acid, 4-hydroxy- (5.12%), (3-Allyl-6-methoxyphenol (4.94%), n-Hexadecanoic acid (4.44%), 4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl- (4.10%) which are known for their pharmacological relevance. The present findings confirm that *R. retusa* is a potent source of natural antioxidants and bioactive compounds, supporting its ethnomedicinal applications and potential for therapeutic drug development.

OP9. GLOBAL ADOPTION OF FACIAL RECOGNITION TECHNOLOGY: CURRENT SCENARIO, CHALLENGES AND LEGAL CONSIDERATIONS

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ABSTRACT

People usually identify each other based on their facial characteristics in everyday life. Human face is a topic of interest among the various disciplines such as anatomy, anthropology, forensic science, medical sciences etc. After the COVID-19 outbreak, contactless facial recognition technology is becoming more and more common across the globe. The reason behind the popularity of this technology is contactless biometric features. Facial Recognition Technology (FRT) has rapidly transitioned from futuristic concept to a mainstream tool, reshaping security, governance and commercial practices worldwide. Businesses are adopting artificial intelligence based facial recognition technology in place of traditional fingerprint scanners, creating a plethora of new business opportunities. The technology holds its broad applications in several industries, including digital healthcare, security and surveillance, access control systems, and photo retrieval. Despite its rapid advancement and widespread, facial recognition technology also has some limitations. The accuracy of recognition systems can be significantly affected by variations in lighting, facial expression, angles and occlusions etc. Moreover, several studies have highlighted algorithmic biases, particularly across gender, age and ethnic groups raising concerns about fairness and reliability in diverse populations. However, there is a need for responsible innovation and stricter legal considerations. This presentation highlights the widespread use of facial recognition technology, its growing commercial trend, its application in diverse industries with emphasis on India and other parts of the world along with its drawbacks, and rising concerns about privacy bias, ethical oversight.

OP10. A LYSM DOMAIN-CONTAINING PROTEIN TALYSM1-A CONFERS SALINITY AND DROUGHT TOLERANCE IN TRANSGENIC *ARABIDOPSIS*

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ABSTRACT

LysM domain-containing proteins are associated with stress response in plants. Herein, we found an upregulated expression of *TaLysM1-A* in the presence of salinity and drought stress in bread wheat, which indicates its role in stress response. *TaLysM1-A*-expressing transgenic Arabidopsis plants displayed significant tolerance with improved morpho-physio-biochemical parameters during salinity and drought stress conditions. The transgenic lines showed superior phenotypic traits, such as seedling growth, leaf and rosette area, overall plant growth and silique yield as compared to wild-type (WT). The reactive oxygen species (ROS), like H2O2 and superoxide radicals, and MDA contents were significantly reduced; whereas, ascorbic acid accumulation and activity of antioxidant enzymes, such as catalase (CAT), ascorbate peroxidase (APX), guaiacol peroxidase (POD), and superoxide dismutase (SOD) were considerably improved in transgenic lines than in the WT plants during salinity and drought treatments. The results suggested reduced oxidative damage in *TaLysM1-A*-expressing transgenic plants. Additionally, the accumulation of proline, lignin, chlorophylls, carotenoids and RWC was increased in transgenic plants, which suggested improved osmoprotection, cell wall strength and photosynthesis under both the stress conditions. The study unveiled the role of *TaLysM1-A* in salinity and drought stress tolerance; however, the detailed mechanism needs to be explored in future studies.
Keywords: Arabidopsis, Drought, LysM, Salinity, *TaLysM1-A*, Transgenic

OP11. EXPANDING THE MOLECULAR TOOLKIT: THE ROLE OF FORENSIC PROTEOMICS IN DECODING THE DEAD

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ABSTRACT

Proteomics is the large scale study of entire proteome of an organism. It is the global analysis of the physiological and biochemical states of proteins in a sample. It can be used to identify

body fluids, tissues and to convey genetic information because proteins in a sample reflects the transcriptional and translational program of cells. Hence proteomics serves as a valuable orthogonal approach to traditional DNA analysis, especially in the cases where nucleic acids are absent, degraded or uninformative. Additionally, the use of proteomics minimizes sample contamination as compared to DNA. Proteomics has a wide applicability in basic life sciences but this review specifically focuses on forensic proteomics which involves the comprehensive study and analysis of proteins in biological evidence for case solving. The review provides a comprehensive analysis of forensic proteomics examining its current status, challenges, and future potential. It explores various applications of proteomics and its distinct advantages in scenarios where DNA analysis is not feasible due to unavailability, degradation and other quantification issues. These applications include human identification, Post-Mortem Interval (PMI) estimation, body fluid identification, detection of toxins etc.

OP12. INSIGHTS INTO THE CINNAMATE 4-HYDROXYLASE GENE FAMILY OF *VANILLA PLANIFOLIA*: AN IN-SILICO APPROACH

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ABSTRACT

Cinnamate 4-hydroxylase (C4H) gene encodes the enzyme catalyzing the second step of phenylpropanoid pathway which is responsible for the biosynthesis of diverse range of phenylpropanoids. This enzyme belongs to cytochrome P-450 dependent monooxygenases. Due to the therapeutic potential of phenylpropanoid compounds extracted from orchids, a characterization of the C4H gene in an economically and medicinally important orchid species, Vanilla planifolia has been done in the present study. Two C4H genes have been identified in Vanilla planifolia. All the amino acid residues related to C4H activity such as substrate recognition sites, ERR triad, heme-iron binding domain, hinge motif and enzymatic active sites were conserved in nature in both the proteins. Sub-cellular localization predicted their location in the endoplasmic reticulum. Alpha helices and random coils pre-dominated the secondary structure of these proteins. The evolutionary analysis showed that the C4H proteins of monocots and dicots clustered separately into two clades. Gene structure analysis showed the presence of two introns in the genes and the analysis of promoter sequences predicted cis–regulatory elements regulated by light, plant growth and development, phytohormones and abiotic and biotic stress conditions. Expression profiling of genes revealed the high expression in flower tissue indicating their probable role in flower coloration.

OP13. BLINKING LIGHTS: URGENT CONSERVATION STRATEGIES FOR ECOSYSTEM HEALTH MONITORING

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ABSTRACT

Bioluminescent beetles, particularly fireflies, function as keystone species and critical bioindicators in global ecosystems, serving essential roles in pest control, nutrient cycling, and maintaining ecological balance. These remarkable organisms demonstrate exceptional sensitivity to environmental changes, making them invaluable sentinels for ecosystem health assessment. However, firefly populations face unprecedented decline due to multiple anthropogenic threats that compromise both biodiversity and human environmental quality. Artificial light at night (ALAN) represents the fastest-growing threat to firefly populations worldwide, disrupting bioluminescent communication essential for mating and survival. Urban development and intensive agricultural practices have caused habitat fragmentation and pesticide contamination, reducing firefly diversity by up to 76% in affected regions. Climate change further exacerbates these impacts through altered precipitation patterns and temperature fluctuations that affect larval development. The present research synthesizes global conservation data to identify critical intervention strategies for firefly preservation. Implementation of dark-sky initiatives, habitat restoration protocols, and pesticide-free agricultural zones demonstrate significant population recovery potential. These conservation efforts directly align with sustainable development goals, as healthy firefly populations indicate pollution-free environments beneficial for human health and agricultural sustainability

OP14. THERMOCHEMICAL CONVERSION OF AGRICULTURAL WASTE INTO BIO-OIL

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ABSTRACT

Bio-oil is a liquid Bio-fuel produced from various agricultural waste, municipal waste, crop residues etc., Agricultural waste is left over after cultivating and processing agricultural products like fruits, vegetables, dairy, grains and crops. Agricultural waste is mainly classified into four types: Crop waste (Rice husk, wheat straws, sugarcane, bagasse, animal waste (animal excreta, dead animal) processing waste (packaging material, fertilizer cans). Agricultural waste such as crop residue is used as a fodder for animals. Bio-oil is derived

from lignocellulosic agricultural waste which is a renewable source of energy production. Various techniques are under research for conversion of agricultural waste into bio-energy, bio fuel such as bio-char and bio-oil. The techniques include Physico-chemical conversion, bio-chemical conversion and thermochemical conversion. Physico-chemical conversion includes trans-esterification, bio-chemical conversion includes anaerobic digestion, fermentation, enzymatic hydrolysis, Thermochemical conversion includes combustion, pyrolysis, gasification, liquefaction. Biochemical conversion is costly and time consuming but thermochemical conversion process has higher reaction rates due to involvement of high temperature, high pressure and catalysts. Thermochemical conversion process also has some limitation as low energy efficiency, complex technology, feedstock sensitivity etc. The thermochemical conversion of agricultural waste presents a sustainable approach to waste valourisation, energy recovery, and in hand supports Bio-energy goals and rural energy. Keywords: Bio-oil, Lignocellulosic biomass, Sustainable energy, Thermochemical Conversion

OP15. EARTHWORM DIVERSITY IN AN UNEXPLORED HIMALAYAN LANDSCAPE: PATTERNS ACROSS FOREST, ORCHARD AND CROP FIELD ECOSYSTEMS

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ABSTRACT

The present study was undertaken to explore the earthworm diversity in the Bani Valley, situated at an elevation range of 1200-2000 m above sea level, in the western Himalayan Region. Over the course of two years (March 2021 to January 2023), eight earthworm species were documented in three distinct habitat-types (forest, orchard and crop field), characterized by varying levels of anthropogenic interference. Notably, the crop field habitat exhibited highest earthworm density as well as biomass, while the forest habitat was observed to exhibit least earthworm abundance despite negligible human interference. Year-wise comparison showed that Octolasion tyrtaeum exhibited the highest mean density during both the years [34.31± 2.54 m^{-2} (2021-22) and 27.91 ± 1.88 m^{-2} (2022-23)], while the least density was recorded for Amynthas corticis (2.84 ± 1.06 m^{-2}) during 2021-22, but for Drawida nepalensis (1.60 ± 0.63 m^{-2}) during 2022-23 period. Moreover, an aggressive dominance of exotic earthworm species was observed in the study area with the occurrence of only one native species i.e. Drawida nepalensis. Maximum Likelihood Phylogram analysis of different earthworm species revealed three major clades, largely consistent with

classical taxonomy. However, intergeneric clustering between Drawida nepalensis and Octolasion tyrtaeum suggests a potential case of cryptic similarity warranting further investigation. Analysis of Variance followed by multivariate ordination through canonical correspondence analysis suggested that the earthworm community structure was governed by the interactive effects of different soil physico-chemical properties. Despite the valuable insights with regard to earthworm diversity of the Bani Valley, further investigations are required

OP16. PROTECTIVE EFFECTS OF *ECLIPTA ALBA* (L.) HASSK. POWDER AGAINST DIET-INDUCED OBESITY IN ZEBRAFISH: INSIGHTS FROM LIPASE INHIBITION, PHYTOCHEMICAL PROFILING, BIOCHEMICAL AND FTIR ANALYSIS

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ABSTRACT

Obesity is a metabolic disorder that has become a global health concern during the last few decades. Different anti-obesity medications usually have several negative effects, which prompts the investigation into safer natural alternatives. *Eclipta alba* (L.) Hassk. is conventionally known for its anti-inflammatory and antioxidant properties but its anti-obesity potential remains undiscovered. In the present study, we examined the anti-obesity potential of E. alba powder through in-vitro and in-vivo investigations. Four solvent fractions of E. alba powder (aqueous, methanolic, acetone, and n-hexane) were screened for their in-vitro anti-lipase activity. In zebrafish, obesity was induced through brine shrimp overfeeding and E. alba powder was given 30 minutes before normal feeding. Further, morphological and biochemical parameters were measured. Acetone fraction showed excellent anti-lipase activity (IC_{50} = 48.99 µg/mL). Orbitrap High-Resolution Liquid Chromatography-Mass Spectroscopy (OHR-LCMS) analysis of the acetone fraction revealed the presence of different phytoconstituents including genistein and wedelolactone. In the in-vivo studies E. alba powder significantly reduced body weight, body mass index (BMI), blood glucose, cholesterol and triglycerides (TG) levels in DIO+EA group as compared to diet-induced obese (DIO) zebrafish. Further, ATR-FTIR spectra also authenticated reduction of obesity-related lipid, protein and phosphate band shifts in serum samples. Our study proves that E. alba powder can efficiently enhance metabolic health, rendering it a potential natural anti-obesity agent.

OP17. HUMAN AI COEVOLUTION TOWARDS ETHICAL DESIGN

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ABSTRACT

Artificial intelligence and humans are evolving together. Human choices shape AI models, and AI changes how we learn, communicate, and create culture. In this, presentation, coevolution from a neutral, action-oriented perspective has been described. AI systems, especially recommender systems and generative models, influence cultural variations, transmission, and selection. The present study discusses the several complementary approaches such as cultural feedback design, algorithmic literacy, society in the loop, ethical coevolution framework etc. Anthropological observation of AI-human behaviour merges ethnography with computational analysis to track how people form meanings, care networks, and health-related practices in AI-mediated spaces. . These strategies position AI as a socio-technical partner that can improve access to science and healthcare, enhance local knowledge systems, and support more inclusive innovation. The goal is a practical, neutral path for human–AI coevolution that empowers diverse communities while maintaining a variety of cultural futures.

Keywords: Artificial intelligence, Human-AI-Coevolution, Ethnography, AI and Technology

OP18. DIGITAL CRIMES: HOW TO PREDICT, PROTECT AND PREVENT THE CRIMES OF A NEW AGE

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ABSTRACT

Digital crimes are also known as cybercrimes, and these encompass a wide range of malicious activities carried out through digital means. These include ransom ware, phishing, identity theft, data breaches, crypto-related fraud etc. Such threats target not only businesses but also the common people. Threats to our privacy, financial health, and even critical infrastructure are there everyday. Hence, the prevalence of such crimes demands the urgent need for a robust digital defence that comes not only with pre-emptive measures taken to counter such activities but also raising awareness towards how crucial digital safety is in today's world. The present study explores the various types of digital crimes, how they prey upon common folks and what can be the possible methods, precautions, government advisories to predict prevent and protect the common people from these crimes to ensure the safety from these rising threats. This study centres around the three pillars i.e., predicting digital crimes through data analysis and intelligence, protecting systems and individuals with advanced security practices, and preventing future incidents with proactive monitoring and rapid response measures.

Keywords: Digital crimes, Cyber security, Artificial intelligence, Forensic investigation, Cyber safety

OP19. ROLE OF CHEMICAL ANALYSIS IN FORENSIC DEATH INVESTIGATION

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ABSTRACT

Chemical analysis is a cornerstone of forensic death investigation, providing pivotal insights into the cause and manner of death. This comprehensive review elucidates the multifaceted role of chemical analysis in detecting and identifying toxic substances, poisons, and drugs, and its significance in interpreting injuries or illnesses. Chemical analysis techniques, including chromatography, mass spectrometry, and spectroscopy, are essential tools in forensic toxicology. These methods enable the detection and quantification of a wide range of substances, from illicit drugs to toxic metals, in biological matrices such as blood, urine, and tissue samples. Although some challenges like sample contamination, interference from post-mortem changes, limited sensitivity or specificity of the instrument being used have to be faced during the forensic investigation which impact the reliability of chemical analysis results, yet the contemporary scientific instrumental developments such as portable and field-deployable instruments and advancements in pre-existing technologies like high- resolution mass spectrometry, integration of omics technologies like metabolomics and proteomics is expected to enhance the capabilities of chemical analysis in forensic death investigation. In conclusion, by understanding the role of chemical analysis and its applications, challenges, and future directions, forensic scientists and investigators can harness its full potential to guide justice and uncover the truth.

OP20. FORENSIC ESTIMATION OF SEXUAL DIMORPHISM USING MAXILLARY AND MANDIBULAR CANINES IN THE POPULATION OF CHANDIGARH

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ABSTRACT

Sexual dimorphism in human dentition provides valuable information in biological anthropology and forensic identification. Canine teeth, being the most dimorphic among all teeth, can serve as an efficient parameter for sex estimation. The present study aims (I) to study the differences in canine width in both maxillary and mandibular canines with respect to sexual dimorphism, (ii) to evaluate the maxillary and mandibular inter-canine distance with respect to sexual dimorphism, and (iii) to study the differences in canine size between vegetarian and non-vegetarian populations. A total of 199 individuals (103males and 96 females) from the Chandigarh population were analyzed. Mesiodistal widths of the maxillary and mandibular canines and inter-canine distances were measured using a digital vernier caliper. Statistical analyses were conducted using Student's t-test and the sexual dimorphism index was calculated. Results revealed statistically significant differences in canine dimensions between males and females, with mandibular canines showing the highest degree of dimorphism. Moreover, slight variations were observed between vegetarian and non-vegetarian groups. The study concludes that canine measurements, particularly mandibular canine width, can serve as reliable indicators for sex determination and population studies in forensic anthropology.
Keywords: Sexual dimorphism, canine tooth, inter-canine distance, forensic anthropology, Chandigarh population.

OP21. ESTIMATION OF SEX AND STATURE FROM FOOTSTEP LENGTH AND STRIDE LENGTH: FORENSIC AND ANTHROPOLOGICAL IMPLICATIONS

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ABSTRACT

The uniqueness of a person's footprints is similar to that of their fingerprints. The individualisation pattern and biological profiling of an individual's footsteps and gait

parameters can be used to estimate his/her stature and sex. The present research aims to study the presence of sexual dimorphism as defined by an individual's gait and to estimate stature as a function of footstep length and stride length. A total of 180 participants (90 males and 90 females) from the Panjab University, Chandigarh (India) were asked to walk on a white paper sheet to get the dynamic footprint impressions, and further, footstep length and stride length were measured. The results of the study showed notable sex differences in footstep length and stride length among the samples considered in the study. Both the parameters, depict a moderate strength, positive, statistically significant correlation with stature ($p<0.05$) in sex-combined dataset analysis. Regression models were formulated to predict the stature using the dynamic footprint measurements and it showed footstep length to be a more accurate and reliable ($p<0.05$) predictor than stride length ($p>0.05$) while estimating stature in sex-specific samples. Although, in pooled data analysis, both can be defined as potential parameters to estimate stature, footstep length again shows a preferable consideration with significance at level $p<0.01$. The findings of the study establish the efficiency of measurements like footstep length and stride length in estimating stature of an individual, reinforcing the applicability of gait analysis for sex and stature estimation in anthropological and forensic contexts.

OP22. FROM GENES TO DREAMS- THE POWER OF BIOTECHNOLOGY

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ABSTRACT

"From Genes to Dreams: The Power of Biotechnology" Biotechnology stands at the intersection of science and imagination, transforming genetic understanding into real-world innovations. "From Genes to Dreams: The Power of Biotechnology" highlights the incredible journey from decoding the genetic blueprint of life to achieving breakthroughs that redefine medicine, agriculture, and environmental sustainability. From gene editing and recombinant DNA technology to biofuels and personalized medicine, biotechnology is turning visionary ideas into reality. This topic explores how advancements in genetic engineering, bioinformatics, and synthetic biology are shaping a smarter, healthier, and more sustainable world. It celebrates the power of human curiosity and innovation that turns genes—the essence of life—into dreams that drive the future of sciences.

OP23. VACCINE HESITANCY: UNDERSTANDING THE DETERMINANTS BEHIND PUBLIC UNCERTAINTY

Trisha Chander[1]
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ABSTRACT

Vaccine hesitancy has emerged as a critical focus in contemporary public health research, reflecting the complex spectrum between vaccine acceptance and refusal. This review aims to synthesize existing literature on public hesitancy toward various vaccines, identify the determinants influencing these attitudes, and assess how such factors vary across populations, vaccine types, and sociocultural settings. A comprehensive literature search was conducted across major scientific databases to identify peer-reviewed studies published between 2015 and 2024 that examined vaccine hesitancy, particularly in relation to childhood immunisations and newly introduced vaccines such as HPV, COVID-19, and MMR. The reviewed studies reveal that hesitancy is influenced by multiple interacting determinants highlighting that vaccine hesitancy is multifactorial and deeply rooted in sociocultural identity and communication environments. Overall, this review underscores that understanding vaccine hesitancy requires developing dynamic, evidence-based frameworks that integrate behavioural, cultural, and institutional insights to guide effective public health interventions. By applying anthropological insights and community-centred engagement, this work proposes practical, culturally-sensitive strategies that respect diverse worldviews while building evidence-based confidence. Ultimately, restoring trust in vaccination means treating trust itself as preventive medicine, carefully nurtured, thoughtfully adapted to local contexts, and meaningfully shared to protect communities from misinformation while ensuring equitable healthcare access for everyone.

OP24. TELEMEDICINE: HEALTHCARE ACCESS FOR RURAL AND REMOTE COMMUNITIES

Vertika[1]
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ABSTRACT

Telemedicine is the healthcare delivered through telecommunication technology such as video conferencing, messaging and through other remote monitoring devices. This health care service has become a real game-changer for people living in rural and remote areas. The communities

which are often cut off, either because the nearest hospital is far away, not enough doctors around, or economic barriers making it hard to get timely care. The present study explores how telemedicine affects three big things: accessibility, patient satisfaction, and cost. The current study is shedding light on various telemedicine programs of India such as eSanjeevani, Apollo Telehealth, ISRO’s telemedicine efforts, highlighting how digital health tools are helping to close the gap between rural and urban healthcare. However, there are certain challenges faced by this service such as unreliable internet access, limited comfort with digital platforms, and inconsistent telemedicine policies. There are some practical examples of solutions which are already making a difference. These include affordable health apps, community-based tele-clinics, and AI-powered diagnostic tools that help identify health issues early. Together, these innovations show how quality care can become more accessible and cost-effective, even in remote areas. To fully realize these benefits, there is a need of strong internet infrastructure, clearer and consistent policies, and support systems that make both patients and healthcare providers comfortable with digital tools.

Abstracts of Poster Presentations

Poster Presentation- Life Sciences		
PP1	Mrs. Shivani Seraik	Buckwheat Honey Derivatized Silver Nanoparticles and Evaluation of its Antimicrobial Activity
PP2	Ms. Aastha Sharda	Understanding responses of Common bean (*Phaseolus vulgaris* L.) to rising temperature and developing suitable strategies to improve heat tolerance
PP3	Ms. Ayushi Srivastava	Detecting Metabolic Disorders from Hair: A Review of Spectroscopic Insights into Diabetes and Thyroid dysfunction
PP4	Ms. Bhawna Kumari	Search for tolerance to combined abiotic stresses - A case study in Mungbean
PP5	Ms. Deepshikha	Endangered Beauty: Raising awareness for Orchid Conservation
PP6	Ms. Ekta Rani	Artificial Intelligence and Anthropology: A review of emerging connections
PP7	Mr. Jaspreet Singh	Unlocking Export Opportunities in Medicinal, Herbal, and Nutraceutical Products from Indian Orchid Flora
PP8	Ms. Kajal Preet	A review: to use the colour and texture in therapeutic fashion
PP9	Mr. Karan Sharma	Insights into the Cinnamate 4-Hydroxylase Gene Family of *Vanilla planifolia*: An in-silico approach
PP10	Ms. Mitali Jain	Crafting Change: Exploring Crochet as a Medium for Social Empowerment and Well-being
PP11	Ms. Navreet Kaur	Machine Learning Based Forensic Discrimination and Brand Identification of Automobile Tyres from Rubber Evidence
PP12	Ms. Neha Bhatt	Chilling for a Cause: How Vernalization Triggers Flowering in Plants
PP13	Ms. Neha Thakur	Transcriptomic analysis of Protein Arginine Methyltransferases (PRMTs) in five species of *Phalaenopsis* orchid
PP14	Ms. Nishu	Exploration of mitochondrial calcium uniporters suggested their role in abiotic stress response in bread wheat
PP15	Ms. Pooja Rani	EMF radiations, An Emerging Environmental Contaminant
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		cephalotes Extracts and their applications
PP20	Mr. Mohammad Asif Gawhari	Ethnopharmacology of *Silybum marianum* and its phytoconstituents
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PP22	Mr. Naveenraj R	Effect of iron homeostasis on antimicrobial resistance in *Escherichia coli*
PP23	Ms. Pallvi	Larvicidal and Nutritional Disruption in Spodoptera litura caused by Soil Bacterial Isolates
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PP27	Mr. Akshit Sharma	Anthropocene: Are Humans the new geological force ?
PP28	Ms. Arshita	From Bottle to Bench: Exploring the antivirulence potential of probiotic strain isolated from Yakult against *Pseudomonas aeruginosa*
PP29	Ms. Ayushi Raturi	The Imitators: Unveiling the Mystery Behind Mimicry Orchids and Their Look-Alike Counterparts
PP30	Ms. Deepti Rani Sehrawat	Anthropological exploration of traditional food systems and their shifting paradigm among the kinnaura tribe of baspa valley, himachal pradesh
PP31	Ms. Drishti Sharma	In-silico study to explore the potential of natural compounds against urinary tract infection
PP32	Ms. Kanika Sharma	Root–Microbe Dialogue: Scientific Insights and Real-World Barriers in Sustainable Agriculture
PP33	Ms. Nilanjana Sharma	"Isolation, Identification and Antimicrobial Sensitivity of *Klebsiella pnuemoniae* from Cattle and Buffaloes"- as review
PP34	Ms. Prabhjot Kaur	Phytoremediation -Green Technology for Environment Cleanup
PP35	Ms. Pritpal Kaur Rose	Reproductive biology of *Luffa cylindrica* (L.) *Roem*
PP36	Mr. Pulkit Sharma	Artificial intelligence and forensics: implications in personal identification
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PP40	Ms. Anchal Bhogal	Biomanagement of Root Knot Nematode using Leaf Extract of *Azadirachta indica*
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PP43	Mr. Sumit Kumar	Addressing Gaps in Clinical Research Associate Trainings: An Exploration of Potential Applications and Integration of Artificial Intelligence
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PP45	Samarth Sharma	*In silico* characterization of *Chalcone isomerase* (*chi*) genes in three orchid species: *Apostasia shenzhenica*, *Dendrobium catenatum* and *Phalaenopsis equestris*
PP46	Neha Thakur	Transcriptomic analysis of protein arginine methyltransferases (prmts) in five species of *Phalaenopsis orchid*
PP47	Bhupender Singh	Neo-invasive plants in the north-western himalayas: patterns, impacts, and management
PP48	Ms. Aarushi Thakur	Sustainable biochar-cellulose filter paper for dual filtration and onsite-pollutant sensing
PP49	Ms. Shivani Rawat	Phytochemical Composition and In Vitro Bioactivities of *Skimmia laureola*: A Threatened Medicinal Plant of Himachal Pradesh.
PP50	Ms. Anshu	Eco-Friendly Biosynthesis and Characterization of Silver Nanoparticles from Fish Gill Extract
PP51	Mr. Aryan Bhan	Pan-Genome Analysis Reveals AMR Patterns in *Pseudomonas aeruginosa*

ABSTRACTS OF POSTER PRESENTATIONS

PP1. BUCKWHEAT HONEY DERIVATIZED SILVER NANOPARTICLES AND EVALUATION OF ITS ANTIMICROBIAL ACTIVITY

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ABSTRACT

Green synthesis of nanoparticles is an eco-friendly and sustainable approach that uses plant extracts, microorganisms, or biomolecules as reducing and stabilizing agents. Buckwheat (*Fagopyrum esculentum*) honey is rich in bioactive compounds such as flavonoids, phenolics, and proteins, which can act as natural reducing agents for converting silver ions (Ag^{+}) into silver nanoparticles (Ag^{0}). In this study, silver nanoparticles (AgNps) were synthesized via the green synthesis method using Buckwheat (*Fagopyrum esculentum*) honey of District Shimla, Himachal Pradesh. The characterization of Buckwheat honey mediated silver nanoparticles was achieved using UV-spectroscopy, FESEM-EDX, FTIR and XRD. The antimicrobial activity of buckwheat honey mediated silver nanoparticles was determined against two Gram positive bacteria (*Staphylococcus aureus, Bacillus subtilis*); Gram negative bacteria (*Escherichia coli, Pseudomonas aeruginosa*) and one fungal agent (*Candida albicans*). The in vitro evaluation of antimicrobial performances of honey mediated silver nanoparticles was determined by Agar Well Diffusion method for Zone of Inhibition and Broth microdilution method for Minimum Inhibitory Concentration (MIC). The silver nanoparticles prepared using Buckwheat honey at pH 8.5 had the best physical characters regarding stability and uniformity of particle size and shape. The Buckwheat honey mediated silver nanoparticles exhibited zone of inhibition between 18-24mm for the microbial strains and recorded lowest MIC for the *E. coli* strain. The Buckwheat honey mediated silver nanoparticles were found to be effective against all the tested bacteria and fungi and can open avenues for targeted biomedical, pharmaceutical, and environmental applications.

PP2. UNDERSTANDING RESPONSES OF COMMON BEAN (*PHASEOLUS VULGARIS* L.) TO RISING TEMPERATURE AND DEVELOPING SUITABLE STRATEGIES TO IMPROVE HEAT TOLERANCE

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ABSTRACT

Rising global temperatures, a consequence of climate change, pose serious threats to agricultural productivity worldwide. Common bean (Phaseolus vulgaris L.), an important

annual crop valued for its high nutritional content, is particularly sensitive to heat stress. The optimum temperature for its growth and development ranges between 25–28 °C; beyond this threshold, plants experience heat stress. In our study we screened on the basis of physiological, growth and reproductive biology traits and categorized the genotypes, as heat tolerant and heat sensitive. High temperature stress impairs pollen viability, cause anther indehiscence, and result in substantial yield losses. To combat the heat stress effects, common bean employs a range of physiological, biochemical, and molecular strategies to withstand elevated temperatures. The accumulation of signaling molecules such as calcium ions, protein kinases, reactive oxygen species, carbohydrates, and phytohormones plays a pivotal role in activating stress-responsive genes and transcription factors. These regulatory networks coordinate the synthesis of protective compounds, including heat shock proteins, which enhance cellular stability under stress conditions. Molecular breeding and biotechnological approaches offer promising avenues for developing heat-tolerant genotypes. The identification of superior alleles, coupled with use of breeder-ready molecular markers, can accelerate the development of heat-tolerant genotypes suited to warmer climates. Furthermore, the production of high-temperature–resistant transgenic cultivars of common bean could provide yield stability and enhance productivity in the face of global warming.

PP3. DETECTING METABOLIC DISORDERS FROM HAIR: A REVIEW OF SPECTROSCOPIC INSIGHTS INTO DIABETES AND THYROID DYSFUNCTION

Ayushi Srivastava[1], Vishal Sharma[2], Kewal Krishan[3]

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ABSTRACT

Hair is a biochemically resilient matrix that remains unaffected by the external environmental factors, yet serves as a valuable biomarker of the internal physiochemical changes arising in the bloodstream, rendering it an invaluable substrate for both medical diagnostics and forensic investigations. Conventional diagnostic methods, such as blood and urine analysis, though accurate, are often invasive, time-sensitive, and often reflect short-term physiological states. However, hair can offer a long-term metabolic archive that can be analysed without destruction and complex preparation, with minimal discomfort to patients, offering a paradigm shift towards sustainable and patient-friendly healthcare diagnostics. Additionally, it is one of the most frequently encountered pieces of evidence at the crime scene, aiding in associating individuals to the crime scene. Moreover, spectroscopic analysis has emerged as a rapid, non-destructive, and reagent-free method to characterize molecular alterations in hair composition, making it suitable for large-scale screening programs and population-level health surveillance. In the arena of forensic

science, identification of such pathological conditions can provide valuable corroborative evidence in medico-legal investigations. According to recent research, metabolic perturbations such as diabetes and thyroid dysfunction can cause specific spectral alterations, reflecting changes in protein conformation, carbohydrate metabolism, and lipid oxidation. Characteristic vibrational peaks corresponding to proteins (Amide I and II), lipids (CH_2 stretching), carbohydrates (C–O and C–N), and disulfide bonds (S–S) serve as biomarkers of biochemical imbalance. This communication highlights the diagnostic potential of spectroscopy for detecting metabolic disorders, paving the way for its integration into preventive diagnostics and forensic investigations.

PP4. SEARCH FOR TOLERANCE TO COMBINED ABIOTIC STRESSES - A CASE STUDY IN MUNGBEAN

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ABSTRACT

Abiotic stresses such as drought and high temperature are major constraints limiting crop productivity, often causing yield losses exceeding 50% of potential output. These stresses adversely affect most crop species, including wheat and soyabean, by disrupting their growth and developmental processes. With the progression of climate change, the frequency and intensity of these stresses have increased, posing a serious threat to the cultivation of mungbean [*Vigna radiata* (L.) Wilczek]. So, the present study would highlight the interactive effects of combined drought and heat stress on a selective set of mungbean genotypes. Mungbean, the third most important legume after chickpea and pigeon pea, is particularly sensitive to environmental extremes. The simultaneous occurrence of drought and heat stress severely impairs plant growth and productivity by disturbing key physiological and biochemical processes. Combined stress conditions adversely affect plant water relations through reduced stomatal conductance, limited water uptake, and elevated canopy temperature. These disturbances enhance the accumulation of reactive oxygen species (ROS), leading to oxidative damage, membrane lipid peroxidation and reduced photosynthetic efficiency. Moreover, reproductive processes such as pollination, fertilization, and pod development are highly vulnerable to concurrent drought and heat stress, resulting in significant yield reductions. Therefore, understanding the interactive effects of these stresses is crucial for identifying key physiological and biochemical traits associated with tolerance and also provides insights for developing climate-resilient cultivars.

PP5. ENDANGERED BEAUTY: RAISING AWARENESS FOR ORCHID CONSERVATION

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ABSTRACT

Orchids are highly valued for their beauty and medicinal properties, but face significant threats due to over-exploitation. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) regulates international trade, while the International Union for Conservation of Nature (IUCN) Red List assesses conservation status. With approximately 28,000 species, over 70% are on the IUCN Red List, classified as Endangered or Critically Endangered .CITES Appendix II lists 124 orchid genera, covering 75% of listed orchids. Habitat loss, overcollection, and climate change are major threats. Strengthening CITES regulations and implementing effective conservation strategies, such as ex-situ conservation and sustainable harvesting practices, are crucial to protect these unique plants.

PP6. ARTIFICIAL INTELLIGENCE AND ANTHROPOLOGY: A REVIEW OF EMERGING CONNECTIONS

Ekta Rani[1], Kewal Krishan[1]
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ABSTRACT

Today, Artificial Intelligence (AI) has permeated nearly every other sector and has significant impact on human life. Anthropology studies humankind holistically with time and space, offering valuable insights into these changing transformations. Integration of Artificial Intelligence (AI) and Anthropology is an interesting interdisciplinary approach that offers to study humans and their evolving interactions with technology. A comprehensive review was conducted using published papers from - Google scholar, PubMed, Scopus and ScienceDirect that examines the usage of Artificial Intelligence across 4 major domains of anthropology: Biological anthropology, Socio-cultural anthropology, archaeological anthropology and Linguistic anthropology covering wide range of sub-topics such as - personal identification, artifacts classification, linguistics and ethnography. A detailed overview of the methods of AI based upon the relevance, has been discussed in the communication. Besides four domains of anthropology, this paper emphasizes Cyborg Anthropology, an emerging interdisciplinary approach that studies the symbiotic relationship between cyborg (intelligent machines like Artificial Intelligence, robots) and non-cyborg (humans). There is an urgent need for a universal definition of Artificial Intelligence to effectively address the growing ethical challenges arising from its use. Specific recommendations have been provided for the future studies that how the various methodologies of the AI may be used in various subdisciplines of Anthropology.

Keywords: Artificial Intelligence, Recent technology, Biological Anthropology, Socio-cultural Anthropology, Archaeological Anthropology, Linguistic Anthropology, Ethical issues

PP7. UNLOCKING EXPORT OPPORTUNITIES IN MEDICINAL, HERBAL, AND NUTRACEUTICAL PRODUCTS FROM INDIAN ORCHID FLORA

Jaspreet Singh[1], Promila Pathak[1]
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ABSTRACT

India's diverse orchid population presents numerous export opportunities, particularly in the medical sector. Orchids have medicinal properties that are being explored in traditional medicine, herbal supplements, and pharmaceutical research. These include medicinal orchid-based herbal products, pharmaceuticals, cosmetic industry, and seed and plant cultivation. Orchids have been traditionally used in Ayurvedic and folk medicine for their ability to treat ailments like stress, inflammation, and skin conditions. Orchid extracts could be incorporated into nutritional supplements, particularly in countries like the US, Europe, and Japan. Orchids are also used in the cosmetic industry for their rejuvenating and anti-aging properties. India's orchids can be cultivated in countries with strong interest in medicinal or rare orchids, such as research institutions and agricultural industries. Additionally, India's orchids can be positioned as sustainably sourced and certified organic products, appealing to eco-conscious markets. However, challenges include adherence to regulations, compliance with conservation laws, and market competition. Key medicinal orchid species in India include *Dendrobium crepidatum*, *Vanilla planifolia*, and *Vanda testacea*. By addressing these challenges and utilizing these opportunities Indian exporters can establish themselves as major players in the international market and can contribute to the country's economic growth.

PP8. A REVIEW: TO USE THE COLOUR AND TEXTURE IN THERAPEUTIC FASHION

Kajal preet[1], Prof. Prabhdip brar[1]
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ABSTRACT

Color and texture, the main elements of fashion are used widely to create aesthetics in fashion industry and to enhance looks. the study showcases the use to colors and textures for heath healing rather than only aesthetics. The chromotherapy plays a vital role in defining the therapeutic effect of different colors on the human body and mind according to seven chakras. It also showcases the historical significance of health healing textiles and the use of colors in patient care.

PP9. INSIGHTS INTO THE CINNAMATE 4-HYDROXYLASE GENE FAMILY OF *VANILLA PLANIFOLIA*: AN IN-SILICO APPROACH

Karan Sharma[1], Swati[1], Jaspreet Kaur[2]
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ABSTRACT

Cinnamate 4-hydroxylase (C4H) gene encodes the enzyme catalyzing the second step of phenylpropanoid pathway which is responsible for the biosynthesis of diverse range of phenylpropanoids. This enzyme belongs to cytochrome P-450 dependent monooxygenases. Due to the therapeutic potential of phenylpropanoid compounds extracted from orchids, a characterization of the C4H gene in an economically and medicinally important orchid species, *Vanilla planifolia* has been done in the present study. Two C4H genes have been identified in *Vanilla planifolia*. All the amino acid residues related to C4H activity such as substrate recognition sites, ERR triad, heme-iron binding domain, hinge motif and enzymatic active sites were conserved in nature in both the proteins. Sub-cellular localization predicted their location in the endoplasmic reticulum. Alpha helices and random coils pre-dominated the secondary structure of these proteins. The evolutionary analysis showed that the C4H proteins of monocots and dicots clustered separately into two clades. Gene structure analysis showed the presence of two introns in the genes and the analysis of promoter sequences predicted cis–regulatory elements regulated by light, plant growth and development, phytohormones and abiotic and biotic stress conditions. Expression profiling of genes revealed the high expression in flower tissue indicating their probable role in flower coloration.

PP10. CRAFTING CHANGE: EXPLORING CROCHET AS A MEDIUM FOR SOCIAL EMPOWERMENT AND WELL-BEING

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ABSTRACT

This study explores how crochet can go beyond being just a creative pastime to become a meaningful avenue for social empowerment and community well-being. While often seen as a leisure craft, crochet holds the potential to connect people, encourage creativity, and express culture in powerful ways. This research examines public perceptions of crochet's ability to create positive social change. Through a structured questionnaire, responses were gathered to understand how familiar people are with crochet, how they view its social impact, and how they perceive its role in building stronger, more connected communities. The findings aim to highlight the growing importance of creative, hands-on practices like crochet in inspiring grassroots change, showing how threads of art and purpose can together weave a stronger social fabric.

PP11. MACHINE LEARNING BASED FORENSIC DISCRIMINATION AND BRAND IDENTIFICATION OF AUTOMOBILE TYRES FROM RUBBER EVIDENCE

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ABSTRACT

Criminal investigations involving vehicle collisions, hit-and-run cases, abductions, hostage incidents, and the illicit movement of prohibited goods often yield tyre rubber traces as crucial forensic evidence. Such traces may be deposited on roadways, victims' clothing or bodies, or as skid marks produced during abrupt braking or vehicle rotation. These remnants can significantly aid forensic experts in narrowing down suspects by linking the crime scene, the involved vehicle, and the perpetrator through information on the tyre's brand, manufacturer, or origin. In the present work, a dataset comprising 220 tyre rubber samples from multiple brands was analyzed and classified using diverse machine learning algorithms available in the PyCaret environment. This was integrated with a rapid, non-destructive analytical approach employing ATR-FTIR spectroscopy equipped with a diamond crystal. Prior to model development, spectral data underwent essential pre-processing steps including baseline correction, smoothing, derivatization, and normalization. The proposed methodology highlights the potential of combining spectroscopy and machine learning for swift, non-destructive identification of tyre rubber traces and effective brand recognition in forensic investigations.

PP12. CHILLING FOR A CAUSE: HOW VERNALIZATION TRIGGERS FLOWERING IN PLANTS

Neha Bhatt[1], Neha Thakur[1], Jaspreet Kaur[2]
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ABSTRACT

Vernalization is the process by which certain plants require a period of cold exposure before they can flower. This ensures that flowering happens at the right time, usually in spring, when conditions are favorable for pollination and seed formation. During this process, plants sense and store the "memory" of winter through molecular and epigenetic changes. The cold treatment does not damage the plant but instead activates internal signals that prepare it to bloom later. In many species such as Arabidopsis thaliana and wheat, the cold period leads to the silencing of flowering repressor genes like FLOWERING LOCUS C (FLC). When the plant experiences warmer temperatures afterward, the repressor remains inactive, and flowering-promoting genes like FT and SOC1 become active, allowing the plant to transition

from vegetative to reproductive growth.The mechanism of vernalization involves DNA methylation, histone modification, and chromatin remodeling — all of which help maintain the plant's memory of the cold. This regulation ensures that flowering does not occur during harsh winter months. Studying vernalization is beneficial because it helps scientists and farmers understand how plants adapt to their environment. By controlling or modifying vernalization requirements, plant breeders can develop new crop varieties suited for different climates, improve yield stability, and extend growing seasons. Overall, vernalization represents a perfect example of how plants use environmental cues to control their life cycle for survival and reproduction.

PP13. TRANSCRIPTOMIC ANALYSIS OF PROTEIN ARGININE METHYLTRANSFERASES (PRMTS) IN FIVE SPECIES OF *PHALAENOPSIS* ORCHID

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ABSTRACT

Orchidaceae includes one of the most exquisite and diverse group of flowering plants. The intricate floral architecture of orchids makes them one of the most economically important plants in the floriculture industry. One of the key phenomena is epigenetics that regulates flowering time through mechanisms such as histone modifications. Post-translational modifications of histones by protein arginine methyltransferases (PRMTs) involves addition of methyl group on arginine residues and controls various biological processes in plants. In the present study, an in-silico analysis of transcriptomes of five Phalaenopsis orchid species was performed and identified a total of 34 putative PRMT sequences from P. aphrodite (7), P. bellina (7), P. lueddemanniana (8), P. modesta (6) and P. schilleriana (6). The identified PRMT proteins were grouped into two types, type I and type II PRMTs, based on the presence of distinct conserved domains and motifs, and supported by the phylogenetic clustering of all the PRMT sequences. Multiple sequence alignment helped to locate the positions of conserved domains. The sequences were further subjected to protein structure prediction to detect the presence distinct secondary structures. Furthermore, expression profiling of the PRMT genes across various tissues of five orchid species was represented in the form of heat maps and suggested the potential role of these genes in vegetative as well as reproductive growth and development of orchids. Thus, the findings of the present study provide a platform for future investigations into the functional characterization of PRMT genes in orchids.

PP14. EXPLORATION OF MITOCHONDRIAL CALCIUM UNIPORTERS SUGGESTED THEIR ROLE IN ABIOTIC STRESS RESPONSE IN BREAD WHEAT

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ABSTRACT

Mitochondrial calcium uniporters (MCUs) play a crucial role in calcium transport, signaling, and homeostasis, which is vital for plant growth, development, and stress responses. In this study, we identified 17 TaMCU genes classified into seven homoeologous groups with conserved gene architecture in the bread wheat genome. The structural analysis revealed the presence of MCU domain, DVME motif, transmembrane helices, and various key amino acid residues, which are conserved across all TaMCU proteins. Each TaMCU protein consisted of a mitochondrial targeting peptide and predicted to be localized in the mitochondria. The phylogenetic and synteny analyses provided insights into their evolutionary diverged and conserved nature. Cis-regulatory element analysis suggested that TaMCU genes are involved in abiotic stress responses, involving key transcription factors such as MYB, MBS, W-box, and ERF. Protein-protein interaction study suggested that TaMCUs interact with other mitochondrial and stress-related proteins, such as MICU, PHB, and FREE1. Additionally, six miRNAs related to plant development and stress-response such as miR5384–3p, tae-miR5050 etc., exhibited interactions with a few TaMCU transcripts. RNA-seq expression profiling revealed differential expression of various TaMCU genes in tissue developmental stages and under various stress conditions. qRT-PCR under salinity and drought treatments confirmed the involvement of TaMCU1-D, TaMCU3-A, and TaMCU5-B genes in these stress conditions. These findings provide insights into the potential roles of TaMCU genes and suggest their future applications in the development of abiotic stress-resilient crop plants.

PP15. EMF RADIATIONS, AN EMERGING ENVIRONMENTAL CONTAMINANT

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ABSTRACT

Electromagnetic fields (EMF) are present everywhere in the environment, yet are undetectable to human eye. These fields are generated both by natural and man-made sources. Until the 1990s, sources of electromagnetic field radiations were limited, mainly to a few radio and television transmitters. However, the last couple of decades have witnessed an unprecedented growth in various technological fields. The electromagnetic spectrum is

composed of ionizing radiations (like gamma rays, X-rays) having high frequency and low wavelength; and non-ionizing radiations (like radio waves, micro waves) having low frequency and high wavelength. Non-ionizing radiations in the frequency range of 3 kHz- 300 GHz constitute the radiofrequency radiations (RFR), and are generally employed in the communication sector. With the expansion in the quantity of communication sector, the radio frequency being utilized is likewise evolving. With these developments, environmental EMF levels have risen considerably and are now regarded as emerging contaminants. Although earlier reports suggested that the low-frequency and radio frequency radiation appear to be harmless, later studies revealed these radiations are so strong that they can heat the tissues and damage the molecules. A number of studies have been conducted in human beings whereas a lesser attention has been paid to the plants. During the deliberations of this conference, it is proposed to discuss the impacts of EMF radiations on the growth and development of plants.

PP16. ANTI-MELANOGENIC EFFECT OF APOCYNIN: THERAPEUTIC IMPLICATIONS FOR HYPERPIGMENTARY DISORDERS

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ABSTRACT

Apocynin, a natural phenolic compound derived from *Picrorhiza kurroa* (Kutki) and *Apocynum cannabinum* (Cannadian hemp), is a well-known anti-oxidant and anti-inflammatory agent that inhibits NADPH oxidase mediated reactive oxygen species (ROS) generation. Despite its diverse pharmacological effects, apocynin's role in regulating melanogenesis remains unexplored. This study investigated the anti-melanogenic and anti-oxidant potential of apocynin in melanocytes and fibroblasts. Melanogenesis, the process of melanin synthesis, is regulated by enzymes —tyrosinase (TYR), tyrosinase related protein 1 (TRP-1), and DOPAchrome tautomerase (DCT), which are transcriptionally regulated by microphthalmia-associated transcription factor (MITF). Excessive ROS production caused by environmental stressors like UV radiation enhances MITF activation, leading to hyperpigmentation disorders such as melasma or post-inflammatory hyperpigmentation. Our results showed that apocynin significantly reduced melanin content and suppressed DCT expression in melanocytes, suggesting anti-melanogenic effect. Activation of the Wnt/β catenin pathway using LiCl further enhanced DCT expression and melanin synthesis, whereas co-treatment with apocynin reversed these effects, indicating interference with Wnt/MITF signaling axis. Furthermore, apocynin decreased intracellular ROS levels in H_2O_2,-induced oxidative stress conditions in melanocytes and fibroblasts, highlighting its antioxidant potential, as excessive ROS generation is known to stimulate melanogenesis in hyperpigmentary disorders. In conclusion, apocynin attenuates oxidative stress in melanocytes and fibroblasts and suppresses melanogenesis in melanocytes, likely through

modulation of Wnt/MITF signaling pathway. These findings suggest its potential as a safe, naturally derived therapeutic for hyperpigmentation disorders, and further studies are needed to confirm its efficacy and translational relevance.

PP17. SUSTAINABLE UTILIZATION OF INVASIVE PLANTS: A NOVEL MANAGEMENT APPROACH

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ABSTRACT

Invasive plant species have long been recognized as a major threat to global biodiversity, ecosystem stability, and agricultural productivity. Their aggressive growth, high adaptability, and lack of natural enemies allow them to outcompete native species and degrade ecosystems. Traditional management approaches, such as mechanical removal, herbicidal control, and biological suppression, are often expensive, temporary, and environmentally unsustainable. In the context of a rapidly changing climate and global shift toward circular bioeconomy models, there is a growing realization that invasive weeds can be transformed from ecological liabilities into economic opportunities. Numerous invasive species possess bioactive compounds, high lignocellulosic biomass, or metal-accumulating potential, making them ideal for biofuel production, phytoremediation, biochar synthesis, essential oil extraction, and fiber-based composites. Utilizing these weeds not only provides renewable resources but also reduces invasion pressure and supports rural communities and their livelihoods. 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.

PP18. DIETARY SUPPLEMENTATION WITH MOREL MUSHROOM MORCHELLA ESCULENTA L. (PERS.) ATTENUATES LIPID DYSREGULATION IN DIET-INDUCED OBESE ZEBRAFISH

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ABSTRACT

Obesity-associated dyslipidemia has emerged as a major global health issue that can affect each body organ and contribute to the development of various metabolic syndromes. Thus, there is an urgent need for effective dietary management that can reverse lipid disturbances and restore metabolic homeostasis to counter this rising public health issue. The present study investigates the hypolipidemic potential of Morchella esculenta (L.) Pers. dietary supplementation in a diet-induced obese zebrafish model. Preliminary phytochemical analysis

confirmed the presence of diverse bioactive compounds, which were further characterized through Orbitrap High-Resolution Liquid Chromatography–Mass Spectrometry (OHR-LCMS), leading to the identification of 38 different metabolites. Dietary supplementation with M. esculenta fruiting bodies powder significantly improved serum lipid profile by reducing triglycerides (TG), total cholesterol (TC), low density lipoprotein (LDL) and very low density lipoprotein (VLDL), while increasing high density lipoprotein (HDL) level in diet-induced obese zebrafish. Furthermore, Attenuated Total Reflectance–Fourier Transform Infrared (ATR-FTIR) spectroscopy revealed reduced vibrational intensities corresponding to lipid and protein bands (amide I–III), indicating favorable modulation of metabolic biomolecules. In conclusion, these findings highlight M. esculenta as a natural, multi-target dietary supplement capable of mitigating obesity-induced lipid dysregulation through its bioactive compounds, signifying its promising role in metabolic health management.
Keywords: Hypolipidemic; Morchella esculenta; OHR-LCMS; pancreatic lipase; zebrafish; lipid profile; ATR-FTIR spectroscopy

PP19. GREEN SYNTHESIS OF SILVER NANOPARTICLES USING *LEUCAS CEPHALOTES* EXTRACTS AND THEIR APPLICATIONS

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ABSTRACT

The green synthesis of silver nanoparticles (AgNPs) using *Leucas cephalotes* extract can be employed as an eco-friendly, cheap and sustainable substitute for chemical method of synthesis. Green synthesis makes use of certain phytochemicals present in *Leucas cephalotes* like flavonoids, phenolics and alkaloids. They act as natural reducing and capping agents aiding in the rapid formation of stable AgNPs. The biosynthesized AgNPs are generally characterized by surface plasmon resonance peaks and are characterized by techniques like UV-Vis spectroscopy, X-ray diffraction (XRD), scanning electron microscopy (SEM) etc. to demonstrate their size, shape and crystalline nature. The individual properties of the green synthesized AgNPs like their surface area which is size dependent and increased surface reactivity is translated in many ways into varied applications, but more distinctly in the antimicrobial and biomedical fields. The AgNPs exhibit good antibacterial, antifungal and anti-viral activities ascribe to their action on the microbial cell wall in different ways thereby hindering the various cellular functions. The AgNPs produced by the use of *Leucas cephalotes* extract can also be used for wound healing and drug delivery besides biosensing and anti-inflammatory drugs. The green synthesized AgNPs demonstrate increased biocompatibility and reduced toxicity as compared to chemical synthesis and can be used effectively for therapeutic purposes. Apart from biomedical applications, the AgNPs find use in environmental remediation also besides an interest in their application in catalysis and textile industry implying the huge utility. This review poster deals with the synthesis methodology along with characterization profile, mechanistic workings and their varied applications

PP20. ETHNOPHARMACOLOGY OF *SILYBUM MARIANUM* AND ITS PHYTOCONSTITUENTS

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ABSTRACT

Silybum marianum (milk thistle) is a medicinal plant traditionally used for hepatic disorders, with silymarin—its main bioactive compound—demonstrating protective effects against liver diseases. Recent research, however, suggests that silymarin and its constituents (such as silybin, isosilybin, silychristin, silydianin, dihydrosilybin, and so on), may exert diverse pharmacological activities beyond hepatoprotection, including cardiovascular, antidiabetic, anticancer, neuroprotective, anti-atherosclerotic, hypolipidemic, and renal protective effects. It prevents insulin resistance, especially in cirrhotic patients. Furthermore, it shows promise in the prevention of Alzheimer's disease. This review critically examines current evidence on the phytochemistry, pharmacological properties, adverse effects, and therapeutic potential of *Silybum marianum*. We systematically analyzed peer-reviewed studies with rigorous methodologies to provide an updated synthesis of SM's benefits and limitations. Our findings indicate that, while preclinical and some clinical data support multifaceted therapeutic actions of milk thistle, inconsistencies in study designs and limited large-scale trials constrain definitive clinical recommendations. Future research should address these gaps to better define the clinical utility and safety profile of *Silybum marianum* in various disease contexts.

PP21. ECO-FRIENDLY METHOD OF KERATINOUS WASTE DEGRADATION BY KERATINOLYTIC FUNGI

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ABSTRACT

Feather keratin represents a major by-product of the poultry processing industry. The persistent accumulation of this insoluble protein poses environmental and public health challenges due to the inefficiency of conventional disposal methods. Consequently, there is a growing need to develop sustainable and eco-friendly alternatives for managing keratinous wastes. This study evaluated the keratinolytic potential of *Aspergillus nidulans* for the biodegradation of chicken feathers under submerged fermentation. Enzymatic activities were monitored as indicators of keratinolytic performance. The highest keratinase (266.10 ±14.29 U/ml) and disulfide reductase (3.53 ± 0.22 U/ml) activities were observed, accompanied by maximum soluble protein (2.77 ± 0.10 mg/ml) and free amino acid (1.52 ± 0.07mg/ml). A

degradation efficiency of 33.6% was achieved by the end of the study. Scanning electron microscopy (SEM) confirmed fungal colonization and hydrolysis of the feather structure, while Fourier-transform infrared (FTIR) spectroscopy indicated structural modifications associated with the β-sheet disruption. These findings demonstrated the effectiveness of *A. nidulans* in the biodegradation of feather keratin waste through a green and sustainable approach, and highlight its potential for biotechnological applications in waste valorization and bioresource recovery.

PP22. EFFECT OF IRON HOMEOSTASIS ON ANTIMICROBIAL RESISTANCE IN *ESCHERICHIA COLI*

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ABSTRACT

Antimicrobial resistance (AMR) is a worldwide concern that must be addressed for successful therapeutic outcome. There are several environmental factors including iron that promote AMR. The molecular mechanism via which iron modulates AMR remains to be elucidated. In our study, we explored the effect of iron homeostasis on AMR by using *E. coli* as a model organism. The stool isolated *E. coli* were found to be clonally distinct and 15% of the isolates belong to pathogenic phylogroups B2 and D. Drug susceptibility test showed that the isolates were susceptible to aminoglycosides, chloramphenicol and β lactams except ampicillin (47% isolates). >60% isolates resisted minocycline, doxycycline, and erythromycin and >20% isolates resisted tetracycline and co-trimoxazole. MICs of various antimicrobials including antibiotics, dyes, biocides, and heavy metals were determined. AMR genes such as ampC, aacA4, aadB, aacC1 and aac-6'-Ib-cr and virulence genes including aerobactin, ibeA and aggRks were detected. WGS data of the selected isolates revealed the diversity of antibiotic resistome. Addition of iron resisted polypeptide and aminoglycoside antibiotics by >2 fold and decreased susceptibility towards various classes of antibiotics. Iron recovered membrane polarization, and growth retardation by proton motive force inhibitor and antibiotics combination. Disturbance in iron homeostasis resulted in disruption in biofilm formation. RT-PCR data revealed differential expression of efflux pumps and transcriptional regulators. An iron responsive transcriptional regulator namely ModE was identified. Gel shift assay demonstrated iron responsive binding of regulator to it's own promoter. Overall, our study demonstrated the role of iron in modulating AMR in critical bacterial pathogens.

PP23. LARVICIDAL AND NUTRITIONAL DISRUPTION IN SPODOPTERA LITURA CAUSED BY SOIL BACTERIAL ISOLATES

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ABSTRACT

Spodoptera litura (Fabricius) (Lepidoptera: Noctuidae), commonly known as the tobacco caterpillar, is a globally distributed polyphagous pest that inflicts severe damage on a wide range of crops. The heavy reliance on chemical insecticides for its control has led to several adverse consequences, including the development of resistance, pesticide residues, destruction of natural predators, and disruption of ecological balance. These challenges highlight the urgent need for sustainable and environmentally friendly pest control alternatives. One promising approach is microbial control, which has become a key component of integrated pest management (IPM) strategies. In this context, the present study aimed to evaluate the insecticidal potential of soil-derived bacteria as biocontrol agents against S. litura. Among the isolates tested, Planococcus sp. (KIC5), Rhodococcus sp. (MG1), and Comamonas sp. (C2) demonstrated significant insecticidal activity, resulting in high larval mortality. In addition to causing mortality, these bacterial strains also disrupted the pest's development by extending the developmental period, reducing adult emergence, and causing visible morphological deformities. Furthermore, the bacteria negatively influenced the nutritional physiology of S. litura larvae, as evidenced by reductions in relative growth rate (RGR), relative consumption rate (RCR), efficiency of conversion of ingested food (ECI), and efficiency of conversion of digested food (ECD), along with alterations in approximate digestibility (AD).

PP24. MORPHO-PHYSIOLOGICAL AND BIOCHEMICAL RESPONSES OF RICE TO DROUGHT STRESS

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ABSTRACT

Oryza sativa, commonly known as rice, is one of the world's most vital food crops and is adversely affected by drought stress, which represents an extreme set of physiochemical limits to normal plant growth, development, and ultimately grain quality. In response to drought stress, the rice plant modifications its water relations (reduced relative water content and reduced leaf water potential), it closes its stomata early, restricts cell expansion, and reduces carbon assimilation - all limiting biomass accumulation, and consequently yield. From a biochemical perspective, drought stress creates oxidative stress as a result of increased production of reactive oxygen species (ROS), which alters lipid peroxidation

(higher malondialdehyde production) and increased membrane permeability and cellular structural integrity. Responses to restore homeostasis include antioxidant defense systems in rice (superoxide dismutase, catalase, and peroxidases), osmolytes (proline and soluble sugars) for osmotic adjustment, and phytohormone signaling alterations (notably abscisic acid) that remodel and activate metabolic pathways. The ability of rice to respond to drought stress will depend on the timing, intensity and duration of the drought event and the genetic background of the cultivar. While new breeding and biotechnology avenues are beginning to assess traits for drought tolerance (root architecture, detoxification systems, and stress-responsive genes), our understanding of the interactions of omics, biochemistry and physiology are relatively limited.

PP25. DECODING THE ISLET AMYLOID POLYPEPTIDE–PLASMA MEMBRANE INTERACTOME: A BIOINFORMATICS ANALYSIS

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ABSTRACT

Islet Amyloid Polypeptide aggregation is a defining feature of β-cell dysfunction and diabetes progression. However, the plasma membrane (PM) factors that coordinate IAPP's cellular interactions and toxicity remain poorly understood. In this study, we present an integrative bioinformatics framework to delineate the IAPP-PM interactome and its potential regulatory axes. Transcriptomic datasets from NCBI were systematically mined to identify differentially expressed genes (DEGs) using GEO2R. Protein–protein interaction (PPI) analysis was performed using STRING to study co-expressed genes with IAPP. Subsequently, validated miRNA–target data from miRTarBase were integrated for all IAPP-PM associated genes, followed by Cytoscape-based network construction and topological analysis to identify regulatory hub nodes. We identified three datasets (GSE38642, GSE20966, GSE25724), found 2465 significant DEGs (1882 downregulated and 583 upregulated). Further, collectively 496 PM-associated genes found in which 427 were upregulated and 69 were downregulated. PPI network revealed 11 co-expressed genes with IAPP. Cytoscape-based network analysis identified ten hub genes with the highest degree centrality which includes *APP*, *CPE*, *GNAS*, *PRNP*, *HSPA5*, B2M, GNB1, IDE, CD4, and IAPP and miRNAs with high connectivity were predominantly linked to these hub genes, suggesting their potential as biomarkers of PM-mediated IAPP regulation. Collectively, this integrative network analysis offers IAPP-PM interactome, revealing unrecognized regulatory hub nodes. The identified miRNA–gene represents promising biomarker candidates for monitoring PM dysfunction and β-cell impairment in diabetes. These findings open new avenues for targeted therapeutic exploration and mechanistic validation of IAPP-associated membrane signaling, offering transformative insights into diabetes pathogenesis and lays the groundwork for targeted experimental validation.

PP26. ENDOPHYTIC BACTERIA FROM HALOPHYTIC PLANTS: A NATURAL SOURCE OF SALT-TOLERANT BIO-STIMULANTS

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ABSTRACT

Soil salinity strongly impacts productivity of crops on a global scale thereby calling for the need of sustainable alternatives to chemical inputs immediately. Halophytic plants adapted to salinity possess salt tolerant endophytic bacteria with good potential as plant growth-promoting traits (PGP). The endophytes produce favorable phytohormones (IAA, gibberellins), solubilize nutrients, synthesize ACC deaminase and exopolysaccharides (EPS), and contribute to osmo-protective properties and ion balance in the host plant. When applied to crops such as rice, wheat, and tomato under salt stress conditions, endophytes improve germination, total biomass, chlorophyll content and yield by enhancing antioxidant defense mechanisms and maintaining Na^+/K^+ homeostasis. Endophytes from halophytes can be read as a cheaper, more environmentally friendly alternative to fertilizers.

PP27. ANTHROPOCENE: ARE HUMANS THE NEW GEOLOGICAL FORCE?

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ABSTRACT

Anthropocene is a proposed new geological epoch with humans as the driving force after the Holocene. The term Anthropocene was first proposed by Paul Crutzen in 2000 at a meeting of the Scientific Committee of the IGBP in Cuernavaca. During the Holocene, mankind's activities gradually grew into a significant geological and morphological force, as recognized early on by several scientists. Mankind has now inhabited or visited almost all places on Earth and has even set foot on the Moon. The release of SO_2, globally about 160 Tg/year, into the atmosphere by coal and oil burning is at least twice the sum of all natural emissions, occurring mainly as marine dimethyl sulfide from the oceans.The Anthropocene, on current evidence, appears to show global changes consistent with the suggestion that an epoch-scale boundary has been crossed within the last two centuries. Even so, the Anthropocene has not yet been officially recognized as a formal epoch by the International Commission on Stratigraphy. Research combining geology, climatology, and archaeology can help establish precise stratigraphic markers such as plastics, radionuclides, or concrete layers to define its beginning . Studies have often focused on environmental data without addressing human behavior, policy, or cultural factors. Fostering collaboration between scientists, economists, sociologists, and policymakers to design holistic models of human-Earth interaction is one of the key approaches to understanding the impact of human activities. Our everyday actions continue to transform our surroundings, deviating from the 11,700-year-old Holocene pattern, and have become a notable variable in shaping the world.

PP28. FROM BOTTLE TO BENCH: EXPLORING THE ANTIVIRULENCE POTENTIAL OF PROBIOTIC STRAIN ISOLATED FROM YAKULT AGAINST *PSEUDOMONAS AERUGINOSA*

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ABSTRACT

The gut microbiota, a diverse and dynamic population of bacteria found in the GI tract, is essential to maintain health. Among beneficial microbes, probiotics—live microorganisms that, when administered in adequate amounts, confer health benefits—have emerged as an effective approach to restore microbial balance. The goal of this study was to isolate and identify the probiotic strain found in Yakult, a commercial probiotic drink. Morphological traits, Gram staining, and molecular identification through 16S rDNA sequencing confirmed the isolate as *Lacticaseibacillus paracasei*. Preliminary screening demonstrated the isolate's resistance to phenol, tolerance to bile salts, and capacity to grow in a broad pH range, suggesting that it may be able to withstand the harsh conditions of the GIT. The isolate Lc. paracasei was found to be sensitive to a broad spectrum of antibiotics, indicating its safety profile. Moreover, Lc. paracasei's CFS inhibited the growth of *Proteus mirabilis*, *Pseudomonas aeruginosa*, and *Bacillus subtilis*, demonstrating its antibacterial potential. The probiotic cell-free supernatant (CFS) showed a minimum inhibitory concentration (MIC) of 12.5%, and hence 6.25% was selected as sub-MIC against P. aeruginosa. Interestingly, treatment with probiotic CFS inhibited P. aeruginosa virulence by inhibiting production of hemolysin, elastase, total protease, and pyocyanin at sub-MIC. Using the Agrobacterium tumefaciens NTL4 biosensor and AHLs from P. aeruginosa, the isolate's CFS showed stronger quorum sensing inhibition than the whole cell culture. Results imply that Lc. paracasei has promising anti-virulence and anti-quorum sensing properties in addition to its probiotic qualities. Therefore, it can be used as an alternative substitute for traditional

PP29. THE IMITATORS: UNVEILING THE MYSTERY BEHIND MIMICRY ORCHIDS AND THEIR LOOK-ALIKE COUNTERPARTS

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ABSTRACT

Orchids are among nature's most fascinating plants, admired for their extraordinary beauty, wide diversity, and clever survival strategies. Some orchids, known as mimicry orchids, have evolved the remarkable power to deceive—they copy the look, smell, or even texture of

insects, flowers, or fungi to attract pollinators without giving any real reward. This intelligent adaptation allows them to reproduce successfully even in challenging environments where true pollinators are scarce. Species like *Ophrys insectifera* (Fly orchid), *Drakaea glyptodon* (Hammer orchid), and *Chiloglottis trapeziformis* (Wasp orchid) are classic examples, using mimicry as a tool for reproduction, protection, and long-term survival. Alongside these true mimics are the look-alike orchids such as *Dracula simia* (Monkey orchid), *Caleana major* (Flying Duck orchid), *Orchis italica* (Naked Man orchid), and *Cymbidium* spp. (Boat orchid). Though they don't use mimicry for pollination, their natural shapes and vibrant patterns resemble animals or objects—showing the playful and creative side of evolution and how nature sculpts beauty in unexpected ways. This study explores how cunningly orchids use mimicry and resemblance as creative survival tactics, revealing how evolution and imagination blend together in these “floral artists.” They remind us that nature is not only intelligent—but also an artist with a deep sense of beauty, creativity, and wonder.

PP30. ANTHROPOLOGICAL EXPLORATION OF TRADITIONAL FOOD SYSTEMS AND THEIR SHIFTING PARADIGM AMONG THE KINNAURA TRIBE OF BASPA VALLEY, HIMACHAL PRADESH

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ABSTRACT

Traditional food systems are globally undergoing significant contemporary shifts. This ethnographic study focuses on the Kinnaura tribal community of the Baspa Valley, Kinnaur, Himachal Pradesh, India. It is an area characterised by a semi-arid and high altitude ecosystem. The community's historical reliance on resilient traditional foodways includes hardy crops cultivation, diverse wild edible foraging, and complex preservation techniques which serve as a critical demonstration of environmental determinism in subsistence strategy development. These systems are more than mere mechanisms for physiological sustenance and are deeply embedded in the community’s socio-cultural fabric, indigenous traditional knowledge and ecological management practices. The local food landscape is experiencing a paradigm shift. Pressures from modernisation, globalisation and the shift towards a cash based economy are driving the community away from its historical methods of subsistence farming and transhumant pastoralism. This trend is evidenced by an escalating economic dependency on high value cash crops and a corresponding reliance on market based food sources. Critically, this economic reorientation is directly linked to the disruption of intergenerational transmission of traditional ecological practices. This research documents indigenous technical knowledge along with analysing the social factors and functional imperatives of the food system. It evaluates the current status of food availability and provides a detailed understanding of these transformations in Kinnaura food practices along with their effects on the community’s cultural heritage and overall food security of the area.

Ultimately, this work contributes to the broader academic discourse on sustainable development and adaptation in fragile mountain ecologies.

PP31. IN-SILICO STUDY TO EXPLORE THE POTENTIAL OF NATURAL COMPOUNDS AGAINST URINARY TRACT INFECTION

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ABSTRACT

UTI is the most prevalent kind of bacterial infection globally ~120–150 million cases reported annually. Different classifications of UTI can be made based on the location of the infections. UPEC is the primary etiological agent of UTI, which include pyelonephritis and cystitis. It can bind to and invade host cells and tissues within the urinary tract through FimH lectin domain adhesion which is taken as receptor protein for the current study. The major strains studied were CFT073 and UTI89. Traditionally, antimicrobial agents have been used in therapeutic treatment; however, with the sharp rise in antimicrobial resistance, this approach has lost some of its therapeutic effect. For this reason, one current area of research is the search for natural UTI treatment options. In this project, we have targeted our study towards potential of Nutraceuticals against UTI using in-silico method. Polyphenolic compounds such as EGC, PAC A2 and Quercetin found in Green Tea, Cranberry, Red wine, Apple, Onion, Berries and Kales were studied. The 3D structures of receptor protein were obtained from PDB database (PDB ID: 5MTS and 4BUQ) respectively. Five commonly labelled drugs which are used for the treatment of UTI were selected. Their mechanism of action was studied and molecular docking was performed to find the binding interactions between ligands and protein target. Multivariate correlation and regression analysis was done to find the dependency between the binding energy and rest of the docking parameters like Drug likeliness, logP, internal energy. R2 value obtained was 1, meaning perfect correlation.

PP32. ROOT–MICROBE DIALOGUE: SCIENTIFIC INSIGHTS AND REAL-WORLD BARRIERS IN SUSTAINABLE AGRICULTURE

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ABSTRACT

The interaction between plant roots and diverse soil microbes forms the foundation of a dynamic root–microbe dialogue that drives nutrient cycling, stress tolerance, and overall plant health. Through the exchange of biochemical signals such as flavonoids, lipochitooligosaccharides, and phytohormones, roots recruit and communicate with

beneficial microbes, leading to symbiotic associations including nitrogen fixation, mycorrhizal formation, and nutrient solubilization. These interactions offer immense potential to reduce dependence on synthetic fertilizers and pesticides, thereby promoting environmentally sustainable agriculture. Despite promising laboratory results, field application remains challenging due to variable soil conditions, native microbial competition, and inconsistent inoculant performance. Additionally, limited farmer awareness and formulation issues hinder widespread adoption. Recent advances in omics technologies, synthetic microbial communities, and precision agriculture present new opportunities to strengthen plant–microbe networks. By bridging fundamental research and practical farming, understanding root–microbe communication can significantly enhance crop resilience, reduce chemical inputs, and support global goals for sustainable food security and empowered farming communities.

PP33. "ISOLATION, IDENTIFICATION AND ANTIMICROBIAL SENSITIVITY OF *KLEBSIELLA PNUEMONIAE* FROM CATTLE AND BUFFALOES"- AS REVIEW

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ABSTRACT

Klebsiella is an opportunistic bacterial pathogen that infects both humans and animals and is widely recognized for its diverse mechanisms of antimicrobial resistance (AMR). The increasing occurrence of AMR in *Klebsiella* species poses a significant threat to public health and animal husbandry, as it complicates treatment strategies and promotes the spread of resistance genes across bacterial populations. The present study was undertaken to isolate and characterize *Klebsiella* species from cattle and buffaloes and to investigate their antimicrobial resistance profiles. A total of sixty samples, including mastitic milk and diarrhoeic faecal samples, were collected aseptically from cattle and buffaloes. The isolates were identified using cultural, morphological, and biochemical characteristics, followed by molecular confirmation through a species-specific PCR assay targeting *Klebsiella pneumoniae*. Antimicrobial susceptibility testing was conducted to determine resistance patterns against commonly used antibiotics, and multiple drug resistance (MDR) profiles were evaluated. This study aims to provide insight into the prevalence and resistance characteristics of *Klebsiella* isolates in livestock populations. Understanding these patterns is crucial for the development of effective antimicrobial stewardship strategies, surveillance programs, and infection control measures to limit the emergence and dissemination of resistant *Klebsiella* strains in both veterinary and public health settings.

PP34. PHYTOREMEDIATION -GREEN TECHNOLOGY FOR ENVIRONMENT CLEANUP

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ABSTRACT

Phytoremediation is an innovative plant-based technology that harnesses the natural abilities of plants to extract, detoxify, stabilize, or volatilize contaminants from soil, water, and air. It offers a low-cost, aesthetically pleasing, and eco-friendly alternative to conventional remediation methods. The process involves mechanisms such as phytoextraction, phytostabilization, phytodegradation, phytovolatilization, rhizofiltration, and phytostimulation, through which plants uptake, translocate, or degrade pollutants like heavy metals, pesticides, and petroleum residues. Species such as Indian mustard (*Brassica juncea*), sunflower (*Helianthus annuus*), and poplar (*Populus* spp.) are particularly effective, as their roots absorb or transform toxins while enhancing soil structure and fertility through rhizospheric interactions. Being solar-driven and non-invasive, phytoremediation can be applied over large contaminated areas without disturbing the ecosystem. It also aids soil stabilization, reduces erosion, and supports biodiversity through vegetation regrowth. However, its efficiency depends on factors such as pollutant concentration, plant species selection, and soil characteristics, which may make it slower than physico-chemical methods. Overall, phytoremediation represents a promising green technology for sustainable environmental cleanup, aligning with global goals for ecological restoration and pollution management.
Keywords: phytoremediation, green technology, ecosystem restoration, sustainable environment remediation.

PP35. REPRODUCTIVE BIOLOGY OF *LUFFA CYLINDRICA* (L.) *ROEM*

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ABSTRACT

Luffa cylindrica (L.) Roem (syn *L. aegyptiaca* Mill), commonly called sponge gourd, an emerging cash crop in India, belongs to the family Cucurbitaceae. It is a diploid species with 26 chromosomes (2n = 26) and a cross-pollinated crop. *Luffa cylindrica* (L.) is a monoecious, unisexual, actinomorphic flower with a pentamerous perianth. Floral stages of male and

female flowers viz. tight and mature bud stage; pencil stage; partially open and open flower stage; partially senescent and senescent stage, has been recorded. The measurement of corolla diameter (N=10) was 8.5 + 0.84 cm for female flowers and 9.3 + 0.25 cm for male flowers. Male flowers of *L. cylindrica* open first and are followed by female flowers. Both flowers of *L. cylindrica* began to open between 03.00 and 0 4. 30 and closed around 06.30 h. Thus, the anthesis period lasted for about 02 -03 h. In total, 11 pollinators were collected, including butterflies and small red ants that visited the flowers to forage on pollen and/or nectar. Studies on the reproductive biology of L. cylindrica are critical, given the broad agronomic implications of the species. Once the basic reproductive structure has been clearly studied, it will be possible to analyse the behaviour of commercial lines, hybrids, and plants with different ploidy levels to improve some aspects of reproduction, such as pollen efficacy and pollination efficiency and finally productivity of Luffa cylindrica.

PP36. ARTIFICIAL INTELLIGENCE AND FORENSICS: IMPLICATIONS IN PERSONAL IDENTIFICATION

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ABSTRACT

Artificial Intelligence (AI) has become a common household commodity in today’s world; it is no surprise that it has found its place in more niche disciplines like forensic science and personal identification. Advances in AI are transforming forensic science and personal identification across digital and physical domains, from automated pattern recognition in fingerprints and tool marks to deep-learning reconstructions of faces from skeletal remains. AI methods, particularly deep learning and 3D computer-vision have enhanced forensic pathology and anthropological tasks such as sex/age estimation, post-mortem interval modelling, and computerized facial reconstruction, improved speed and reproducibility while raising new questions about validation and bias. Across subfields like digital forensics, forensic pathology, forensic anthropology, latent print and ballistics; AI offers powerful tools for prioritizing solutions, probabilistic matching, and pattern recognition, but persistent challenges remain such as dataset bias, poor generalizability, lack of transparent explanations, and uneven regulatory readiness. AI is now redefining what it means to identify a person be it from face, voice, gait, or even bone structure with precision. Yet, as these technologies advance, the human dimension of identity and the ethical responsibility to use such tools wisely must remain at the centre. The present study aims to delve deeper into how AI can strengthen and modernize personal identification in forensic science with a special focus on its applications, advantages and ethical implications in personal identification.

PP37. FROM AROMA TO ATTRACTION: THE SCIENCE OF FRAGRANT ORCHIDS

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ABSTRACT

The family Orchidaceae is one of the most diverse groups of flowering plants, admired for its beautiful and often highly fragrant flowers that play a crucial role in pollination biology and plant evolution. Floral fragrance serves as a key modulating factor in plant–pollinator interactions, attracting specific pollinators such as bees, moths, butterflies, beetles, and birds. Orchid scents are produced in specialized osmophores and comprise compounds like monoterpenes, sesquiterpenes, and aromatic derivatives, including linalool, geraniol, benzyl acetate, methyl salicylate, and vanillin. These compounds function as sexual or general attractants, mimic pheromones, or even serve as repellents or modifiers. Each orchid species exhibits a unique blend of fragrance correlated with flower morphology, color, and pollination time—some emit scent only during the day or at dusk to coincide with pollinator activity. Environmental factors such as temperature, light, and humidity greatly influence fragrance emission and intensity. Beyond ecological significance, orchid fragrances have immense potential in biotechnology, perfumery, and hybridization programs, offering genetic resources for floral scent improvement. The diverse and complex nature of orchid fragrances underlines their evolutionary success and highlights their importance as both a scientific and aesthetic treasure of the plant kingdom.

PP38. HEALTH IN THE 21ST CENTURY: MULTIDISCIPLINARY SCIENTIFIC INNOVATIONS

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ABSTRACT

The 21st century has marked an era of unprecedented scientific and technological advancement, fundamentally transforming the global landscape of health and healthcare. This paper synthesizes key multidisciplinary innovations encompassing breakthroughs in biomedical science, the proliferation of digital technologies, advances in psychological interventions, and the evolution of policy frameworks that together define and drive modern strategies for promoting human health. Key developments include the maturation of genomic and precision medicine, regenerative biotechnologies and nanomedicine, the integration of artificial intelligence (AI), telemedicine and Internet of Things (IoT) devices into clinical

practice and the growing incorporation of climate and sustainability considerations into health system planning. Simultaneous progress in digital mental health, brain-computer interfaces, and holistic care models highlights the crucial need to address the human aspects of healthcare. Notably, these innovations have brought forth new ethical, legal, and equity challenges particularly concerning data governance, transparency in artificial intelligence, and the risk of technological disparities. This paper draws on leading international reports and peer reviewed literature to map current progress, identify implementation barriers and propose an integrated agenda for future research and policy. Fulfilling the promise of 21st-century health innovation requires ongoing interdisciplinary collaboration, strong governance systems that uphold equity and privacy, and policy commitments that expand access for underserved and marginalized populations. A series of evidence-informed and pragmatic recommendations are proposed to guide researchers, clinicians, and policymakers in advancing health systems that are equitable, sustainable, and centered on human well-being.
Keywords: Multidisciplinary Innovation, Digital Health, Precision Medicine, AI Ethics, Health and Climate

PP39. UNDERSTANDING ALZHEIMER’S DISEASE: FROM NEUROPATHY TO FUTURE GOALS.

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ABSTRACT

Understanding Alzheimer’s disease has become imperative due to its alarming rise, affecting over 55 million people worldwide and straining healthcare systems. It is marked by progressive brain atrophy driven by neuronal dysfunction and death, primarily from amyloid-β plaques and neurofibrillary tangles. Misprocessed amyloid precursor protein (APP) produces amyloid-β aggregates that disrupt synaptic communication, while hyperphosphorylated tau proteins destabilize microtubules, impairing intracellular transport. These events, coupled with acetylcholine deficiency and chronic neuroinflammation from activated glial cells, drive cognitive decline. Alzheimer’s disease accounts for 60–80% of dementia cases. Genetic risk factors include APP duplication in Down’s syndrome, mutations in presenilin 1 and 2 that increase amyloid-β production, and inheritance of the APOE4 allele, which impairs amyloid clearance. Environmental factors include hypercholesterolemia, hypertension, diabetes, and smoking. Diagnosis often involves MMSE, MRI, and genetic testing for presenilin and APOE4 mutations. Although no cure exists, current treatments such as cholinesterase inhibitors, NMDA antagonists, and psychiatric symptom management provide partial relief. Preclinical studies using mice, zebrafish, and in vitro neuronal cultures have advanced understanding of pathology and therapeutic testing. Future research emphasizes chimeric models, human iPSC systems, and advanced gene-editing strategies. Emerging treatment strategies include disease-modifying treatments, anti-tau therapies, gene and stem cell therapy, CRISPR-based methods, and immunomodulatory approaches targeting

neuroinflammation and the blood–brain barrier. Although it has autoimmune-like aspects, Alzheimer's remains categorized as a neurodegenerative disease with immune dysregulation. Overall, this review highlights pathological mechanisms, diagnostic approaches, genetic and environmental risks, current therapies, and emerging research directions that together shape our understanding of Alzheimer's disease.

PP40. BIOMANAGEMENT OF ROOT KNOT NEMATODE USING LEAF EXTRACT OF *AZADIRACHTA INDICA*

Anchal Bhogal[1], Shivam Jasrotia[1], Abhijit Pradhan[1], Sudhanshu[1]
[1] *Chandigarh University*

ABSTRACT

Nematodes have a significant impact on crops in India, reduced the yield up to 50-60% in some cases and decreased the fruit quality. Nematode shows adverse effect on the plant and cause stunted plant growth, increased susceptibility to other diseases and economic losses (estimated to be around Rs. 10,000 crores annually). *Meloidogyne incognita* can cause significant yield losses in tomato plants. The present study evaluated the efficacy of neem extract in managing *Meloidogyne incognita* infestation on tomato plants. Different concentrations of neem extract were applied to tomato plants and their effects on nematode morphology, mortality, and egg hatching were assessed. Neem extract demonstrated maximum efficacy against nematodes in both in vitro and in vivo experiments, exhibiting significant improvements in morphological parameters, enhanced enzymatic and non-enzymatic antioxidative activities, and inhibition of egg hatching and juvenile development thereby showed potent nematicidal activity. This offers a viable alternative to synthetic nematicides, which can be harmful to the environment and human health. Neem extracts' multi-faceted mechanism of action and natural origin makes it an attractive solution for agricultural and horticultural applications. The paper aims to comprehensively investigate efficacy of neem extra in managing nematode infestations in plants and investigate the effects of neem extract on plant growth parameters, such as root weight, shoot weight, plant length and gall formation. Overall, these objectives are to investigate the potential of neem extract as a sustainable solution for managing nematodes.

PP41. NATURE'S PHARMACY: FIGHTING DRUG RESISTANCE WITH MEDICINAL PLANTS

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ABSTRACT

The rise of antibiotic-resistant bacteria is a major global health challenge, threatening the efficacy of conventional drugs and increasing morbidity and mortality. Medicinal plants,

historically used in traditional medicine, produce a wide range of bioactive compounds-alkaloids, phenolics, flavonoids and terpenoids- that exhibit potent antibacterial activity. This study explores the antibacterial potential of selected medicinal plant extracts against multi-drug-resistant bacterial strains, suggesting their potential as low-cost, sustainable alternatives to conventional antibiotics. Integrating traditional botanical knowledge with modern scientific validation not only addresses drug resistance but also provides accessible healthcare solutions, particularly in resource-limited regions. This research aligns with the CHASCON 2025 theme, "Empowering Humanity: Science, Technology & Healthcare for All," by highlighting innovative, nature-based strategies to combat a pressing health crisis. By leveraging the natural antibacterial properties of medicinal plants, this approach paves the way for the development of new, safe and effective therapies, offering hope in the global fight against antimicrobial resistance.

Keywords: Medicinal plants, Antibacterial activity, Bioactive compounds, Sustainable healthcare

PP42. RISKS AND COMPLICATIONS INVOLVED IN GIVING BIRTH AT AN ADVANCED MATERNAL AGE

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ABSTRACT

Introduction: Advanced maternal age (AMA), defined as pregnancy at 35 years or older, is linked to increased maternal and fetal complications. With more women conceiving later in life, this topic has gained greater clinical relevance. Risks rise progressively beyond age 35 and include miscarriage, ectopic pregnancy, multiple gestation, preeclampsia, gestational diabetes, placental complications, preterm delivery, low birth weight, chromosomal abnormalities, perinatal mortality, and higher cesarean rates. Objectives: To assess the risks and complications associated with AMA, determine whether maternal age is an independent factor affecting outcomes, evaluate potential benefits, and explore strategies for improvement through preconception counseling, early antenatal registration, close monitoring, and advanced screening. Methods: A six-month observational, questionnaire-based cross-sectional study was conducted among women who delivered at advanced maternal age. Data were collected electronically using a structured questionnaire to evaluate awareness, perceptions, and pregnancy outcomes. Results: Among 114 participants, AMA showed a strong association with adverse outcomes. Common maternal complications included gestational diabetes, preeclampsia, and increased cesarean deliveries. Neonatal risks involved preterm birth, low birth weight, and NICU admissions. While 70% of participants were aware of AMA, only 45% received adequate information from healthcare providers. Major factors influencing pregnancy decisions were health, partner's health, and financial readiness. Conclusion: Advanced maternal age heightens pregnancy risks; however, early counseling,

lifestyle management, and vigilant antenatal care can significantly reduce complications and ensure safer outcomes.

PP43. ADDRESSING GAPS IN CLINICAL RESEARCH ASSOCIATE TRAININGS: AN EXPLORATION OF POTENTIAL APPLICATIONS AND INTEGRATION OF ARTIFICIAL INTELLIGENCE

Sumit Kumar[1], Dr Sukhpal Kaur[2], Dr Ananya Hazra[1]
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ABSTRACT

Clinical Research Associates (CRAs) are essential to maintaining the integrity, compliance, and data quality of clinical trials. However, current CRA training programs remain largely theoretical and insufficiently aligned with the complex demands of modern clinical research environments. This study aimed to identify key gaps in existing CRA training programs and explore the potential role of Artificial Intelligence in enhancing training effectiveness. A descriptive exploratory mixed-method design was adopted. Data were collected through structured questionnaires from 72 professionals working as CRAs and in related roles. Responses were analyzed using descriptive statistics and thematic analysis to evaluate strengths, limitations, and improvement areas within existing training structures. Findings showed considerable gaps, including limited practical hands-on exposure, inadequate therapeutic area knowledge, and lack of continuous learning opportunities. While GCP and regulatory aspects were strong, training programs lacked adaptability and real-world applicability. An AI-supported training framework was proposed, highlighting adaptive learning modules, virtual simulations, real-time feedback, and performance analytics to personalize learning and improve decision-making skills. Integrating AI into CRA training can foster dynamic, learner-centric approaches that enhance competency and overall trial quality. It offers strong potential to better equip CRAs in a rapidly evolving ecosystem, ultimately strengthening clinical trial outcomes and patient safety.

PP44. ADVANCEMENTS IN BIO-BASED EDIBLE COATINGS AND FILMS: INNOVATIVE PACKAGING SOLUTIONS FOR SUSTAINABLE FOOD PRESERVATION

*Agrima Sood, Raj Rani, Saloni Sharma, Manoj K. Patel, Manoj K. Nayak**

ABSTRACT

The growing global preference for healthier lifestyles has significantly increased demand for minimally processed fruits, vegetables, and foods. However, mitigating the loss of around 30% of these perishable products along the supply chain remains a pressing issue for both commercial and scientific sectors. Bio-based edible coatings and films from plant-derived

polysaccharides, proteins, and lipids have emerged as sustainable alternatives to synthetic packaging, addressing environmental and public health concerns.

These natural coatings, typically applied as thin biopolymeric layers directly to food surfaces, help reduce post-harvest losses while preserving fresh produce's nutritional, sensory, and organoleptic qualities. These coatings are often fortified with functional additives such as nanoparticles, essential oils, bioactive compounds, and antimicrobial agents to enhance their effectiveness further. These additives help retain moisture, prevent microbial contamination, and mitigate spoilage by maintaining highly perishable products' texture, color, and flavor. The development of composite coatings, which blend biopolymers with plasticizers and cross-linking agents, has improved their physicochemical, mechanical, structural, and barrier properties. Recent advancements in these functional coatings and films have resulted in significant shelf life extensions and better-quality preservation across various food categories, including fresh produce, meat, dairy, and baked goods. In doing so, they play a key role in reducing food waste and promoting sustainable food systems.

Additionally, the review highlights the transformative potential of intelligent packaging solutions, which utilize advanced sensors and indicators for real-time quality monitoring throughout the supply chain. These technologies enable defect detection, quality assessment, and optimized decision-making, addressing critical challenges related to food safety, waste reduction, and resource efficiency. This review provides a holistic perspective on their synergistic contributions to enhancing food preservation, minimizing environmental impact, and paving the way for a sustainable future in food systems. Persistent challenges, including cost, scalability, and regulatory hurdles, are also discussed, offering an outlook on future opportunities for innovative, sustainable solutions in food preservation.

PP 45. *IN SILICO* CHARACTERIZATION OF *CHALCONE ISOMERASE* (*CHI*) GENES IN THREE ORCHID SPECIES: *APOSTASIA SHENZHENICA, DENDROBIUM CATENATUM* AND *PHALAENOPSIS EQUESTRIS*

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ABSTRACT

Chalcone isomerase (CHI) is a vital enzyme in the flavonoid biosynthetic pathway that catalyzes the intramolecular cyclization of chalcones into flavanones—key intermediates in pigment formation, UV protection, and stress defense. Orchids, known for their unique floral diversity, rely heavily on flavonoid compounds for color expression and adaptation. In this study, CHI gene family was systematically identified and analyzed in three orchid species—*Apostasia shenzhenica*, *Dendrobium catenatum*, and *Phalaenopsis equestris*—using

comprehensive *in silico* approaches. A total of 14 CHI protein sequences were identified. Domain analysis predicted the presence of Chalcone_3 domain while motif analysis confirmed the presence of ten conserved motifs. Multiple sequence alignment was performed to locate the positions of critical catalytic sites as well as other active sites. Furthermore, the CHI proteins were classified into three types, type I, type III and type IV based on phylogenetic clustering and ortholog prediction. Homology modeling was carried out to predict the secondary and tertiary structures of CHI proteins. Likewise, gene structure was predicted to reveal exon-intron distribution. In addition, analyses of *cis*-acting regulatory elements and expression profiles of *CHI* genes helped in providing insights to their putative roles in the orchid species under study. Overall, this study provides the first comparative *in silico* characterization of *CHI* gene family in orchids and the results serve as a genomic foundation for future functional validation and metabolic engineering of genes involved in flavonoid pathways in orchids.

PP46. TRANSCRIPTOMIC ANALYSIS OF PROTEIN ARGININE METHYLTRANSFERASES (PRMTS) IN FIVE SPECIES OF *PHALAENOPSIS ORCHID*

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ABSTRACT

Orchidaceae includes one of the most exquisite and diverse group of flowering plants. The intricate floral architecture of orchids makes them one of the most economically important plants in the floriculture industry. One of the key phenomena is epigenetics that regulates flowering time through mechanisms such as histone modifications. Post- translational modifications of histones by protein arginine methyltransferases (PRMTs) involves addition of methyl group on arginine residues and controls various biological processes in plants. In the present study, an in-silico analysis of transcriptomes of five Phalaenopsis orchid species was performed and identified a total of 34 putative PRMT sequences from P. aphrodite (7), P. bellina (7), P. lueddemanniana (8), P. modesta (6) and P. schilleriana (6). The identified PRMT proteins were grouped into two types, type I and type II PRMTs, based on the presence of distinct conserved domains and motifs, and supported by the phylogenetic clustering of all the PRMT sequences. Multiple sequence alignment helped to locate the positions of conserved domains. The sequences were further subjected to protein structure prediction to detect the presence distinct secondary structures. Furthermore, expression profiling of the PRMT genes across various tissues of five orchid species was represented in the form of heat maps and suggested the potential role of these genes in vegetative as well as reproductive growth and development of orchids. Thus, the findings of the present study provide a platform for future investigations into the functional characterization of PRMT genes in orchids.

PP47. NEO-INVASIVE PLANTS IN THE NORTH-WESTERN HIMALAYAS: PATTERNS, IMPACTS, AND MANAGEMENT

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ABSTRACT

Neo-invasive plant species are rapidly altering the structure and functions of Himalayan ecosystems, yet region-specific studies in this regard particularly in the North-Western Himalayas remain scarce. Evidences indicate that neo-invasive plants are expanding into sub-temperate zones, reducing native species richness via allelopathy and competitive exclusion. Climate change and increased human-mediated dispersal are likely to accelerate the upward range shifts further complicating the management efforts. During extensive field surveys in the North-Western Himalayan region, several neo-invasive plant species showing potential to spread were identified, paving their way upwards. Among these *Hedera helix*, *Tagetes minuta*, *Tecoma stans* and *Cirsium arvense* were the prominent ones. These species have either invaded through ever increasing vehicular movement or must have escaped from their places of cultivation. Nevertheless, their spread (though manageable so far) is a cause of concern as they are suppressing the native vegetation. It is, therefore, pertinent to manage these species at the earliest before they wreak havoc. Though management can be achieved through conventional ways, yet now a days more focus is on their utilisation, so that the native communities can be benefitted. During the deliberations of this conference, it is proposed to discuss the impact and management of these neo-invasive plant species.

PP48. SUSTAINABLE BIOCHAR-CELLULOSE FILTER PAPER FOR DUAL FILTRATION AND ONSITE-POLLUTANT SENSING

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ABSTRACT

Water scarcity and agricultural runoff are emerging global concerns demanding efficient and sustainable purification technologies. This study presents a low-cost, biodegradable filter system fabricated from biochar and bacterial cellulose for simultaneous wastewater treatment and pollutant sensing. Biochar derived from agricultural residues serves as the primary adsorbent, offering high surface area and oxygenated functional groups (–COOH, –OH, –C=O) that facilitate the removal of heavy metals and organic dyes through electrostatic and π-π interactions. The bacterial cellulose matrix, produced by *Komagataeibacter xylinus*, provides mechanical integrity, hydrophilicity, and nanoscale porosity, enabling uniform biochar dispersion and improved water flux. To integrate real-time detection, the composite surface is functionalized with gold nanoparticle-based colorimetric nanosensors that exhibit a surface plasmon resonance (SPR) shift upon interaction with target pollutants, leading to visible colour changes. This dual-function approach allows both filtration and qualitative sensing without external instrumentation. The paper further discusses the fabrication parameters, surface characterization (FESEM, FTIR, BET), adsorption efficiency, and the quantitative correlation between SPR shifts and contaminant concentration. The proposed biochar-cellulose platform represents a scalable and sustainable strategy for decentralized wastewater treatment, particularly in agricultural and rural settings where resource-efficient water management is critical.

Keywords: Biochar, bacterial cellulose, gold nanoparticle, wastewater treatment.

PP49. PHYTOCHEMICAL COMPOSITION AND IN VITRO BIOACTIVITIES OF *SKIMMIA LAUREOLA*: A THREATENED MEDICINAL PLANT OF HIMACHAL PRADESH.

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ABSTRACT

Skimmia laureola (DC.) Siebold and Zucc ex Walp, an endangered aromatic shrub of the family Rutaceae, is traditionally used in the Himachal Pradesh to treat inflammation and microbial infections. The present study evaluated its phytochemical composition and in vitro biological activities. Methanolic extract of S. laureola leaves were screened for major phytochemical groups, showing the presence of alkaloids, flavonoids, phenolics, tannins, and terpenoids. Total phenolic and flavonoid contents were determined spectrophotometrically. Antioxidant activity was assessed using the DPPH free radical scavenging assay, while anti-inflammatory potential was evaluated by the protein denaturation method. The extract exhibited significant antioxidant and anti-inflammatory activity in a concentration-dependent manner. Antibacterial studies using the agar well diffusion method revealed strong inhibition against both Gram-positive (*Staphylococcus aureus*, *Bacillus subtilis*) and Gram-negative (*Escherichia coli*, *Pseudomonas aeruginosa*) bacteria. The findings support the traditional use of S. laureola and emphasize its potential as a source of natural therapeutic agents and the need for its conservation.

Keywords: *Skimmia laureola*, Phytochemicals, Antioxidant, Anti- inflammatory, Antibacterial

PP50. ECO-FRIENDLY BIOSYNTHESIS AND CHARACTERIZATION OF SILVER NANOPARTICLES FROM FISH GILL EXTRACT

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[1] *Research Scholar,* [2] *Associate Professor*

ABSTRACT

This study emphasis on the green synthesis of silver nanoparticles (AgNPs) using aqueous extract of fish gills as a sustainable and eco-friendly reducing and stabilizing agent. The

research offers an environmentally benign alternative to eliminates the use of toxic chemicals commonly employed in conventional synthesis. Biosynthesis of silver nanoparticles was initially indicated by a visible color change of the reaction mixture from pale yellow to dark brown due to surface plasmon resonance. Characterization through UV–Visible spectroscopy confirmed the successful synthesis of AgNPs with an absorption peak around 422 nm. Dynamic Light Scattering (DLS) analysis revealed an average hydrodynamic size of approximately 92 nm and X-ray Diffraction (XRD) analysis estimated a crystalline size of around 32 nm, suggesting that the actual metallic core of the particles is much smaller. The diffraction peaks were corresponded to the (111), (200), (220), and (311) planes of face-centered cubic (fcc) silver, confirming high crystallinity. The synthesized nanoparticles were expected to exhibit potent antimicrobial activity due to their small size and bio-capping from fish gill biomolecules. This study implies a cost-effective and sustainable approach for synthesis of nanoparticle utilizing fish waste, converting an environmental pollutant into a valuable nanomaterial with potential biomedical and environmental applications.

Keywords: Nanoparticles, Gills, Fish waste, AgNps.

PP51. PAN-GENOME ANALYSIS REVEALS AMR PATTERNS IN *PSEUDOMONAS AERUGINOSA*

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ABSTRACT

Pseudomonas aeruginosa is a ubiquitous Gram-negative pathogen responsible for severe infections in immunocompromised and admitted patients. Its large and plastic genome (5.5–7 Mb) contributes to remarkable adaptability, virulence, and multidrug resistance (MDR). In this study, 100 P. aeruginosa strains from NCBI-SRA, isolated from diverse sources such as bronchoalveolar lavage of cystic fibrosis patients, hospital environments, and clinical samples, were analysed using an integrated bioinformatics workflow. Quality control and alignment were performed using FastQC, Trimmomatic, and Bowtie2, followed by variant calling with BCFtools and annotation using snpEff. Functional annotation and pan-genome construction were carried out using SPAdes, Prokka, and Roary, while antimicrobial resistance genes were identified via RGI from the CARD database. Variant annotation revealed significant genomic variations in virulence-associated genes, correlating with enhanced antimicrobial resistance, especially to colistin. Pan-genome analysis indicated a predominantly closed genome structure (~20% accessory content), yet persistent resistance determinants such as *OprM*, *MexA/B/C*, MexR, nalC/D, PmpA, and CpxR were consistently detected. Additionally, potential colistin resistance genes (*ArnT*, *arnA*, *basS/R*, *cprR/S*) highlight an alarming rise in MDR and possible emergence of XDR strains. These findings emphasize *P. aeruginosa's* genomic adaptability and resistance evolution, underscoring the urgent need for genomic surveillance, regulated antibiotic use, and sustained research funding. This computational approach provides a framework for comparative genomics and resistance tracking, especially critical in countries like India where antibiotic misuse accelerates resistance and increases healthcare burdens.

MATHEMATICAL SCIENCES

- **Mathematics**
- **Statistics**
- **Computer Science and Applications**

Sectional President
Dr. Anuj Sharma

Sectional Secretary
Dr. Rohini Sharma

CHASCON 2025

NATIONAL CONFERENCE ON

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Science, Technology, and Healthcare for All

November 06 – 08, 2025

Section: Mathematical Sciences

Program

November 07, 2025

Venue: CIL Auditorium, CIL Building.

Sectional President	**Sectional Secretary**
Name – Anuj Sharma Mobile – 7888676901	Name – Rohini Sharma Mobile – 8968673254

Time	**Program**
09:00-09:15	Display of posters by participants **Venue:** Outside CIL Auditorium, CIL Building 1st Floor
09:30-10:30	Inauguration of Sectional Program **Session Chair:** **Speaker:** Dr. Gaurav Parkash ***Title: Current role of technology and Artificial Intelligence in cancer care.*** **Venue:** CIL Auditorium, CIL Building 1st Floor
10:30-11:00	Tea Break
11:00-13:00	Oral Presentation **Venue:** CIL Auditorium, CIL Building 1st Floor Poster Presentation **Venue:** Outside CIL Auditorium, CIL Building 1st Floor
13:00-14:00	Lunch
14:00-17:00	Oral Presentation **Venue:** CIL Auditorium, CIL Building 1st Floor Poster Presentation **Venue:** Outside CIL Auditorium, CIL Building 1st Floor **Tea break from 15:30-16:00**

Abstracts of Oral Presentations

Oral Presentation- Mathematical Sciences		
OP1	Dr. Aarti Khurana	Propagation of Rayleigh-like waves in coated elastic half-space with voids
OP2	Dr. Anju Goyal	Concomitants of Bivariate generalized Linear Exponential–Weibull (BGLEW) distribution using generalized order statistics
OP3	Dr. Gagandeep Singh	PageRank and the Power of Markov Chains.
OP4	Dr. Jasleen Kaur Bains	Lightweight Deepfake Detection on Mobile Devices for Secure Telemedicine Using UADFV Dataset
OP5	Dr. Rajinder Singh	Intelligent task scheduling and resource optimization in edge cloud environment for sustainable smart cities
OP6	Dr. Surinder Pal Singh Kainth	The Cauchy-Goursat Theorem: A Shortcut Vs the Classical Approach
OP7	Dr. Manish Goyal	Non-parametric tests for two-sample scale comparison with a common quantile
OP8	Dr. Savkirat Kaur	Propagation of Rayleigh-like waves in coated elastic half-space containing voids
OP9	Dr. Sukhdeep Singh	Scalable Graph Transformers for Efficient Large-Scale Network Representation
OP10	Ms. Amanpreet Kaur	Analysing and evaluating the performances of various colorectal cancer detection methods: a comparison between convention and ai driven approaches
OP11	Mr. Amit Kumar Maurya	Multiple comparison procedure for normal distributed ordered treatment effects under heterogeneity of variances
OP12	Mrs. Bhagya Shree	Advancements, Challenges, and Prospects in Text-to-Sign Language Translation
OP13	Mr. Bohar Singh	Virtualization and containerization in cloud computing: a review
OP14	Mr. Chahat Monga	Exploring Plagiarism Detection Techniques for Regional Languages
OP15	Ms. Dimple	Security Evaluation of Handwritten CAPTCHA Designs Against OCR-Based Attacks
OP16	Mr. Harmanjeet	An introduction to basics of mathematical theory of elasticity
OP17	Mr. Jatender Kumar	Comparative Analysis of Deep Learning Models for Lung Carcinoma Classification Using Histopathological Images
OP18	Mr. Karan Kaushal	Intelligent Task Scheduling and Resource Optimization in Edge-Cloud Environments for Sustainable Smart Cities
OP19	Ms. Krittika	SLT-Based Hybrid Deep Learning Framework for Video Forgery Detection

OP20	Mr. Manit Malhotra	An Adaptive YOLO–LSTM Framework for Automated Dual-Phase Proctoring in Online Examinations
OP21	Ms. Manpreet Kaur Dhaliwal	Anomaly Detection Using Unsupervised Learning in PIF v3 Dataset
OP22	Ms. Mehak	Simultaneous inference on exponential location parameters through step-up closed testing procedure
OP23	Mr. Narender Kumar	Quantitative Evaluation of Preprocessing Techniques for Enhanced Mammographic Image Analysis in Automated Breast Cancer Detection
OP24	Ms. Navdeep Kaur	Decoding artificial fruit ripening: challenges, risks, and detection strategies
OP25	Ms. Pallvi Sharma	Bridging Uncertainty in Machine Learning Applications using Fuzzy Logic
OP26	Mr. Pankit Chahal	Markov Chains, PageRank, and The Art of Ranking The Web
OP27	Mr. Parteek	IoT-Enabled Smart Kitchen Architecture for Efficient Home Automation
OP28	Mrs. Rajni Garg	A Robust and Adaptive Framework for Energy-Efficient VM Consolidation in Cloud Data Centers
OP29	Mr. Ranveer	Source Printer Identification Using VGG16-Based Deep Feature Extraction Model
OP30	Mrs. Rashmi	Advancing Pregnancy Care with Machine Learning Box Models: Insights and Trends in Maternal Mortality Prevention
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ABSTRACTS OF ORAL PRESENTATIONS

OP1. PROPAGATION OF RAYLEIGH-LIKE WAVES IN COATED ELASTIC HALF-SPACE WITH VOIDS

Savkirat Kaur[1], Aarti Khurana[2], S. K. Tomar[2]
[1] *Dev Samaj College, Sector 45, Chandigarh,* [2] *Department of Mathematics, Panjab University, Chandigarh*

ABSTRACT

Propagation of Rayleigh-like surface waves in a linear, homogeneous, and isotropic elastic solid half-space coated with a thin isotropic elastic solid layer has been studied. The interface between the half-space and the layer is assumed to be in smooth contact with each other. Both the layer and the half-space contain uniform distribution of small void pores. The effective boundary conditions are derived that replace the entire effect of the thin layer to the interface. These conditions are then utilized to derive the approximate secular equations of second-order, third-order, and fourth-order for Rayleigh-like wave propagation in terms of dimensionless wavenumber. The corresponding secular equations are solved numerically to obtain the speed of propagating Rayleigh-like wave for a particular model. The presence of voids in the model is found to influence the speed of Rayleigh-like wave theoretically and verified numerically. However, the void parameters of the half-space (and not of the layer) are found to affect the propagation of Rayleigh-like wave. In the absence of voids from the model, the resulting secular equation is found to be in complete agreement with the corresponding model available in literature.

OP2. CONCOMITANTS OF BIVARIATE GENERALIZED LINEAR EXPONENTIAL–WEIBULL (BGLEW) DISTRIBUTION USING GENERALIZED ORDER STATISTICS

Sumit Kumar[1], Anju Goyal[1], Davendra Kumar[2], Narinder Kumar[1]
[1] *Department of Statistics Panjab University Chnandigarh,* [2] *Department of Statistics University of Delhi Delhi*

ABSTRACT

Concomitants of order statistics represent the associated random variables that arise when another variable is ordered, and they provide valuable insights into the dependence structure between paired observations. In this paper, we study the bivariate generalized linear exponential–Weibull (BGLEW) distribution through the framework of concomitants of generalized order statistics (GOS). The paper focuses on deriving explicit expressions for both the product and single moments of the distribution by utilizing the properties of the concomitants of GOS. Furthermore, numerical computations of the mean and variance are carried out for different value of parameters. Finally, to demonstrate the practical utility of the proposed distribution, we applied our findings to two real data sets.

OP3. PAGERANK AND THE POWER OF MARKOV CHAINS.

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ABSTRACT

Google's PageRank algorithm transformed how we search the web by turning the network of links between pages into a mathematical model. Think of each webpage as a point in a vast web, and every link as a path connecting them. This network can be represented using a Markov chain, a simple idea from probability that describes movement between connected states. In this model, a "random surfer" follows links from page to page, with the Google Matrix capturing these transitions. A special parameter called the damping factor, often called Google's "magic number", keeps the process stable and ensures all pages can be reached. Over time, this random movement reveals which pages are visited most often, forming the basis of Google's ranking system. By blending probability, linear algebra, and clever design, PageRank turned web search into one of the most elegant examples of applied mathematics in the digital world.

OP4. LIGHTWEIGHT DEEPFAKE DETECTION ON MOBILE DEVICES FOR SECURE TELEMEDICINE USING UADFV DATASET

Ashish Kumar[1], Dr Jasleen Kaur Bains[2], Dr Balwinder Kaur[2]

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ABSTRACT

Video-based consultations are now much more common due to the growth of telemedicine and remote healthcare services, which both improve accessibility and present new security

threats. *Deepfake* videos, capable of altering facial identities and expressions, pose a direct threat to the authenticity and reliability of video-based healthcare systems. In order to offer real-time verification without the need for expensive hardware or continuous internet connectivity, this study investigates the viability of deploying lightweight deepfake detection models directly on mobile devices. The UADFV dataset, which offers a small but representative set of actual and modified facial films, is used to fine-tune *MobileNetV2*, a compact convolutional neural network, to identify whether individual video frames are real or fake. For efficiency, the model is trained on a laptop. TensorFlow Lite is then used to transform the model into a format that can be used on a smartphone for on-device inference. This research offers insights into the real-world implementation of lightweight AI models in limited settings by focusing on assessing inference speed, resource consumption, and classification consistency over the phone. This study shows that mobile AI can effectively detect deepfakes and improve the safety of telemedicine.

OP5. INTELLIGENT TASK SCHEDULING AND RESOURCE OPTIMIZATION IN EDGE CLOUD ENVIRONMENT FOR SUSTAINABLE SMART CITIES

Dr. Rajinder Singh[1], Karan Kaushal[2]
[1] *P.U. Chd,* [2] *P.U.Chd.*

ABSTRACT

Smart cities leveraged the Cloud of Health Things (CoHT) to improve service delivery and manage task scheduling efficiently. Edge–cloud computing was applied to reduce latency and enhance resource utilization for IoT-driven applications. An intelligent task scheduling model was developed using Moth Flame Optimization (MFO) with Deep Reinforcement Learning (DRL) to classify tasks and provide optimal allocation. The model was trained on real-world and synthetic datasets to ensure accurate and fast decision-making. A comprehensive survey of twenty-four edge computing simulators was conducted to evaluate scalability, functionality, reliability, and usability, helping researchers select suitable tools for various scenarios. Network Digital Twin (NDT) technology was explored, and a detailed data model was proposed to represent Edge–Cloud Continuum (ECC) components for multiple stakeholders. Edge Intelligence (EI) and Mobile Edge Computing (MEC) offloading strategies were analyzed to address privacy, security, task dependency, and decision-making challenges. The findings demonstrated that integrating edge and cloud computing with intelligent scheduling significantly improved performance, reduced latency, and enhanced

Quality of Service (QoS) in distributed networks. The proposed approach also provided practical guidance for optimizing task offloading in MEC, strengthening privacy and security measures in Edge Intelligence systems, and improving the accuracy and utility of Network Digital Twin models. These results offered a unified framework to support sustainable smart city applications, enabling reliable, real-time, and efficient computing across IoT, mobile, and network infrastructures.

OP6. THE CAUCHY-GOURSAT THEOREM: A SHORTCUT VS THE CLASSICAL APPROACH

Surinder Pal Singh Kainth[1]
[1] *P. U. Chandigarh*

ABSTRACT

In this talk, I will sketch a short pedagogical approach to prove the Cauchy integral theorem for simply connected domains, avoiding the use of the *Cauchy-Riemann equations*. We establish this theorem for arbitrary closed curves inside simply connected domains, using only the result for rectangles. We also offer an analogous proof of the Cauchy integral formula in the same setting.

OP7. NON-PARAMETRIC TESTS FOR TWO-SAMPLE SCALE COMPARISON WITH A COMMON QUANTILE

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ABSTRACT

This paper proposes a class of non-parametric tests for comparing two populations that share a common known quantile but may differ in scale. The proposed class provide a more general and flexible method for detecting scale differences. The asymptotic distribution of the test statistics is derived, and the Pitman asymptotic relative efficiency is evaluated with respect to existing tests. The performance of the proposed tests is further examined through Monte Carlo simulation to assess the empirical power under various alternatives. An illustrative example using real-life data shows how the proposed tests can be applied in practice. The results indicate that this new class of tests is an effective and practical tool for comparing scale differences when the populations share a common quantile.

OP8. PROPAGATION OF RAYLEIGH-LIKE WAVES IN COATED ELASTIC HALF-SPACE CONTAINING VOIDS

Savkirat Kaur[1]

[1] *Dev Samaj College For Women, Chandigarh*

ABSTRACT

Propagation of Rayleigh-like surface waves in a linear, homogeneous, and isotropic elastic solid half-space coated with a thin isotropic elastic solid layer has been studied. The interface between the half-space and the layer is assumed to be in smooth contact with each other. Both the layer and the half-space contain uniform distribution of small void pores. The effective boundary conditions are derived that replace the entire effect of the thin layer to the interface. These conditions are then utilized to derive the approximate secular equations of second-order, third-order, and fourth-order for Rayleigh-like wave propagation in terms of dimensionless wavenumber. The corresponding secular equations are solved numerically to obtain the speed of propagating Rayleigh-like wave for a particular model. The presence of voids in the model is found to influence the speed of Rayleigh-like wave theoretically and verified numerically. However, the void parameters of the half-space (and not of the layer) are found to affect the propagation of Rayleigh-like wave. In the absence of voids from the model, the resulting secular equation is found to be in complete agreement with the corresponding model available in literature. The nature of contact interface between layer and the half-space affects the propagation speed of Rayleigh-like waves. The thickness of the coating/layer also affects the speed of propagation in the considered model.

OP9. SCALABLE GRAPH TRANSFORMERS FOR EFFICIENT LARGE-SCALE NETWORK REPRESENTATION

Dr. Sukhdeep Singh[1], Karan Pathania[2], Dr. Anuj Sharma[2]

[1] *D.M. College, Moga,* [2] *Department of Computer Science and Applications, Panjab University, Chandigarh*

ABSTRACT

Graph-structured data, common in areas like social networks, molecular chemistry, and recommendation systems, present challenges for traditional graph neural networks (GNNs), including over-smoothing and scalability limitations on large graphs. This work explores the potential integration of transformer architectures into GNNs to improve global context

awareness via self-attention mechanisms tailored to graph topologies. We discuss a conceptual scalable graph transformer approach that could incorporate edge-aware positional encodings and sparse attention to potentially lower computational complexity from $O(n^2)$ to $O(n \log n)$. Using benchmark datasets such as OGB-LSC and Cora as examples, we examine how such a model might enhance node classification tasks and handle graphs with over 1 million nodes more efficiently. The discussion highlights a hybrid attention layer concept that aims to balance local graph convolutions with global transformer elements, suggesting possibilities for applications in big data analytics.

OP10. ANALYSING AND EVALUATING THE PERFORMANCES OF VARIOUS COLORECTAL CANCER DETECTION METHODS: A COMPARISON BETWEEN CONVENTION AND AI DRIVEN APPROACHES

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ABSTRACT

Colorectal cancer (CRC) occurs when the cells in the lining of colon starts to grow irrepressibly and ultimately results in the formation of abnormal growths called polyps, which have the tendency to become cancerous over time. CRC is considered as one of the reasons for cancer related deaths. Several traditional detection methods (colonoscopy, fecal occult blood tests (FOBT), fecal immunochemical tests (FIT)) along with numerous imaging based techniques which are being considered as the medical standard for CRC screening. Although, these traditional methods are quite beneficial but their operator dependency sometime makes their implementation challenging. Due to the portability related issues of traditional methods, recent years development have witnessed the emergence of artificial intelligence (AI) driven approaches as a powerful tool for CRC detection. These AI detection methods are comparatively portable and have the ability to reduce human error and hence is a powerful tool for real-time polyp detection. Apart from various advantages, these AI detection methods suffers from transparency issues , due to their “black-box” nature, which in turns have shifted the growing interest in explainable AI (XAI) techniques for CRC screening. In this research work, a comparative analysis of conventional and AI-based CRC

detection methods is done along with the evaluation of their performances, advantages and limitations. The findings of this study will results in highlighting the importance of XAI techniques for CRC screening.

Keywords: Colorectal Cancer (CRC); Artificial Intelligence (AI); Explainable Artificial Intelligence (XAI); screening methods

OP11. MULTIPLE COMPARISON PROCEDURE FOR NORMAL DISTRIBUTED ORDERED TREATMENT EFFECTS UNDER HETEROGENEITY OF VARIANCES

Mr. Amit Kumar Maurya[1], Prof. Narinder Kumar[1], Dr. Vishal Maurya[2]

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ABSTRACT

In this paper, we consider k normally distributed ordered treatments with unknown means and variances, and we propose a multiple comparison procedure to compare these k successive treatments with respect to the differences in their means. We have also proposed simultaneous confidence intervals for the differences in the successive treatment mean effects under heterogeneity of variances. Two-stage and one-stage procedures are used to develop the multiple comparison procedure. The required critical constants are computed for the implementation of the proposed procedures. A simulation study is conducted to examine the size and power of both the two-stage and one-stage cases. Finally, the proposed procedure is illustrated with real-life numerical data.

OP12. ADVANCEMENTS, CHALLENGES, AND PROSPECTS IN TEXT-TO-SIGN LANGUAGE TRANSLATION

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ABSTRACT

Every individual, including those with hearing disabilities, has the fundamental right to access all opportunities. Sign language serves as a primary mode of communication for people with hearing disabilities. The automatic conversion of text to sign language presents a

promising solution to bridge the communication gap between the hearing-disabled community and society. This paper presents a brief review of recent advancements, challenges, and future directions in the field of text-to-sign language translation. It highlights the contribution of deep learning models and natural language processing techniques in improving translation accuracy and sign representation. Although significant progress has been made, the field continues to face challenges, including grammatical differences between written and sign languages, limited datasets, and the absence of standardized sign language representations across various countries. Further, the paper discusses approaches to integrating hybrid models with speech recognition systems for real-time sign generation. Ultimately, this review aims to provide a comprehensive understanding of the current state and future potential of text-to-sign language technologies to support inclusive communication.

OP13. VIRTUALIZATION AND CONTAINERIZATION IN CLOUD COMPUTING: A REVIEW

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ABSTRACT

Containerization and virtualization play an important role in resource utilization in cloud computing. Hypervisor-Based *Virtualization* (HBV) creates multiple Virtual Machine instances having a dedicated guest operating system (OS) on a single physical host. It provides OS flexibility and isolation but introduces performance overhead due to the hardware abstraction layer. Container-Based virtualization (CBV) becomes a lightweight alternative to HBV that allows multiple applications to run on a single instance of a host operating system. Container technology shares the host OS kernel, resulting in significantly reduced resource consumption and faster startup times. HBV and CBV have become key cloud computing technologies that have completely changed the way services are deployed, maintained, and optimized in heterogeneous computing environments. The research indicates that CBV is becoming an emerging trend in cloud computing and real-time industry due to small memory size, easy migration, scalability, and portability of containers. However, with these benefits, it includes significant drawbacks such as reduced OS flexibility, potential security vulnerabilities, and challenges in multi-tenant isolation environments. The transition from conventional HBV to lightweight CBV is examined in this article, along with the differences in performance, deployment techniques, and implications for modern cloud architectures. In this paradigm shift, the study concludes that next generation cloud

architectures are moving toward hybrid approaches that combine the advantages of containerization with selective hypervisor deployment where OS diversity is necessary.

OP14. EXPLORING PLAGIARISM DETECTION TECHNIQUES FOR REGIONAL LANGUAGES

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ABSTRACT

Plagiarism is a rising issue in academics as increasing resources constantly, and it plays a high impact on student's performance and quality of education. Several studies have been carried out to mitigate the issue. This study provides a comprehensive analysis of the previous research, plagiarism detection approaches, existing plagiarism detection tools, type of the tools, features of Popular plagiarism detection tools and the challenges in plagiarism detection. Plagiarism identification in Punjabi is extremely complex in nature since there are variations in scripts, morphological complexity, and no tools are available in a standard form. The tools for identifying plagiarism such as Urkund and Turnitin are English-based and are not sufficient enough to detect web-based content, paraphrased content, and content in different formats in Unicode in Indian languages. It indicating its potential to enhance academic integrity and prevent plagiarism in the education field.

OP15. SECURITY EVALUATION OF HANDWRITTEN CAPTCHA DESIGNS AGAINST OCR-BASED ATTACKS

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ABSTRACT

Handwritten CAPTCHAs use the natural differences in people’s handwriting to make it hard for computers to read them. But with today’s advanced OCR tools, their real strength is now in question. This paper studies how easily handwritten CAPTCHA designs can be broken using OCR-based attacks. Seven types of handwritten CAPTCHAs were tested with two OCR systems, Google Lens and ChatGPT-4 OCR. In the first step, the original CAPTCHA images were given directly to the OCRs to check how well they could recognize them. In the next step, a custom denoising process was used to clean the images by reducing background noise, improving contrast, and making the text clearer. These cleaned images were then tested

again with the same OCRs. The results showed a clear rise in recognition accuracy after cleaning, which means that many visual distortions in CAPTCHAs can be easily removed. By comparing the two OCR systems, the study found that design features such as overlapping letters, irregular spacing, and busy backgrounds made the CAPTCHAs weaker. The work highlights the need to create handwritten CAPTCHA designs that are based on the structure of the script and have carefully balanced distortions to make them more secure against modern OCR systems.

OP16. AN INTRODUCTION TO BASICS OF MATHEMATICAL THEORY OF ELASTICITY

Harmanjeet[1], Dilbag singh[1]
[1] *Panjab University*

ABSTRACT

The Mathematical Theory of Elasticity provides a fundamental framework for understanding how solid bodies deform and return to their original shape when subjected to external forces. This presentation explores the essential concepts of stress and strain, which describe the internal forces and resulting deformations within a material. The discussion further extends to the generalized Hooke's law, which establishes the linear relationship between stress and strain for elastic materials under small deformations. Finally, the equations of motion are derived to describe the dynamic behaviour of elastic bodies under external loads. Together, these concepts form the mathematical foundation for analysing structural stability, material strength, and mechanical behaviour in engineering and applied sciences

OP17. COMPARATIVE ANALYSIS OF DEEP LEARNING MODELS FOR LUNG CARCINOMA CLASSIFICATION USING HISTOPATHOLOGICAL IMAGES

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ABSTRACT

Recent progress in deep learning has greatly improved the accuracy and speed of disease detection in digital pathology. Early and correct classification of histopathological images

is important for timely diagnosis and better treatment outcomes. Lung carcinoma is one of the most common cancers, and its diagnosis still depends mainly on manual examination of tissue slides, which is time-consuming and can vary between observers. This study compares the performance of three modern convolutional neural network (CNN) models: DenseNet201, having dense connectivity; EfficientNetB0, with compound scaling; and ConvNeXt_Tiny, a transformer-based convolution. The dataset used for classification consists of 32,000 lung histopathology images. These images are categorised into three classes: benign, adenocarcinoma, and squamous cell carcinoma. The models are compared using different performance measures, which include accuracy, ROC-AUC score, and log loss. EfficientNetB0 presents the best performance with 92.89% accuracy, the highest ROC-AUC score, and the lowest log loss. DenseNet201 achieved 90.51% accuracy, and ConvNeXt_Tiny reached 87.61% accuracy. The comparative results highlight the effectiveness of EfficientNetB0 in balancing accuracy and efficiency. It reinforces the potential of modern CNN architectures for automated, robust, and scalable diagnostic support in lung carcinoma classification.

OP18. INTELLIGENT TASK SCHEDULING AND RESOURCE OPTIMIZATION IN EDGE-CLOUD ENVIRONMENTS FOR SUSTAINABLE SMART CITIES

Karan Kaushal[1], Dr. Rajinder Singh[1]

[1] *Panjab University Regional Center Hoshiarpur*

ABSTRACT

Smart cities leveraged the Cloud of Health Things (CoHT) to improve service delivery and manage task scheduling efficiently. Edge–cloud computing was applied to reduce latency and enhance resource utilization for IoT-driven applications. An intelligent task scheduling model was developed using Moth Flame Optimization (MFO) with Deep Reinforcement Learning (DRL) to classify tasks and provide optimal allocation. The model was trained on real-world and synthetic datasets to ensure accurate and fast decision-making. A comprehensive survey of twenty-four edge computing simulators was conducted to evaluate scalability, functionality, reliability, and usability, helping researchers select suitable tools for various scenarios. Network Digital Twin (NDT) technology was explored, and a detailed data model was proposed to represent Edge–Cloud Continuum (ECC) components for multiple stakeholders. Edge Intelligence (EI) and Mobile Edge Computing (MEC) offloading strategies were analyzed to address

privacy, security, task dependency, and decision-making challenges. The findings demonstrated that integrating edge and cloud computing with intelligent scheduling significantly improved performance, reduced latency, and enhanced Quality of Service (QoS) in distributed networks. The proposed approach also provided practical guidance for optimizing task offloading in MEC, strengthening privacy and security measures in Edge Intelligence systems, and improving the accuracy and utility of Network Digital Twin models. These results offered a unified framework to support sustainable smart city applications, enabling reliable, real-time, and efficient computing across IoT, mobile, and network infrastructures.

OP19. SLT-BASED HYBRID DEEP LEARNING FRAMEWORK FOR VIDEO FORGERY DETECTION

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ABSTRACT

Slantlet transformation (SLT) has emerged as a robust mechanism for video forgery detection. This is accomplished by exploiting both spatial and temporal dependencies within video sequences. Existing techniques uses frame level or handcrafted feature based methods however these methods often fail to capture inconsistencies arising from complex manipulations. These forgeries include frame interpolation, deepfake synthesis, or region replacement. In this work, an SLT based framework is proposed to accurately classify video forgeries through hubrid mechanism of spatial textures and temporal motion patterns. The proposed system uses hybrid deep learning architecture that integrating 3D convolutional encoders with self attention mechanisms. This mechanism will be used to extract discriminative spatio temporal embeddings. Temporal correlations are further improved using *Transformer* units that adaptively handles issues present across consecutive frames. A multi task-based mechanism used in this work by combining binary forgery classification and pixel level spatio temporal segmentation that enables simultaneous detection and localization. The experiments were conducted on benchmark datasets such as FaceForensics++, DFDC, and VideoSham that demonstrate superior performance over conventional CNN RNN models. Furthermore, visualization based interpretability analysis highlights better detection of activation regions corresponding to tampered areas. This confirms the reliability of learned features.

OP20. AN ADAPTIVE YOLO–LSTM FRAMEWORK FOR AUTOMATED DUAL-PHASE PROCTORING IN ONLINE EXAMINATIONS

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ABSTRACT

Ensuring the integrity of high-stakes online medical examinations is critical to upholding professional standards and safeguarding future patient safety. This study presents an End-to-End Behavioral Risk-Ranking Framework (EBRF) for real-time detection and ranking of suspicious behaviors in remote proctored assessments. The framework is trained on a purpose-built dataset comprising 24,563 images that capture 13 distinct facial and ocular behaviors indicative of potential academic dishonesty. At its core, the system employs a YOLOv11 object detector, achieving 0.98 mAP@0.5 and operating in real time at 455 FPS (2.2 ms latency). Each video frame is converted into a 13-dimensional feature vector, which is then processed sequentially by a Long Short-Term Memory (LSTM) network to classify behavioral sequences as suspicious or normal with 91% accuracy. To enhance reliability, an adaptive risk-ranking mechanism further refines the output by filtering out low-confidence detections, leading to a 44% reduction in false or non-critical alerts. Experimental validation on 93,111 video frames across 3,124 behavior sequences collected from five medical students confirms the framework's efficiency and robustness. The proposed EBRF demonstrates a scalable, interpretable, and high-performance solution for maintaining educational integrity in online medical examinations. It provides a data-driven foundation for fair, real-time proctoring, ensuring that certified practitioners meet essential ethical and educational standards.

OP21. ANOMALY DETECTION USING UNSUPERVISED LEARNING IN PIF V3 DATASET

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ABSTRACT

Diverse sectors are producing substantial quantities of data from multiple sources. Models face a considerable challenge in efficiently identifying and recognizing anomalous behavior in real time. Identifying anomalies in human-centric data presents significant challenges due to interindividual variability and the scarcity of authentic anomalous data, which complicates system validation. Generalised and personalised learning paradigms using IF, LOF, OCSVM, and deep learning-based Autoencoder architecture are compared in this study. Generalised models are trained on pooled data from several participants and evaluated on unseen subjects. A subject-specific scenario trains and validates the model, maintaining physiological data consistency. For OSVM and IF, mean accuracies were 91.9 and 89.8, respectively, compared to 72.4 and 72.1 for the generalised models. When data is homogeneous and subject-specific, simpler models can generalise well within a confined domain, eliminating the requirement for deep models' complicated representational power. For subject-specific data, the tailored model outperforms the generic one, according to experiments. Personalised models are essential for precision anomaly identification in situations with considerable inter-subject variability.

OP22. SIMULTANEOUS INFERENCE ON EXPONENTIAL LOCATION PARAMETERS THROUGH STEP-UP CLOSED TESTING PROCEDURE

Mehak[1], Narinder Kumar[1]
[1] *Panjab University, Chandigarh*

ABSTRACT

This study proposes a step-up closed multiple testing procedure for the simultaneous comparison of location parameters among k independent exponential distributions with a common but unknown scale parameter. The method ensures strong control of the familywise error rate (FWER). Exact critical constants are derived analytically for the case of k=3, and for larger populations, simulated critical constants are obtained using Monte Carlo methods to maintain the desired FWER control. The performance of the proposed procedure is evaluated through extensive simulations under various alternative configurations. The results demonstrate that the proposed method consistently achieves higher power compared to existing approaches. A real-data example is also provided to illustrate the practical application and effectiveness of the proposed procedure.

OP23. QUANTITATIVE EVALUATION OF PREPROCESSING TECHNIQUES FOR ENHANCED MAMMOGRAPHIC IMAGE ANALYSIS IN AUTOMATED BREAST CANCER DETECTION

Narender Kumar[1], Anuj Kumar[1]
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ABSTRACT

This study presents an in-depth investigation of preprocessing techniques for enhancing mammographic images from the CBIS-DDSM dataset. Preprocessing is critical for improving image quality and enabling accurate automated breast cancer detection.

Mammographic images frequently contain various noise types, such as salt-and-pepper, speckle, and Poisson noise. These are commonly caused by patient motion, sensor imperfections, or image acquisition conditions. These distortions may obscure fine tissue details, reducing diagnostic reliability. To address these challenges, this study employs a sequence of preprocessing methods. Median filtering is used to remove salt-and-pepper noise, Gaussian filtering smooths speckle noise, Wiener filtering adaptively reduces noise while preserving edges, and Contrast Limited Adaptive Histogram Equalization (CLAHE) is applied to enhance contrast. Additionally, a hybrid Adaptive Median and Modified Decision-Based Median Filter (AMF+MDBMF) is applied to further improve noise suppression and structural detail preservation. Intensity normalization ensures brightness uniformity across images. The performance of these methods is evaluated using quantitative metrics, including Signal-to-Noise Ratio (SNR), Peak Signal-to-Noise Ratio (PSNR), Structural Similarity Index Measure (SSIM), and Mean Squared Error (MSE). Experimental findings show that the applied preprocessing techniques significantly improve image clarity, contrast, and texture homogeneity, making subtle abnormalities more visible and improving overall mammographic image quality. By optimizing the preprocessing stage, this study lays a robust foundation for reliable mammographic image analysis, contributing to more accurate automated breast cancer detection.

OP24. DECODING ARTIFICIAL FRUIT RIPENING: CHALLENGES, RISKS, AND DETECTION STRATEGIES

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ABSTRACT

Artificial fruit ripening has emerged as a significant concern in the agri-food sector due to the increasing use of chemical agents such as calcium carbide, ethephon, and other ethylene-releasing compounds to accelerate ripening. Although these practices address market demands, they compromise the nutritional integrity, sensory quality, and safety of fruits, posing notable public health risks. The phenomenon requires scientific decoding to comprehend its chemical, physiological, and regulatory complexities. The risks linked to artificial ripening extend beyond health implications to include uneven ripening, reduced shelf life, and deterioration of fruit quality. Despite existing regulations, weak enforcement and limited public awareness allow the continued use of prohibited substances. Conventional laboratory-based detection methods, though reliable, are destructive, time-consuming, and unsuitable for large-scale monitoring. Emerging non-destructive and AI-based detection methods offer a transformative means to identify artificially ripened fruits with higher precision and efficiency. These technological interventions provide new opportunities for ensuring fruit authenticity, quality, and consumer safety. This paper critically explores the challenges, associated risks, and detection strategies of artificial fruit ripening. It emphasizes the need for technological innovation, scientific awareness, and stronger policy enforcement to ensure the availability of safe and naturally ripened fruits in the market.

OP25. BRIDGING UNCERTAINTY IN MACHINE LEARNING APPLICATIONS USING FUZZY LOGIC

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ABSTRACT

Machine learning has been able to achieve a lot in various areas such as pattern recognition and making predictions, but it finds it hard to deal with uncertain, ambiguous scenarios with missing information. Most real-life problems are inherently vague and uncertain, which leads to lower accuracy and interpretability in mainstream Machine Learning algorithms. Fuzzy logic, on the other hand, offers a mathematical way to express and deal with vagueness using linguistic rules and degrees of membership. The research presents a conceptual overview of Fuzzy Machine Learning (FML) which is a novel hybrid methodology that integrates the strengths of fuzzy logic and machine learning. It covers five major areas of research: (1) fuzzy classical learning, (2) fuzzy transfer learning, (3) fuzzy data stream learning, (4) fuzzy reinforcement learning, (5) fuzzy recommender systems. The focus is on how Fuzzy Machine Learning increases the robustness, explainability, and real-world efficacy of intelligent systems because Fuzzy logic offers a mathematical foundation for dealing with vagueness and uncertainty, and Machine Learning contributes powerful data-driven learning and predictive capabilities. Integrating fuzzy techniques with machine learning can result in more intelligent, explainable, and effective AI models.

OP26. MARKOV CHAINS, PAGERANK, AND THE ART OF RANKING THE WEB

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ABSTRACT

Google's PageRank algorithm transformed how we search the web by turning the network of links between pages into a mathematical model. Think of each webpage as a point in a vast web, and every link as a path connecting them. This network can be represented using a Markov chain, a simple idea from probability that describes movement between connected states. In this model, a random surfer follows links from page to page, with the Google

Matrix capturing these transitions. A special parameter called the damping factor, often called Google's magic number, keeps the process stable and ensures all pages can be reached. Over time, this random movement reveals which pages are visited most often, forming the basis of Google's ranking system. By blending probability, linear algebra, and clever design, PageRank turned web search into one of the most elegant examples of applied mathematics in the digital world.

OP27. IOT-ENABLED SMART KITCHEN ARCHITECTURE FOR EFFICIENT HOME AUTOMATION

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ABSTRACT

The concept of the Smart Kitchen integrates Internet of Things (IoT) technologies, artificial intelligence (AI), and sensor networks to enhance convenience, safety, and energy efficiency in modern households. This paper presents a comprehensive study on the design and implementation of a Smart Kitchen system that automates cooking processes, monitors food inventory, and ensures optimal energy usage. The proposed system utilizes interconnected smart devices and cloud-based data analytics to provide real-time feedback and personalized cooking recommendations. Experimental results demonstrate significant improvements in user comfort, energy consumption, and kitchen management efficiency. The study highlights the potential of Smart Kitchen ecosystems to transform domestic environments into intelligent, sustainable, and user-centered living spaces.

OP28. A ROBUST AND ADAPTIVE FRAMEWORK FOR ENERGY-EFFICIENT VM CONSOLIDATION IN CLOUD DATA CENTERS

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ABSTRACT

Efficient resource management in cloud data centers requires dynamic consolidation strategies that balance energy efficiency, performance, and Service Level Agreement (SLA) compliance. This research presents a two-stage consolidation framework integrating a Biweight Midvariance Dynamic Threshold (BMDT) policy for adaptive overload detection and a Metric-Based Performance and Resource-Aware Selection (MPRAS) policy for intelligent VM migration decisions. The BMDT policy employs robust statistical estimation to determine adaptive utilization thresholds, minimizing the impact of outliers and transient workload spikes while ensuring stability and responsiveness under varying load conditions. Once overloaded hosts are identified, the MPRAS policy combines heuristic filtering with Analytic Hierarchy Process (AHP)-based multi-criteria decision-making to select optimal VMs for migration, considering factors such as energy consumption, resource contention, migration time, and SLA violations. Experimental evaluation using PlanetLab traces demonstrates that the proposed framework significantly reduces energy consumption, migration overhead, and SLA violations compared to benchmark techniques, achieving balanced and reliable consolidation performance for sustainable Cloud operations.

OP29. SOURCE PRINTER IDENTIFICATION USING VGG16-BASED DEEP FEATURE EXTRACTION MODEL

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ABSTRACT

In the modern digital age, document forensics plays a significant role in verifying the authenticity and origin of printed materials, which is essential in legal, security, and anti-counterfeiting investigations. Among its key branches, source printer identification aims to determine the specific printer that produced a given document. Each printer leaves unique texture patterns and micro-impressions on printed pages, acting as its distinctive signature. In this research, a deep learning-based approach is proposed for effective source printer identification using the VGG16 convolutional neural network as a feature extractor combined with a Support Vector Machine (SVM) classifier. The method includes essential preprocessing steps such as histogram equalization, gamma correction, and resizing to enhance the texture details before feature extraction. The model was evaluated on the DFKI Printing Technique Dataset, which contains 1200 document images printed from 20 different printers. The extracted deep features from VGG16 were trained and validated using k-fold cross-validation with the SVM classifier. The proposed system achieved an accuracy of 85.58%, demonstrating the potential of CNN-based feature extraction for printer source classification. This study provides an effective and automated framework for printer attribution and can be further enhanced through fine-tuning or hybrid feature integration to achieve higher accuracy in real-world forensic applications.

OP30. ADVANCING PREGNANCY CARE WITH MACHINE LEARNING BOX MODELS: INSIGHTS AND TRENDS IN MATERNAL MORTALITY PREVENTION

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ABSTRACT

The development of artificial intelligence (AI) and machine learning (ML) has revolutionized the maternal health care industry, proving more precise predictions, diagnoses, and treatment of pregnancy-related complications. This review examines the use of white box, black box and grey *box models* in the prediction and monitoring of maternal health. Logistic regression and decision trees can be used to explain the data, hence, white *box models* are more appropriate in evidence-based decision-making. Deep learning and ensemble models are black *box models* which are very good in predictive ability and are capable of processing high-dimensional and complex data such as electronic health records and biomedical sensors, but are not often interpretable. Grey *box models* combine the data-driven and mechanistic models, which offer a compromise between accuracy and explainability, because they use the physiological knowledge in the learning algorithms. The review also points out the major use cases such as gestational diabetes prediction to the case of fetal distress, where each type of model has its own strengths. The future is in the creation of hybrid and explainable AI models, which would offer the interpretability of white box systems and the analytical capabilities of black box systems. The review also highlights the need to improve the model interpretability, utilize diverse data sources, and use advanced methods such as explainable AI. The most important issues are the ones concerning the reduction of data bias, greater generalizability, and the ethical implementation.

OP31. DEEP LEARNING-BASED DETECTION OF GUAVA LEAF DISEASES USING EFFICIENTNET-B4

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ABSTRACT

Accurate and early detection of guava leaf diseases is crucial for enhancing crop yield and promoting sustainable agricultural practices. In this study, a deep learning-based approach using the EfficientNet-B4 architecture was employed to classify guava leaf diseases into five

categories: Canker, Dot, Mummification, Rust, and Healthy. A publicly available dataset from Kaggle was used for training, validation, and testing, consisting of high-quality images of guava leaves. Image enhancement techniques were applied to enhance visual quality and highlight discriminative features before model training. *Transfer learning* was utilized to accelerate convergence and achieve higher accuracy. The proposed model achieved 99.78% training accuracy, 97.37% validation accuracy, and 97.20% testing accuracy, demonstrating excellent generalization and robustness. The confusion matrix based on raw prediction counts confirms strong classification performance across all categories, with minimal misclassification, particularly between Canker and Rust. These results suggest that EfficientNet-B4 provides a powerful and efficient framework for automated guava leaf disease classification, with potential for integration into real-time mobile or web-based diagnostic systems to support precision agriculture and timely disease management.

OP32. STROKE TRAJECTORY RECOGNITION USING GRAPH NEURAL NETWORKS

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ABSTRACT

Graph Neural Networks (GNNs) have been demonstrated as an effective machine learning technique for real-world applications. Handwritten recognition represents a valuable area where both offline and online handwriting recognition are essential. The chain code, as a feature extraction method, has shown notable performance in the literature, and we have successfully applied chain codes in conjunction with GNNs. This study introduces a novel approach that integrates handwritten trajectory features represented as chain codes with GNNs. For offline handwritten text, the handwritten trajectories are evaluated through the recovery of the drawing order, whereas online handwritten trajectories are directly processed using chain codes. The results indicate that this combination outperforms previous methods and significantly reduces the error rate within only a few training epochs.

OP33. INTEGRATING AI, MANET AND IOT FOR HIGH SPEED APPLICATIONS: CHALLENGES AND TRENDS

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ABSTRACT

Wireless communication technologies have catalysed a significant surge in innovation and

user connectivity, shaping the route of evolution in today's rapidly evolving technological landscape. In recent years, researchers are exploring on various aspects of wireless communication from sensor networks to under water systems and IoT-MANETs with 5G/6G platform with the aim of developing systems that are more reliable, efficient, and responsive. Despite the promising potential of IoT–MANET convergence, challenges such as dynamic network topology, limited interoperability, and resource constraints remain significant obstacles. This study investigates adaptive strategies designed to address and mitigate these limitations. In response to these challenges, Q-Learning-based Topology-Aware Routing Protocol (QTAR), the Dynamic GATT-Based Data Synchronization Protocol (DynGATT), and the Low-Threshold and Powerful Network Performance Design Protocol have been analysed and these bio inspired approaches have enabled networks to learn and adapt based on environmental conditions. In addition to enhancing connectivity in remote and disaster-affected regions, these also address critical security concerns through models capable of detecting and preventing threats like sink replication attacks but still faces limitation of accuracy mobility prediction. Due to the introduction of machine learning, managing resources, decision making and mobility prediction has become more accurate with support tools like transformer models and Shapley Additive explanations (SHAP). This study further investigates techniques such as stochastic geometry, MAC scheduling, and Markov modeling, that enhance network coverage, energy efficiency, and service quality. The integration of these innovations promises to shape the future of wireless communication systems to be more resilient, sustainable, and intelligently adaptive.

OP34. SENTIMENT ANALYSIS OF DEMONETIZATION DISCOURSE: EVALUATING THE ROLE OF TEXT PREPROCESSING IN MODEL PERFORMANCE

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ABSTRACT

The 2016 demonetization in India sparked an extraordinary wave of online discussion, capturing a wide spectrum of public emotions, opinions, and socio-economic reactions across social media platforms. This study conducts an in-depth sentiment analysis of posts and comments related to demonetization, collected from Twitter, Facebook, and YouTube, to explore how different text preprocessing techniques affect model performance. The dataset used was downloaded from Kaggle. A series of preprocessing steps—such as tokenisation, stop-word removal, stemming, lemmatisation, hashtag and emoji

normalisation, and noise reduction—were applied and systematically compared. Sentiment classification was carried out using both lexicon-based methods (VADER, TextBlob) and machine learning models (Logistic Regression, Support Vector Machine, and Random Forest). The experimental analysis revealed that thorough preprocessing substantially improved accuracy and F1-scores, with optimised normalisation achieving gains of 9–12% compared to unprocessed data. These results highlight the crucial role of linguistic cleaning and normalization in analyzing informal, multilingual social media text. Overall, the study underscores the importance of preprocessing in building reliable sentiment analysis systems and offers insights for understanding public opinion during large-scale socio-economic events.

OP35. FROM LINGUISTICS TO LLMS: EVOLUTION OF MULTIMODAL AND EXPLAINABLE AI MODELS FOR FAKE NEWS DETECTION

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ABSTRACT

The evolution of fake news detection has now shifted from easy linguistic and feature-based methods, to hybrid, deep learning, and multimodal frameworks. Early methods were based on weak lexical cues and clickbait cues and provided a high level of accuracy, but were not domain adaptable. Other studies started applying convolutional and recurrent neural models with near state-of-the-art levels of accuracy. Hybrid systems that combine BERT, Bi-LSTM, and FastText embeddings work better in capturing the contextual cues in the information. Explainable frameworks such as dEFEND and SHAP-based ensembles provided explanations for models being used for these decisions, which added to the trustworthiness of the automated decisions. Current research has expanded to multimodal and cross platforms using transformers, attention, and optimization algorithms, allowing for context and better identifying cues while performing better and being more scalable. Large Language Models (LLM) such as GPT-4 are now showing amazing levels of accuracy when fine-tuned, and yet remain untrustworthy due to their level of accuracy when un-trained and zero-shot. In addition to advancing technology, these developments have significant positive social effects, such as promoting informed citizenship, reducing division of society brought on by misleading information, and enhancing the credibility of online media environments. Gaps still arise in regards to the small quantities of multilingual and multimodal datasets, lack of generalization, the ability to identify AI-generated misinformation, and therefore we are in need of explainable, multilingual, and adversarially robust systems.

OP36. A UNIFIED FRAMEWORK FOR EARLY HEART ATTACK PREDICTION USING MACHINE LEARNING ALGORITHMS

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ABSTRACT

The most common and potentially fatal cardiac condition is myocardial infarction (MI), which causes the heart muscle's blood supply to be blocked. Due to model limitations when trained on single datasets and patient information heterogeneity, early and accurate prediction of MI remains a significant issue in clinical settings. Combining data related to many features, such as clinical, behavioral, cardiac biomarker, etc. is crucial for the precise prediction of heart attack because all these features play a role in MI prediction. Thus, the objective of the research is fourfold and is as follows:First, based on a thorough literature survey, the study report highlights the conventional machine learning techniques for early heart attack prediction. The second step is to create a framework for early prediction of heart attack based on various machine learning algorithms. Thirdly, to assess the suggested framework's model performance using a variety of multimodal data sources. Finally, to identify the best machine learning method for early heart attack prediction, the results of the suggested framework based on multimodal data will be analyzed. To evaluate model robustness and flexibility, several machine learning classifiers like Logistic Regression, k-Nearest Neighbours (k-NN), Support Vector Machine (SVM), Random Forest, XGBoost, and Naive Bayes were trained and evaluated independently on each dataset. The findings showed that while classifiers like SVM, Naive Bayes, Logistic Regression, and k-NN performed rather poorly for heart disease prediction throughout multimodal datasets, Random Forest and XGBoost performed quite consistently across datasets.

OP37. OPTIMIZING MAIZE YIELD PREDICTION IN PUNJAB: A COMPARATIVE MACHINE LEARNING FRAMEWORK FOR REGIONAL FORECASTING

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ABSTRACT

Maize, Punjab's vital crop, spanning around 1.2 lakh hectares and contributing approximately â,¹5,000 crore annually, faces yield losses of 15-20% due to erratic monsoons and soil degradation, threatening food security. Accurate prediction models are essential for maize yield forecasts in the Indo-Gangetic Plains. This study develops a machine learning

framework for maize yield forecasting tailored to Punjab's agro-climatic variability, integrating historical yields, remote sensing, and weather data. Therefore, the objectives of the research are: firstly, to conduct a comprehensive literature review of state-of-the-art techniques such as Random Forest, Support Vector Machine (SVM), Artificial Neural Networks (ANN), CNN-LSTM, etc. Secondly, to compare the outcomes of major techniques over Punjab datasets using standard metrics like R^2 and RMSE. Thirdly, to identify an optimal technique through multi-criteria evaluation, prioritizing robustness for regional deployment. Preliminary results, evaluated on 2010-2024 Punjab data, identified that XGBoost performed better with $R^2=0.92$ and RMSE=0.45 t/ha, outperforming Random Forest by 12%, SVM by 15%, ANN by 10%, and LSTM by 8%, enabling early-season forecasts for 10% yield optimization. This research work advances precision agriculture in Punjab, supporting farmer decision-making amid climate challenges.

OP38. BIVARIATE GENERALIZED LINEAR EXPONENTIAL–WEIBULL (BGLEW) DISTRIBUTION BASED ON CONCOMITANTS OF GENERALIZED ORDER STATISTICS

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ABSTRACT

Concomitants of order statistics represent the associated random variables that arise when another variable is ordered, and they provide valuable insights into the dependence structure between paired observations. In this paper, we study the bivariate generalized linear exponential–Weibull (BGLEW) distribution through the framework of concomitants of generalized order statistics (GOS). The paper focuses on deriving explicit expressions for both the product and single moments of the distribution by utilizing the properties of the concomitants of GOS. Furthermore, numerical computations of the mean and variance are carried out for different value of parameters. Finally, to demonstrate the practical utility of the proposed distribution, we applied our findings to two real data sets.

OP39. A CRITICAL ANALYSIS OF RECENT PLAGIARISM DETECTION TECHNIQUES IN TEXT

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ABSTRACT

Plagiarism checkers have gained increasing attention in recent years. The exponential growth of AI-generated text and digital information has intensified the challenge of detecting plagiarism across academic and professional domains. This paper presents an integrated

framework that unifies semantic-syntactic analysis, feature selection, and supervised learning to enhance text plagiarism detection. The study integrates the semantic relatedness model that exploits lexical databases such as WordNet for cognitive-inspired computing, with *Support Vector Machine* (SVM)-based hyperplane classification using optimized feature selection via the Chi-square method. The system captures lexical, syntactic, and semantic similarities to identify paraphrasing and sentence restructuring. The majority of the studies that describe algorithms for lexical, syntactic, and semantic detection make use of the PAN datasets. Since detecting plagiarism involves retrieving information, approaches for evaluating plagiarism detection are commonly based on precision, recall, and F-measure. The overall analysis concludes that the most promising direction for future research lies in combining multiple analytical methodologies encompassing both textual and nontextual content features.

OP40. MATHAIR: A COMPREHENSIVE DATASET OF IN-AIR HANDWRITTEN MATHEMATICAL EXPRESSIONS

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ABSTRACT

This work presents AirMath, a freely available dataset of mathematical expressions written in mid-air using finger movements. The collection includes 800 samples from 15 participants, each capturing detailed 2D finger-trajectory data. We describe how the dataset was built from the recording setup and participant guidelines to the annotation process that provides precise LaTeX ground truth for every expression. AirMath spans a wide variety of mathematical symbols and structures, reflecting how people naturally "write" equations in space. We believe AirMath will support research on gesture-based mathematical input, VR/AR interfaces, human–computer interaction, and educational or accessibility tools that translate gestures into written mathematics. To make expansion easy, we've also created a Python-based data-collection tool, allowing others to contribute new samples and extend the dataset. Both the dataset and the tool are available at:https://github.com/ujj-w-a-l/AirMath.

OP41. AN ANALYSIS FROM CNNS TO TRANSFORMERS AND MAMBA: EVOLUTION OF METHODS FOR HYPERSPECTRAL IMAGE CLASSIFICATION

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ABSTRACT

Hyperspectral Image Classification (HSIC) has witnessed a lot of methodological changes in a

short span of time that include classic 2D/3D convolutional neural networks that maintained strong local spectral-spatial priors, transformers that added powerful long-range dependency modeling, and the newest state space Mamba models and their variants that offer transformer-like sequence modeling at a drastically low cost. This analysis outlines the evolution of hyperspectral image classification by integrating new developments in spectral-spatial fusion, lightweight design, and hybrid architectures. We categorized techniques based on the primary strategies, which are convolutional inductive biases, tokenization and pooling, kernel/linearized credential attention, spectral grouping and compression (PCA/Autoencoders) depthwise/pointwise convolutions, residual and morphological operators, and state-space modeling (Mamba/HyperSMamba/MorpMamba). For each class, this paper outlined common methods, experimental setups such as Indian Pines, Pavia University, and Salinas, common practices to evaluate (OA /AA/Kappa), and then compare tradeoffs of each in terms of accuracy, parameter cost, and runtime. This paper also highlighted research gaps that are identified during analysis, like keeping narrowband spectral cues under heavy compression, per-class imbalance, cross-sensor generalization, and consistent hardware-aware reporting, and also highlighted useful trends like hybrid conv-transformer pipelines, token-level compression, FFT/agent-token linearization, and few-shot/lightweight designs. This paper presents a short list of suggestions for making HSIC systems that are efficient and strong as well as a list of the most important open research gaps that still need to be solved before they can be used on edge platforms and in cross-domain scenarios.

OP42. A SURVEY ON NAMED ENTITY RECOGNITION TECHNIQUES FOR INDIAN LANGUAGES

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ABSTRACT

Named Entity Recognition (NER) play a very important role in Natural Language Processing (NLP) for tasks such as question answering, information retrieval, text summarization and machine translation. There is abundance of information available on the internet in many languages. Large amount of information makes it difficult to extract information. NER is the process of identification and classification of named entities from a given data such as Person, Location, Organization. Significant progress has seen in NER for English language and other resource- rich languages, while Indian languages face many challenges due to the linguistic diversity, rich morphology, limited datasets and complex syntactic structures. This paper explores the development, challenges of NER system across Indian Languages. The study categorizes approaches into Rule-based, Machine Learning, Deep Learning, Transfer

Learning and Hybrid approaches. Experimental results from benchmark datasets demonstrate various models include deep learning models, hybrid models, transformer-based models, outperforms traditional models.
Keywords: Natural Language Processing, Named Entity Recognition, Indian Languages.

OP43. A COMPARATIVE PERFORMANCE ANALYSIS OF DIFFERENT APPROACHES FOR WORD SENSE DISAMBIGUATION IN THE HINDI LANGUAGE

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ABSTRACT

Word Sense Disambiguation (WSD) remains a pivotal and unresolved challenge in the domain of Natural Language Processing (NLP), primarily due to the inherent semantic ambiguity present in natural languages. Effective resolution of lexical ambiguity is critical for improving the accuracy and efficiency of several NLP applications, including machine translation, information retrieval, text mining, and semantic analysis. The Hindi language, widely used across India for written and spoken communication, exhibits significant lexical ambiguity arising from its rich morphology and contextual variability. Despite its linguistic and cultural significance, research in Hindi WSD has received relatively limited attention. This paper presents a comprehensive comparative performance evaluation of various WSD approaches—knowledge-based, supervised, and unsupervised—applied to the Hindi language. The study systematically analyzes the strengths, limitations, and performance metrics of each approach, thereby contributing to the advancement of robust and context-aware disambiguation techniques for Hindi NLP applications.

OP44. TEXT ENCODER SENSITIVITY ANALYSIS FOR TEXT-TO-FACE GENERATION USING GAN MODELS

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ABSTRACT

Text-to-face generation involves developing generative AI-based models that take text as input and generate a human face. The current state-of-the-art text-to-face generation models use Generative Adversarial Networks (GANs), Variational Autoencoders (VAEs), or transformers. Text encoders like BERT, BiLSTM, and CLIP are used to generate text

embeddings to condition and control the generative process for face images. One limitation of these models is that the training datasets, text encoders and benchmark models use captions of limited context. The text captions used in this process are generated from attributes of the faces by using algorithms to convert the attributes into captions. In this study, we will evaluate the efficiency and sensitivity of various text encoders used in text-to-face generation, focusing on the quality of the textual information. The present study uses different GAN-based models for text-to-face generation with available text encoders. It analyses the impact of various text encoders on the accuracy of the generated facial images. The study will examine the results on the semantic similarity, inception score, structural similarity and overall human perception. This work will guide the researchers in understanding the limitations of existing language encoders for specific face descriptions and in defining a roadmap towards developing better text captions and embeddings to improve the accuracy of text-to-face generation models.

OP45. EVALUATION OF MACHINE LEARNING MODELS FOR PREDICTING AND CLASSIFYING RIVER WATER QUALITY IN INDIA

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ABSTRACT

Water quality is very important for people's health, farming, and industries, so it's important to have good ways to check it. Old ways of testing are usually slow ,doing tests in a lab can take a long time and cost a lot, so people are looking for faster and better ways. This study looks at how different ML methods work, including both types of models used for classification and prediction. Classification models like K-Nearest Neighbors (KNN), Support Vector Machines (SVM), Random Forest Classifier (RFC), Artificial Neural Networks (ANN), boosting methods are used to sort water samples into safe or polluted based on factors such as pH, temperature, DO(Dissolved oxygen), conductivity, BOD(Biological Oxygen Demand), nitrate, and coliform. Regression models such as ARIMA and Ridge Regression are also used to predict specific water quality features based on other measured parameters. The models' success is checked using accuracy, F1-score, RMSE, and R^2. The study found that using machine learning is a good and fast way to check water quality, which helps make decisions quicker and keep track of water conditions in real time for better environmental care and health protection.

OP46. MULTI-SENSOR REMOTE SENSING FOR FLOOD AND AGRICULTURAL RESILIENCE MAPPING

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ABSTRACT

Floods are among the most recurrent natural hazards affecting the agricultural plains of northern India, particularly the Punjab region. This study aims to delineate, analyze, and assess the spatial–temporal dynamics of flood inundation and its impact on crop conditions using multi-sensor satellite data. Synthetic Aperture Radar (SAR) data from Sentinel-1A has been utilized to accurately map flooded areas under monsoon cloud cover, while optical data from Resourcesat-2 (AWiFS and LISS-III) has been employed to evaluate vegetation health through spectral indices such as NDVI. The study highlights the potential of multi-temporal Earth observation data for flood hazard mapping, impact assessment, and the development of predictive frameworks for future flood risk management.

OP47. SENTINEL AI: A DUAL-ACTION SELF-EVOLVING FRAMEWORK FOR CYBER DEFENSE

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ABSTRACT

In an era of escalating cyber threats, static intrusion detection systems (IDS) remain inadequate against adaptive adversaries. Sentinel AI presents a self-evolving cybersecurity framework that performs simultaneous detection and prevention of anomalies using a dual-action learning architecture. The framework integrates unsupervised anomaly detection (Autoencoders + Isolation Forest) inspired by Zou et al. (2025) who combined CNN and wavelet transforms for industrial system protection, and Hu et al. (2023) who applied self-attention mechanisms for adaptive anomaly recognition. Its reinforcement-learning-driven defense module, validated by Wang et al. (2022), autonomously executes countermeasures such as dynamic IP isolation, firewall adaptation, and credential revocation in real time. A self-training subsystem periodically retrains using updated benchmark datasets (UNSW-NB15, CICIDS-2017) to adjust detection thresholds and policy weights based on threat drift, reflecting the continuous-learning paradigm proposed by Liu et al. (2024) in autonomous defense networks. Implementation employs Python, PyTorch, and MongoDB for orchestration and logging. Controlled-lab evaluations aligned with Yu et al. (2024) confirm over 94% detection reliability and sub-second

(≈0.6 s) mitigation latency. By uniting real-time analytics, reinforcement-based decision-making, and adaptive threat modeling, Sentinel AI demonstrates a credible step toward self-governing cyber defense ecosystems. Its modular design enables future integration of federated learning and distributed threat intelligence, bridging Chinese-led depth in cyber defense research with Western infrastructure-oriented AI implementations.

OP48. IDENTIFYING HIGH-RISK GROUPS AND DETERMINANTS OF MOTOR INSURANCE UPTAKE

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[1] Department of Statistics, Panjab Unversity, [2] Department of Statistics, Panjab University

ABSTRACT

This study focuses on identifying high-risk groups and examining the factors that influence individuals to claim motor insurance. The main objective is to analyse demographic, socio-economic, and behavioral variables to understand their impact on motor insurance uptake and claim risk levels. Using statistical analysis and modeling techniques, the research explores how characteristics such as age, driving experience, vehicle type, and regional background relate to the likelihood of holding or claiming motor insurance. The findings aim to assist insurers in improving risk assessment, designing fair and targeted premium strategies, and promoting safer driving behavior. Overall, the study provides valuable insights into the dynamics of risk and decision-making within the motor insurance sector, contributing to more effective and data-driven policy development.

Keywords: Motor Insurance, Risk Assessment, High-Risk Groups, Claim Prediction, Statistical Modeling

OP49. ADOPTION OF DIGITAL PAYMENTS IN PUNJAB, HARYANA AND UT CHANDIGARH- PROGRESS AND CHALLENGES

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ABSTRACT

My study aims to explore both consumer and merchant perspectives towards digital payment adoption showcasing both progress and challenges and also analysing district-wise adoption patterns, including a good sample size, evaluating policy impact in structured and data-driven manner. Various statistical techniques have been used to do the analysis of both primary as well as secondary data. It is followed by policy recommendations for strengthening digital payment adoption from both customer as well as merchant point of view.

OP50. SAFE TO SIP? USING MACHINE LEARNING TO PREDICT WATER POTABILITY

Harmanjot Kaur[1]

[1] *Department of Statistics, Panjab University, Chandigarh*

ABSTRACT

Is the water we are drinking safe? Access to safe drinking water is a fundamental human right, yet billions globally still lack it. We will explore how machine learning can be leveraged to predict water potability based on physicochemical parameters such as pH, turbidity, hardness, and more. Using a dataset comprising 10 key water quality indicators, We will explore and apply logistic regression and various machine learning models—including decision trees and random forests—to classify water samples as potable or non-potable. Through exploratory data analysis , feature importance evaluation, and model performance comparison, we demonstrate the potential of data-driven approaches in environmental monitoring. Our findings highlight the feasibility of integrating AI into water quality assessment systems, offering a scalable solution for early detection and prevention of waterborne health risks.

OP51. BENFORD'S LAW: THE SURPRISING PATTERN HIDDEN IN NUMBERS

Kashish Taank[1]

[1] *Department of Mathematics, Panjab University, CHD*

ABSTRACT

Benford’s law, also known as the Law of Anomalous Numbers, describes a surprising pattern found in many real-world datasets—smaller digits occur more frequently as the leading digit as compared to the larger digits. Benford’s Law posits that in many natural datasets, the leading digit “1” appears about 30.1% of the time, a frequency that logarithmically drops for the higher digits. This predictable distribution acts as a statistical “digital fingerprint” for data integrity. Its scale-invariant nature makes it applicable across diverse data such as populations, financial figures and scientific measurements. Today, Benford’s law allows auditors to instantly highlight which data sets are suspicious, enabling them to prioritise target for complex fraud investigation. This presentation shows how the predictable pattern given by Benford’s law is a powerful weapon against fraud, demonstrating how mathematics uncovers hidden patters in seemingly random numbers.

OP52. WHAT YOU WEAR IS WHAT YOU REAP: A STATISTICAL ANALYSIS OF FALSE SUSTAINABILITY

Niharika[1], Shivani[1]
[1] *Student, Department of Statistics, Panjab University*

ABSTRACT

The paper explores the idea of fast fashion and its adverse effect on the environment. With fashion trends changing every day and high end fashion brands releasing new collections to stay relevant, the idea of sustainability has taken a back seat. Even though some brands claim that their products are sustainable in nature, it is far from the truth. The paper uses data from different sources to support the argument of false eco friendly narrative. The paper also delves into and analyzes the influence of social media trends in the growing fast fashion trends. The role of synthetic dyes, garment dumping, burning, water and energy usage, which is a result of over consumption and over production, and their hazardous consequences on the environment has also been discussed using appropriate datasets and required statistical techniques. A comparative case study of different fast fashion brands launching movements like H&M conscious, Zara join life has also been debated. Lastly, various positive steps that have been taken in this direction have also been discussed.

OP53. BLOCKCHAIN AS A CATALYST FOR FINANCIAL TRANSFORMATION: A STUDY ON TRANSPARENCY, COST REDUCTION, AND TRUST2

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ABSTRACT

The increasing complexity of global financial systems has exposed persistent inefficiencies, including transaction delays, high intermediary costs, data manipulation risks, and a growing lack of trust among stakeholders. Despite technological progress, traditional financial institutions continue to depend on centralized intermediaries such as banks and clearing houses, which not only elevate operational expenses but also limit transparency and resilience. These challenges underscore the urgent need for a more secure, transparent, and decentralized alternative. In response to these systemic shortcomings, this study explores how Blockchain technology—with its decentralized architecture and tamper-resistant ledger—can redefine the financial ecosystem. The research examines Blockchain's

transformative potential across digital payments, trade finance, asset management, and fraud prevention, focusing on how its core attributes—immutability, transparency, and distributed consensus—can directly mitigate existing inefficiencies. The paper evaluates Blockchain's capacity to enhance cross-border payment efficiency, strengthen trust mechanisms, and reduce transaction costs. However, challenges related to scalability, regulatory compliance, and integration with existing financial infrastructures remain critical areas for further research. By bridging technological innovation and financial operations, this study aims to contribute to the ongoing discourse on leveraging emerging technologies to enhance trust, reduce inefficiencies, and modernize traditional financial systems.

Keywords: Blockchain, Financial Technology, Transparency, Cost Reduction, Trust, Decentralized Finance, Cross-Border Transactions, Digital Payments, Financial Transformation

OP54. BAYESIAN NETWORKS FOR DECISION MAKING UNDER UNCERTAINTY

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[1] *Department of Statistics, Panjab University, Chandigarh*

ABSTRACT

In real life, many decisions must be made with incomplete or uncertain information. Bayesian Networks (BNs) provide a structured way to model such uncertainty using probability and graphical relationships between variables. This study explores how Bayesian Networks can support decision-making when data is uncertain or partially known. A simple BN model was developed using open-source tools to demonstrate probabilistic reasoning. Variables such as weather conditions and traffic were connected through conditional dependencies, allowing the system to estimate the likelihood of outcomes based on partial evidence. For example, when cloudiness increases, the model dynamically updates the probability of rain, which in turn affects the estimated chance of traffic congestion. The network's inference mechanism uses Bayes' theorem to update beliefs as new data becomes available, illustrating how rational decisions can be made even in the presence of uncertainty. The results highlight that Bayesian Networks offer transparency, adaptability, and interpretability compared to traditional machine learning models. This project emphasizes that such networks can be effectively applied to real-world domains like healthcare, finance, and weather forecasting, where uncertain information is the norm. The approach balances mathematical rigor with intuitive visual understanding, making Bayesian reasoning a valuable tool for modern decision-making.

OP55. PIONEERS IN UNIFYING MATHS AND PHYSICS

Radhika Aggarwal[1]
[1] *Punjab University*

ABSTRACT

Mathematical physics bridges the abstract world of mathematics and the empirical realm of physics . The physicists, dedicated to this field, knows as mathematical physicists, underpins many of the most profound scientific theories. ISSAC NEWTON, often considered as "THE FATHER OF MATHEMATICAL PHYSICS", unified celestial and terrestrial motion through calculus and laws of motion. ALBERT EINSTEIN revolutionized our understandings of space and time with theory of relativity using different geometry to describe gravity as the curvature of space time. Also, PAUL DIRAC, merged quantum mechanics and special relativity predicting the existence of anti matter. In addition, SATYENDRA NATH BOSE is renowned for his work quantum statistics which led to, "BOSE EINSTEIN STATISTICS", and his concept of bosons. MEGHNAD SAHA introduced the "SAHA IONISATION EQUATION", a corner stone in astrophysics that explains the spectral classification of stars based on their temperature and ionisation states. Through thier precise formulations, mathematical physicists not only deepens our understandings of universe but also inspire new mathematical discoveries highlighting the symbiotic relationship between the two.

OP56. RIPPLE EFFECTS OF U.S. TARIFFS ON INDIA’S ECONOMY

Samriddhi Jain[1], Arpita Jain[1]
[1] *Panjab University*

ABSTRACT

This project investigates the impact of recent U.S. tariff policy changes—particularly the major tariff hikes and reciprocal-tariff measures introduced in 2025—on India’s macroeconomic performance, with a primary focus on Gross Domestic Product (GDP). The study aims to understand how external trade shocks originating from the U.S., one of India’s key trading partners, influence India’s economic growth. The analysis captures both the pre- and post-policy phases, allowing for a comprehensive assessment of the policy’s short-term disruptions and potential long-term structural adjustments. Methodologically, the project employs a mix of advanced econometric frameworks, including Interrupted Time-Series (ITS) analysis, Difference-in-Differences (DiD) estimation, and Vector Autoregression

(VAR) modeling. The ITS approach identifies any immediate changes in India's GDP trend following the tariff shocks, while the DiD method compares India's experience with that of similar economies less affected by the U.S. tariff measures, providing a robust causal estimate. The VAR framework further examines dynamic interlinkages and feedback effects across macroeconomic variables to capture ripple effects within the Indian economy. Finally, the study generates counterfactual forecasts to estimate what India's GDP trajectory might have been in the absence of these tariff shocks, offering valuable policy insights for trade resilience and macroeconomic stability.

OP57. FROM RUSSELL'S PARADOX TO CANTOR'S THEOREM

Tanya Ghai[1]
[1] *Department of Mathematics, Panjab University Chandigarh*

ABSTRACT

In this presentation, I will explore two fundamental ideas : Russell's paradox and Cantor's theorem. The idea is to understand how certain naive assumptions about sets can lead to contradictions. Russell's paradox shows that if we try to define "set of all sets which don't contain themselves"we get a contradiction, on the other hand cantor's theorem tells us that power set of a set is always larger than set itself. Main idea is to show how a similar reasoning appears in both paradox and proof of the theorem. The conclusion emphasizes on how understanding this concept deepens our grasp in set theory.

OP58. PREDICTING THE FUTURE OF AIR: A MACHINE LEARNING APPROACH TO AQI FORECASTING IN DELHI AND CHANDIGARH.

Yash Kumar[1], Kashish Malhotra[1]
[1] *Department of Statistics, Panjab University, Chandigarh.*

ABSTRACT

Air pollution is a severe public health emergency in North India, with cities like Delhi and Chandigarh facing distinct air quality challenges. Accurate Air Quality Index (AQI) forecasting is essential for issuing timely public health advisories and enabling effective policy implementation. This study presents a comparative analysis of AQI prediction for Delhi, a megacity with complex pollution sources, and Chandigarh, a planned city with a different urban environment. We employ a dual methodology, utilizing both statistical

models and machine learning algorithms. By analyzing historical air quality and meteorological data, this research aims to not only develop robust forecasting models but also to identify and compare the key factors and pollutants that drive AQI fluctuations in each city. The findings will provide crucial insights into the unique pollution dynamics of these two urban areas and contribute to the development of more precise, city-specific predictive tools. This work supports the goal of using technology to improve public health outcomes and environmental management.

OP59. BLOCKCHAIN FOR PREVENTING RUMOR PROPAGATION ON SOCIAL MEDIA

Gurnoor Kaur[1], Deepti Sharda[2], Ritika Bansal[2]

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ABSTRACT

In today's digital landscape, social media has become a dominant channel for information sharing, but also a significant source of rumors and misinformation. The rapid spread of unverified content often leads to confusion, social unrest, and loss of public trust. Traditional content moderation systems, which rely on centralized verification, struggle to ensure authenticity and accountability once information goes viral. This paper presents a theoretical exploration of how blockchain technology can be leveraged to mitigate the propagation of rumors on social media platforms. Through a conceptual and exploratory methodology, the study reviews and synthesizes existing literature on blockchain, information security, and social media trust mechanisms. It then maps blockchain's core attributes — immutability, decentralization, and consensus validation — to the social process of rumor dissemination. This paper demonstrates how blockchain can help verify information sources, trace content origins, and maintain transparency in the flow of digital communication. The analysis highlights that integrating blockchain into social media ecosystems could enhance reliability, accountability, and resistance to misinformation. The paper concludes that blockchain offers a promising theoretical foundation for developing more trustworthy social media platforms. However, issues related to scalability, user participation, and integration challenges remain key areas for further study. By bridging technology and social communication, this work aims to contribute to the ongoing discourse on using emerging technologies to safeguard truth in the digital age.

Abstracts of Poster Presentations

Poster Presentation- Mathematical Sciences		
PP1	Mr. Manit Malhotra	A Cost-Effective Tiered Proctoring Framework for Machine-Learning-Based Cheating Risk Assessment in Online Examinations
PP2	Ms. Chandrima Seal	The AI Gold Rush: A Monte Carlo Simulation Forecasting the Implosion Probability of Indian AI Startups & its Market Impact
PP3	Mr. Manveer Singh	Ayush: a helping hand
PP4	Mr. Shivnandan	Empowering Healthcare Decisions through Bayesian Statistics

ABSTRACTS OF POSTER PRESENTATIONS

PP1. A COST-EFFECTIVE TIERED PROCTORING FRAMEWORK FOR MACHINE-LEARNING-BASED CHEATING RISK ASSESSMENT IN ONLINE EXAMINATIONS

Manit Malhotra[1], Indu Chhabra[1]
[1] *Department of Computer Science and Applications, Panjab University, Chandigarh, India*

ABSTRACT

This research introduces a tiered proctoring framework designed to enhance the efficiency and fairness of online exam monitoring. The framework integrates Gaussian Mixture Models (GMMs) and changepoint detection techniques, combined with carefully engineered behavioral and interaction-based features, to classify students into high-, medium-, or low-risk categories of potential academic dishonesty. Each category corresponds to a customized level of proctoring intensity, allowing institutions to allocate monitoring resources more effectively while maintaining academic integrity. The proposed system was validated using expert-labeled datasets and achieved an impressive 94% accuracy in identifying students at risk of cheating. Beyond its strong predictive performance, the framework demonstrates substantial potential for operational cost savings, reducing proctoring-related expenses by up to $6,250 per 1,000 low-risk students without compromising exam security. By combining statistical modeling with adaptive proctoring strategies, this approach advances current practices in remote assessment management. It offers a scalable and data-driven solution that balances security, cost efficiency, and fairness, ensuring that low-risk students experience minimal intrusion while high-risk cases receive appropriate scrutiny. The results highlight the framework's promise as a practical tool for modern educational institutions seeking to uphold integrity in large-scale online examinations.

PP2. THE AI GOLD RUSH: A MONTE CARLO SIMULATION FORECASTING THE IMPLOSION PROBABILITY OF INDIAN AI STARTUPS & ITS MARKET IMPACT

Chandrima Seal[1]
[1] *Panjab University, Chandigarh*

ABSTRACT

With the rapid AI explosion from the early 2020s, the global market has seen a new boom in this brand new era of technology. Indian investors too, have generously funded the budding AI startups, with hopes of its prosperous future. This however is not the 1st time where a technological advancement is being celebrated in the stock market. The rise of the internet in the early 2000s led to a similar situation as we witness today, leading to dramatic increase in the asset price above their intrinsic value of the internet tech companies, which led to its eventual collapse, popularly in the west known as the '*Dot-com crash*' This is a classic example of a '*Black Swan Event*'. The purpose of the study is to identify any visible precursors, if exists, in the current AI market. To achieve the same, financial data such as valuations, revenues, user metrics, P/E ratios etc of the top grossing Indian AI companies are under study, which will be crucial for the core model building using python and R programming. To replicate a realistic simulation, model it with higher volatility, such as log-normal distribution, will be inculcated, along with a small probability of a shock event. Further using Monte Carlo simulation, runs will be simulated which will provide the aggregate valuation of the simulation. Based on the simulation results, it can be concluded whether an AI startup crash is a "true" black swan or a "foreseeable shock".

PP3. AYUSH: A HELPING HAND

Manveer Singh[1]

[1] *Student*

ABSTRACT

The poster is prepared to represent and envision the schemes run for the group that is the largest contributor to the workforce of contemporary India, i.e. Daily Wage Workers. Healthcare is guaranteed to every citizen of India as Fundamental Right enforced by the Constitution. The set up of government hospitals colleges to fund easy & accessible health facilities is carried out throughout the nation. But still our nation is far from realising the standards of world class health system. The poster is based on the raw data available collected through the technique purposive random sampling aims to represent the actual image of healthcare accessibility to daily wage workers. Numerous Schemes and the hurdles towards adapting them is also expressed in the poster.

PP4. EMPOWERING HEALTHCARE DECISIONS THROUGH BAYESIAN STATISTICS

Shivnandan Rikhee[1]

[1] *Department of Statistics, Panjab University.*

ABSTRACT

When a Positive Isn't What It Seems: Bayes, Prevalence, and Medical Testing Diagnostic tests are used to discriminate disease from health, but the posterior probability that a patient truly has a disease given a positive test (the Positive Predictive Value, PPV) depends critically on test characteristics and disease prevalence. Using Bayes’ theorem, it can be proven how even highly accurate tests can produce numerous false positives when the disease is rare, and how incorporating pretest probabilities or sequential testing can improve diagnostic reliability. Analytical expressions, a detailed numerical example, simulation results, and PPV–prevalence curves are presented to highlight the real-world implications for screening strategies and clinical decision-making.

PHARMACEUTICAL SCIENCES

- **University Institute of Pharmaceutical Sciences**

Sectional President
Dr Jai Malik

Sectional Secretary
Dr Ashok Kumar Yadav

CHASCON 2025

NATIONAL CONFERENCE ON

"*Empowering Humanity:*
Science, Technology, and Healthcare for All

November 06 - 08, 2025

Section: Pharmaceutical Sciences

Program

November 07, 2025

Venue: University Institute of Pharmaceutical Sciences

Sectional President	**Sectional Secretary**
Name – Jai Malik Mobile - 9915093938	Name – Ashok Kumar Yadav Mobile - 8795825476

Time	**Program**
09:00-09:45	Display of posters by participants **Venue:** University Institute of Pharmaceutical Sciences Lawns
09:45-10:00	Inauguration of Sectional Program ***Venue: Lecture Hall 1, Prof. K. N Gaind Block (Extension Block), University Institute of Pharmaceutical Sciences.***
10:00-11.00	**Session Chair: Professor V R Sinha** **Speaker: Professor Sanjay Jachak** **National Institute of Pharmaceutical Education and Research, Mohali** ***Title " Application of Ayurinformatics and Sophisticated Analytical Techniques in Research and Development of AYUSH Medicine and Natural Products"***
11.00-11.15	**Question-Answers**
11:15-12:00	Tea Break
12:00-13:00	Oral Presentation ***Venue: Lecture Hall 1, Prof. K. N Gaind Block (Extension Block), University Institute of Pharmaceutical Sciences.*** Poster Presentation **Venue:** University Institute of Pharmaceutical Sciences Lawns
13:00-14:00	Lunch
14:00-17:00	Oral Presentation **Venue:** ***Lecture Hall 1, Prof. K. N Gaind Block (Extension Block), University Institute of Pharmaceutical Sciences.*** Poster Presentation **Venue:** University Institute of Pharmaceutical Sciences Lawns **Tea break from 15:30-16:00**

Abstract of Invited Talk

APPLICATION OF AYURINFORMATICS AND SOPHISTICATED ANALYTICAL TECHNIQUES IN RESEARCH AND DEVELOPMENT OF AYUSH MEDICINES AND NATURAL PRODUCTS

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AYUSH system of medicine has seen a tremendous growth in last decade and people around the globe are interested in the study of AYUSH medicines. An integration of in-silico studies into Ayurvedic system of medicine is termed as 'Ayurinformatics'. This term is coined jointly by All India Institute of Ayurveda and NIPER-Mohali recently and had jointly organized a symposium, 'Ayurinformatics' at NIPER-Mohali in March 2024. Ayurinformatics is a rapidly expanding field that includes gene prediction, protein structure modelling and prediction, protein folding and stability, macromolecular assembly, data mining, and complex biological system modelling. In silico methods significantly reduce the time, cost, and effort involved in the initial steps of drug discovery. It also facilitates efficient, large-scale reverse pharmacological validation of the practices in Ayurveda. Further considering wider interests in the field of in-silico analysis of medicinal plants and traditional medicine formulations, we have recently published Gupta and Jachak guideline for a Pre-Step analysis of medicinal plants for In Silico research (SAPPHIRE: Systematic assessment and Pre step protocol for herbal in silico research and evaluation).

Keeping this in view, we at NIPER-SAS Nagar studied Ayurvedic formulations for their mechanism of action utilizing 'Ayurinformatics' approach. A case study of two such Ayurvedic formulations viz. Arogyamrit Kwath and Dashmoola Asthang Kwath developed by us in collaboration with Dhanwantary Ayurvedic College, Chandigarh; is being presented in this lecture. Both the formulations were studied for metabolomics using LC-HRMS analysis, in vitro and in-silico studies. In conclusion, the application of Ayurinformatics to Ayurvedic system of medicine is a novel approach and could unravel better and rationale use of Ayurvedic formulations.

Abstracts of Oral Presentations

Oral Presentation- Pharmaceuticals Sciences		
OP1	Dr. Amita Sarwal	Smart Biomedical Devices facilitating Site-specific Prevention, Diagnosis and Treatment of various Disorders
OP2	Dr. Ashok Kumar Yadav	Design, and Synthesis of Chromone-Porphyrin Based Nano-Starch Sensitizers as Photodynamic Therapeutics for the Eradication of *Enterococci* Dental Pathogens
OP3	Dr. Ashwani Kumar	Phytochemical evaluation of *Lepidium sativum* L. seeds
OP4	Dr. Divya Dhawal Bhandari	Neuroprotective potential of *Zingiber officinale* : An effect of bioactive constituents on molecular mechanisms
OP5	Mrs. Ishita Atwal	Harnessing the Power of Herbal Remedies in the Management of Chronic Diseases
OP6	Dr. Jai Malik	Process optimization of *Eclipta alba* extraction: a statistical modeling approach for maximizing wedelolactone yield
OP7	Dr. Monika	Lysosomal α Galactosidase A Blueprint to Novel Chaperones for Fabry Disease
OP8	Dr. Neelima Dhingra	From Predictive Modelling to Pioneering Therapeutics: 5α-Reductase Inhibitors Discovery for Benign Prostatic Hyperplasia
OP9	Dr. Prerna Sarup	Nutraceuticals: A Paradigm Shift in Preventive Healthcare through Dietary Supplementation
OP10	Dr. Sandip V Pawar	Sustainable Lignin-Based Magnetic Nanoparticles for Targeted Chemotherapy and Antioxidant Therapy
OP11	Ms. Anisha Sharma	Cognitive Deficits in the ICV-STZ rat model of Sporadic Alzheimer's Disease: Plausible role of Brain insulin resistance
OP12	Ms. Saloni Rahi	Impact of Prenatal Valproate Exposure on Autism-Like Phenotypes: Interplay Between KLOTHO Dysregulation and NLRP3 Inflammasome Activation
OP13	Ms. Tanvi Sharma	Computational insights into the anti-Alzheimer's potential of tetrahydroquinoline derivatives
OP14	Mr. Hardik Kumar	Assessment and evaluation of quality of life in epileptic patients using QOLIE-31 and QOLIE-AD-48 at tertiary care hospital
OP15	Dr. Seema Kirar	Toward Sustainable Photomedicine: BODIPY–Nanolignin Platforms for Controlled ROS Generation
OP16	Ms. Shilpa Debnath	Exploring *Trachyspermum ammi* and *Foeniculum vulgare* in hydroponic system and compare its chemical constituents with soil-based method: A prospective in agriculture
OP17	Ms. Aakanksha Kumari	Ultrasound Helmet: The Future of Non-Invasive Brain Therapy

OP18	Mr. Abhishek Mishra	Digital twin in clinical trials
OP19	Ms. Kanika Sharma	Twice-Yearly siRNA LDL Lowering (Inclisiran / Leqvio): A Step Towards Equitable Cardiovascular Care
OP20	Ms. Kaushiki Roy	A phyto-functionalised nanofibrous sponge for rapid hemostasis in traumatic injuries
OP21	Mr. Onkar Singh	Electronic Tattoos: The Living Circuits Transforming Patient Monitoring
OP22	Mr. Prabal	Optogenetics: Vision restoration in retinitis pigmentosa (A New Ray of Hope in Blindness)
OP23	Mr. Kartikeya Bhardwaj	Reversal of Diabetes using Fibroblast derived Stem cell therapy.
OP24	Ms. Neha	Assessment and Comparison of Quality of Life Measures in Epileptic Patients using EQ-5D-5L and EQ-HWB-S at a Tertiary Care Hospital
OP25	Mr. Pranav Gupta	Artificial Intelligence in Drug Discovery and Development: Re-envisioning the Pharmaceutical Lifecycle using Computational Innovation
OP26	Mr. Ranjeet Singh	Assessment and evaluation of depression severity including north indian pharmacy individuals through PHQ-9
OP27	Ms. Shreya	Assessment and Evaluation of Severity Level of Parkinson's Disease Patients Using MDS-UPDRS at Tertiary Care Hospital.
OP28	Priyanka Puri	To study the impact of gender variability on chronic olanzapine induced weight gain and effect on cognition in balb/c mice

ABSTRACTS OF ORAL PRESENTATIONS

OP1. SMART BIOMEDICAL DEVICES FACILITATING SITE-SPECIFIC PREVENTION, DIAGNOSIS AND TREATMENT OF VARIOUS DISORDERS

Dr. Amita Sarwal[1]
[1] *Associate Professor, UIPS, Panjab University*

ABSTRACT

Smart implants are implantable devices that can be used for both therapeutic and diagnostic purposes, often utilizing inbuilt sensors to monitor a patient's status. It is not a new concept, but recent breakthroughs, research, and its integration with other existing technology have made Artificial Intelligence (AI) a strong tool for bringing intangible methods to life. It is a rapidly changing healthcare, with the potential to transform disease detection and treatment. AI's unparalleled capacity to analyze large amounts of data quickly and accurately is a significant advantage in medical diagnostics. It is vital for the growth of biotech discoveries, as it enables real-time insights, predictive analytics, and adaptive capabilities to completely revolutionize patient care. The algorithms can analyze medical pictures such as X-rays, CT scans, and MRIs to uncover patterns, insights, and illness symptoms that human doctors may overlook. It can also help design medical gadgets that support treatment and diagnostic decisions while protecting patient privacy via data encryption. AI-powered medical devices are the most recent technology that has the potential to revolutionize the treatment of a variety of neurological and other complicated disorders. Successful AI integration in healthcare requires collaboration between healthcare professionals, researchers, policymakers, and industry. By solving difficulties and exploiting opportunities, we can use AI's capacity to create a healthier and more efficient future for everyone. This extensive evaluation seeks to provide a detailed look at the status ofintelligence integration in implanted medical devices.

OP2. DESIGN, AND SYNTHESIS OF CHROMONE-PORPHYRIN BASED NANO-STARCH SENSITIZERS AS PHOTODYNAMIC THERAPEUTICS FOR THE ERADICATION OF *ENTEROCOCCI* DENTAL PATHOGENS

Ashok Kumar Yadav[1]
[1] *UIPS, Panjab University, Chandigarh*

ABSTRACT

One cutting-edge, novel, and promising treatment that can reduce oral infections is photodynamic therapy (PDT). To prevent dental infections, PDT uses a specific wavelength of light and molecular oxygen to activate photosensitizers. The synthesis and characterisation of three chromone-porphyrins [Zn(II)-5-[4-chromone]-15-(4-phenyl)porphyrin (ZnCP), 5-[4-

chromone]-15-(4-12 phenyl)porphyrin (DMCP), and Pd(II)-5-[4-chromone] has been presented. Phenyl-4-porphyrin (PdCP)-15. The link between photophysical characteristics and theoretical calculations for those chromone-porphyrins utilizing density functional theory (DFT) and time-dependent DFT was then established by a computer analysis. Additionally, chromone-porphyrins were encapsulated in starch nanoparticles using the nanoprecipitation approach to create soluble nano-starch sensitizers (ZnCP-SNPs, DMCP-SNPs, and PdCP-SNPs). These nano-starch sensitizers demonstrated exceptional singlet oxygen production capabilities when exposed to green light. Additionally, the pH responsiveness of final nanoformulations has been investigated. The chromone-porphyrin-loaded nano-starch sensitizers showed significant promise as a potential photodynamic therapy to treat enterococci oral infections, according to our fascinating findings.

OP3. PHYTOCHEMICAL EVALUATION OF *LEPIDIUM SATIVUM* L. SEEDS

Ashwani Kumar[1], Doyel Mukherjee[1]
[1] *UIPS, Panjab University, Chandigarh*

ABSTRACT

Lepidium sativum Linn. locally known as Garden cress is a fast-growing native edible herb belonging to Brassicaceae family; traditionally used for the treatment of hiccough, Neuralgia and sprue. Phytochemical screening was conducted on seeds of *Lepidium sativium* which showed the presence of phytochemicals: flavonoid, cholesterol, terpenoids, steroids, carbohydrates, glycosides, tannins, alkaloids, phenols, phytosterols, proteins and saponins. The total alkaloid content was estimated by gravimetric method of Harborn. The total phenolic content, determined according to the Folin-Ciocalteu method, varied from 10 to 200 mg/ml of extract. The flavonoid content, determined according to the aluminium chloride colorimetric assay method, varied from 10 to 100 mg/ml of extract.

OP4. NEUROPROTECTIVE POTENTIAL OF *ZINGIBER OFFICINALE* : AN EFFECT OF BIOACTIVE CONSTITUENTS ON MOLECULAR MECHANISMS

Divya Dhawal Bhandari[1], Jai Malik[1], Prerna Sarup[1]
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ABSTRACT

Neurodegenerative diseases represent an expanding global health burden, particularly as life expectancy increases. Alzheimer's disease (AD) is a devastating neurodegenerative disorder illustrated by loss of memory progressively and cognitive decline. The treatment includes anti-alzheimer's drugs but till date there is no complete cure available with any of these drugs. Current pharmacotherapies offer only symptomatic relief and are ineffective in halting

disease progression. This limitation has led to increased interest in natural agents with neuroprotective potential, thus opening newer opportunities for researchers. Herbs and herbal drugs such as allicin, ginger, curcumin, moringa etc. are gaining much interest due to lesser side effects and higher bioavailability. Ginger (*Zingiber officinale*), a traditional medicinal plant, contains numerous bioactive compounds, such as 6-gingerol and 6-shogaol, which have exhibited the ability in modifying key pathological features of AD and has emerged as potential new drug candidates against Alzheimer disease (AD). The constituents of ginger can interact with various molecular targets associated with Alzheimer's disease (AD) treatment. Nevertheless, there is a scarcity of theoretical research in the literature exploring the potential mechanisms through which these compounds might act as anti-AD agents. A number of pre-clinical and clinical studies have reported the effectiveness of ginger in treating or providing symptomatic relief in case of various neurodegenerative disorders. This review discusses the molecular mechanisms by which ginger may exert neuroprotective effects and evaluates its therapeutic potential as an adjunct in AD treatment.

OP5. HARNESSING THE POWER OF HERBAL REMEDIES IN THE MANAGEMENT OF CHRONIC DISEASES

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ABSTRACT

The significance of herbal remedies in the treatment of chronic diseases has gained substantial attention in recent years. Chronic diseases, such as diabetes, hypertension, and arthritis, are major public health concerns worldwide, necessitating a multifaceted approach to management. Herbal remedies, with their diverse bioactive compounds, offer a promising adjunctive therapy for these conditions. Many plants, such as turmeric, ginger, and ginseng, have been traditionally used to alleviate symptoms and improve quality of life. Modern research has validated the efficacy of these herbal remedies, demonstrating their potential to modulate various physiological pathways involved in disease progression. For instance, curcumin from turmeric has potent anti-inflammatory and antioxidant properties, while ginsenosides in ginseng have been shown to improve glycemic control and cardiovascular health. The integration of herbal remedies into mainstream healthcare could provide a cost-effective and accessible solution for managing chronic diseases, particularly in resource-constrained settings. However, further research is needed to standardize herbal preparations, establish their long-term safety and efficacy, and elucidate their interactions with conventional medications. By exploring the therapeutic potential of herbal remedies, we can unlock new avenues for the prevention and management of chronic diseases, ultimately enhancing patient outcomes and quality of life. This review aims to summarize the current evidence on the role of herbal remedies in the treatment of chronic diseases and highlight future directions for research and clinical practice.

OP6. PROCESS OPTIMIZATION OF *ECLIPTA ALBA* EXTRACTION: A STATISTICAL MODELING APPROACH FOR MAXIMIZING WEDELOLACTONE YIELD

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ABSTRACT

Eclipta alba (family Asteraceae) is a medicinal plant widely employed in commercial formulations, with wedelolactone being one of its principal bioactive markers. However, many industrial processes rely on conventional extraction techniques that do not systematically optimize the yield or marker content. In this study, we developed and optimized an extraction protocol for *E. alba* using Response Surface Methodology (RSM), aiming to maximize both extract yield and wedelolactone content. The research involved comparing four extraction techniques (Soxhlet, reflux, maceration, and ultrasonication) across four solvent systems (acetone, ethanol, 50% aqueous ethanol, and 80% aqueous ethanol). Key process variables chosen for optimization included particle size of the powdered plant material, powder-to-solvent ratio, and extraction duration. A Box–Behnken design was employed to model the relationships between these variables and two responses: total extract weight and wedelolactone content extracted. The study demonstrates that the RSM-guided optimization significantly improves extraction efficiency and marker recovery compared to non-optimized methods. The authors propose that the optimized protocol enhances the consistency, reproducibility, and economic feasibility of *E. alba* extract production. Furthermore, the approach may reduce processing time and cost while ensuring high-quality extracts suitable for downstream applications. Ultimately, this work provides a robust framework for standardizing extraction procedures of botanicals with target bioactive markers and may be adapted to other medicinal plants.

OP7. LYSOSOMAL α GALACTOSIDASE A BLUEPRINT TO NOVEL CHAPERONES FOR FABRY DISEASE

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ABSTRACT

Anderson-Fabry disease (AFD) is a lysosomal storage disorder (LSD) caused by the lack of α-galactosidase A (α-GalA), resulting in the accumulation of toxic metabolites such globotriaosylceramide (Gb3) and globotriaosylsphingosine. Increased Gb3 induces lysosomal dysfunction, resulting in impaired cellular signaling pathways and subsequently leads to the organ failure. Enzyme replacement therapy, is the usual treatment for FD, but due to high cost recently chaperone therapy i,e *Migalastat* has been launched as a treatment option.

Migalastat interacts with active site of α-GLA, stabilizes the abnormal forms and encourages the trafficking to lysosomes for substrate degradation. Taking the advantage of computational approach, present study aimed to identify chemically similar structures to *Migalastat* using the Reaxys software and their molecular insights & binding potential against alpha-galactosidase A (PDB ID: 3GXT). Molecular docking observations demonstrated good binding potential of all the screened molecules (compound 1- 8) in terms of their negative D-score. Critical observations indicated the greater selectivity of (2R,3R,4S,5R)-2-(hydroxymethyl) piperidine-3,4,5-triol (compound-4) toward 3GXT, by affording D score -7.53 kcal/mol in comparison to reference drug migalastat (-7.60 kcal/mol). Binding of lead molecule to the enzyme is reinforced by a strong hydrogen bond involving the ASP 93, ASP 170, ASP 231, GLH 203 amino acids. In silico study provided (2R,3R,4S,5R)-2-(hydroxymethyl) piperidine-3,4,5-triol promising lead as pharmacological *chaperones* for Fabry disease.

OP8. FROM PREDICTIVE MODELLING TO PIONEERING THERAPEUTICS: 5α- REDUCTASE INHIBITORS DISCOVERY FOR BENIGN PROSTATIC HYPERPLASIA

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ABSTRACT

The enzyme 5-alpha-Reductase (5AR), an NADPH-dependent oxidoreductase exhibits significant expression within the prostate epithelial cell lineage. Its crucial physiological function involves the stereospecific reduction of the Delta4-5 double bond of the C-19 steroid testosterone to yield the more biologically potent androgen, dihydrotestosterone This catalytic conversion is paramount to androgen-dependent physiological processes and establishes 5AR as a validated, high-value therapeutic target for androgen-dependent pathologies. In the clinical management of Benign Prostatic Hyperplasia, a condition frequently associated with localized DHT hyper production, significant pharmacological efforts have been concentrated on the rational design and synthesis of 5ARIs. The recent successful resolution of the high-resolution 3D crystal structure for 5AR2, has been a pivotal development. This structural elucidation provides the molecular coordinates necessary for the application of advanced structure-based drug design and molecular modeling methodologies to facilitate the development of novel, isoform-selective 5AR2 inhibitors. A comprehensive quantitative structure-activity relationship campaign was executed utilizing a dataset of over forty chemically diverse, selective 5AR2 inhibitors, primarily derived from the steroidal androstene scaffold. This effort involved the construction of 3D-QSAR models, specifically employing Force Field and Gaussian-Field analyses. These methodologies were instrumental in the descriptor-based mapping and subsequent statistical correlation of critical physicochemical properties—such as steric, electrostatic, and hydrogen-bonding fields—with the experimental biological potencies IC-50 of the compounds. The rigorous validation and

subsequent application of these predictive 3D-QSAR models ultimately enabled the in silico identification and rational optimization of novel, highly potent 5AR inhibitors that exhibit enhanced pharmacokinetic (PK) profiles.

OP9. NUTRACEUTICALS: A PARADIGM SHIFT IN PREVENTIVE HEALTHCARE THROUGH DIETARY SUPPLEMENTATION

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ABSTRACT

The integration of nutraceuticals into one's diet has garnered significant attention for its potential to promote healthy living. These bioactive compounds, derived from food sources, offer a range of benefits, including antioxidant and anti-inflammatory properties, cardiovascular health support, and immune system modulation. As dietary supplements, nutraceuticals can help bridge nutritional gaps, enhance overall well-being, and potentially mitigate the risk of chronic diseases. Key nutraceuticals, such as polyphenols, omega-3 fatty acids, and probiotics, have been shown to exert beneficial effects on human health. The scientific community has increasingly recognized the importance of nutraceuticals in maintaining optimal health. Studies have demonstrated that these compounds can modulate various physiological processes, influencing disease prevention and overall wellness. Polyphenols possess potent antioxidant activity, while omega-3 fatty acids have been linked to improved cardiovascular health. Probiotics play a crucial role in maintaining gut microbiome balance, essential for immune system function and overall health. By incorporating nutraceuticals into their diet, individuals can take a proactive approach to maintaining optimal health and preventing disease. Consulting healthcare professionals before adding supplements is essential to avoid interactions with medications or adverse effects. When used judiciously, nutraceuticals can provide a valuable adjunct to traditional healthcare approaches, enabling individuals to take control of their health and well-being. This approach may lead to improved health outcomes and enhanced quality of life.

OP10. SUSTAINABLE LIGNIN-BASED MAGNETIC NANOPARTICLES FOR TARGETED CHEMOTHERAPY AND ANTIOXIDANT THERAPY

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ABSTRACT

Polymeric magnetic nanoparticles have shown immense potential in both diagnostics and targeted-delivery in cancer with possibility to overcome the limitations with conventional chemotherapy. In this study, we developed a magnetic-polymeric conjugate of methotrexate

using lignin, a biorenewable polyphenolic polymer, and iron oxide as nanocarriers. Nanoparticles were prepared using different methods and anti-solvent precipitation with ultrasonication and polymer to drug ratio of 1:3 was selected with drug loading of 66% and encapsulation efficiency of 64.88%. Successful formulation of magnetic drug-polymer complex of smooth polyhedral nanoparticles with size range of 110-130 nm was confirmed using different characterization techniques. Drug release experiments demonstrated concentration dependant release for 24 hours followed by slow-sustained release. The formulation was non-hemolytic and ex-vivo radical scavenging assay indicated the antioxidant activity of lignin. The cell-viability assay in breast cancer and macrophage cell lines exhibited higher cytotoxicity of the formulation than pure drug showing the synergistic action of iron oxide, lignin and drug. In breast cancer cell line, the induction of apoptosis and oxidative stress was confirmed with elevated caspase-3 activity and reduced glutathione levels along with DNA damage and nuclear condensation. Also, receptor-mediated endocytosis of methotrexate was visible with higher cellular internalization of drug-loaded nanoparticles than blank nanoparticles.

OP11. COGNITIVE DEFICITS IN THE ICV-STZ RAT MODEL OF SPORADIC ALZHEIMER'S DISEASE: PLAUSIBLE ROLE OF BRAIN INSULIN RESISTANCE

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ABSTRACT

Alzheimer's, being the most common form of dementia, is a progressive neurodegenerative disease, accounting for 60-80% of dementia cases India's aging population is growing quickly as a result of lower birth rates and longer life expectancies. Particularly due to its unknown etiology, the condition presents distinct difficulties among neurodegenerative diseases. The condition can be recognized by the dysregulation of brain proteins, which trigger widespread cell death by altering neuronal activity and disrupting synaptic connections. Alzheimer's has been recently indicated as a brain-specific form of diabetes, which supported the notion of AD being a degenerative metabolic disease characterized by impaired brain glucose utilization and uptake. Disturbances in brain insulin signalling have been involved in neuronal dysfunction and cognitive deficits that are hallmarks of AD. Both preclinical and clinical post-mortem studies highlight the potential of drugs targeting insulin signalling pathways to mitigate brain insulin resistance. Insulin in the brain predominantly originates from the pancreas; however, recent discoveries show that small amounts of insulin are synthesized within the brain and the choroid plexus. Under normal conditions, brain insulin regulates critical functions such as mood, cognition, glucose metabolism, food intake, and brain perfusion. In AD, brain insulin resistance (BIR) leads to reduced insulin levels, decreased activity of insulin-degrading enzyme (IDE), accumulation of amyloid β plaques, mood disorders, cognitive decline, impaired glucose metabolism, and decreased activation of insulin receptors (INSR) Therefore, in present research we aimed to study the association of

Alzheimer's Disease with brain insulin resistance.

OP12. IMPACT OF PRENATAL VALPROATE EXPOSURE ON AUTISM-LIKE PHENOTYPES: INTERPLAY BETWEEN KLOTHO DYSREGULATION AND NLRP3 INFLAMMASOME ACTIVATION

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ABSTRACT

Autism spectrum disorder (ASD), is a complex neurodevelopmental disorder that normally begins before the first 3 years of life and lasts a life-time. CDC reported, 1 in 36 children had ASD, with boys having 3.8-fold higher incidence than girls which in near term is expected to rise. Early motor delays and abnormal sensory processing are common features that predict later cognitive and behavioural impairments. Emerging evidence suggests neuroinflammation as a central contributor to ASD pathophysiology with *NLRP3* inflammasome playing a pivotal role in promoting caspase-1–mediated maturation of pro-inflammatory cytokines IL-1β and IL-18. *KLOTHO* (KL), an anti-ageing protein, plays a vital role in neuronal development, survival and synaptic integrity. It exhibits antioxidant, anti-inflammatory, and anti-apoptotic functions and is known to suppress NF-κB/*NLRP3*-signallling cascade, thereby limiting inflammatory cytokine release. However, its involvement in ASD and potential interaction with *NLRP3* inflammasome activation remains unexplored. Our study has demonstrated, for the first time, that downregulation of KL correlates with upregulation of *NLRP3*/Caspase 1 in prenatal valproic acid (VPA, 600 mg/kg) rat model of ASD. VPA-exposed offsprings exhibit delayed physical and sensorimotor development compared to controls, which was associated with significant reductions in KL levels in the hippocampus, cortex, and serum. Moreover, increased expression of *NLRP3* and downstream cytokines such as caspase-1 and IL-1β was seen in brain tissues. These findings highlight the *KLOTHO-NLRP3* axis as a key mechanistic link between the neuroinflammation and ASD. Modulating *KLOTHO* expression may represent a promising therapeutic and diagnostic strategy for autism and related neurodevelopmental disorders.

OP13. COMPUTATIONAL INSIGHTS INTO THE ANTI-ALZHEIMER'S POTENTIAL OF TETRAHYDROQUINOLINE DERIVATIVES

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ABSTRACT

Alzheimer's disease is a neurodegenerative disorder characterized by memory loss and

cognitive decline, with current treatments providing limited relief. This underscores the need for new, more effective agents. Tetrahydroquinoline-based compounds have gained attention for their neuroprotective and cholinesterase inhibitory properties. This study aimed to optimize these compounds through computational analysis and *in-silico* design, modifying the tetrahydroquinoline core with elements inspired by established cholinesterase inhibitors. Molecular docking studies assessed their binding affinities to acetylcholinesterase (AChE) and butyrylcholinesterase (BuChE), while tools like Chem3D and SwissADME analyzed their drug-like properties. Results indicated that several derivatives showed strong binding to AChE and BuChE, favorable physicochemical characteristics, and compliance with Lipinski's criteria, alongside good blood-brain barrier permeability and low toxicity. These findings suggest that tetrahydroquinoline derivatives hold promise for anti-Alzheimer's drug development.

OP14. ASSESSMENT AND EVALUATION OF QUALITY OF LIFE IN EPILEPTIC PATIENTS USING QOLIE-31 AND QOLIE-AD-48 AT TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: To assess and evaluate the quality of life in epileptic patients by using Quality of life in epilepsy inventory for adolescent (QOLIE-AD-48) and Quality of life in epilepsy inventory for adults (QOLIE-31) at tertiary care hospital. Methods: After receiving approval from the Institution Ethics Committees (IEC) of the ISF College of Pharmacy and Guru Gobind Singh Medical College and Hospital, Faridkot. This observational and questionnaire based study was carried out for a period of six months. QOLIE-AD-48 and QOLIE-31 had been used for this research and got approval from Dr. Joyce A. Cramer to use the questionnaire. Results: 109 individuals participated in the observation and questionnaire-based study. In this study, it was discovered that adolescents made up the majority of the patients with respect to adults and quality of life was found to be good ($p=0.062$). Males (63%, 69 patients) were found higher with respect to females (37%, 40 patients). Linear regression test was found to be significant ($p=0.003$) of quality of life score (dependent variable) in relation to age and weight (independent variable) of the patients it. One way ANOVA test was found significant of quality of life score in relation to educational status ($p=0.001$), epilepsy from last year ($p=0.001$), and drug therapy ($p=0.017$). Conclusion: The current study explains the relationship between quality of life and other dependent variables by using different statistical analysis techniques. This study concludes that the quality of life of epileptic patients was found to be good as per significant results.

OP15. TOWARD SUSTAINABLE PHOTOMEDICINE: BODIPY–NANOLIGNIN PLATFORMS FOR CONTROLLED ROS GENERATION

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ABSTRACT

We have prepared a series of electron-withdrawing haloaryl/halonitroaryl substituted BODIPY as photosensitizer probes with a broad emission range. To achieve water-solubility of such photosensitizers, sustainable biopolymer lignin (agri-waste based) derived nanostructures were developed. Subsequently, BODIPY-based nanosensitizers have demonstrated significant in vitro physicochemical properties than their native counterparts. The developed photonanosensitizers were successfully used in pathogen inhibition due to their efficient singlet oxygen generation. The newly developed nanosensitizers could be used as potential antimicrobial photodynamic agents.

OP16. EXPLORING *TRACHYSPERMUM AMMI* AND *FOENICULUM VULGARE* IN HYDROPONIC SYSTEM AND COMPARE ITS CHEMICAL CONSTITUENTS WITH SOIL-BASED METHOD: A PROSPECTIVE IN AGRICULTURE

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ABSTRACT

Background: The forthcoming problems will be of food, and soil due to environmental alteration, growing populations, pollution, and exhaustion of natural resources among other factors. Hydroponic farming has the capacity to alleviate the intimidation of these concerned issues in the agricultural system. Hydroponics is recommended as an alternative way to enhance product yield compared to conventional agriculture. Objective: The present study aimed to determine the different growth parameters and constituents of soil-grown and hydroponically grown Trachyspermum ammi and Foeniculum vulgare for the first time, which could be a patentable in future. Methods: In this study, extraction was carried out by maceration method using methanol as a solvent whereas, growth parameters were performed by the leaves number, plant height, and leaf area. Chlorophyll content was also performed in both sources. Further, a comparison of chemical constituents from different sources was analyzed by GC-MS. Results: The bioactive components in hydroponically grown T. ammi were found more as compared to soil-grown T. ammi. The GC-MS analysis revealed the presence of various compounds in the methanolic extract of plant materials. Conclusion:

Hence, hydroponics could be an alternative in agriculture and this system is now accepted globally. This method provides diverse perspectives for farmers to harvest high-yield, better quality, and enhanced bioactive compounds.

OP17. ULTRASOUND HELMET: THE FUTURE OF NON-INVASIVE BRAIN THERAPY

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ABSTRACT

Deep within the human brain lie the basal ganglia and thalamic nuclei, grey matter, structures which are vital for regulating movement, emotion, and behaviour. Their dysregulation is linked to several neurological and psychiatric disorders, including Parkinson's disease, depression, Tourette syndrome, Alzheimer's disease, and addiction. For years, scientists have struggled to modulate these deep brain regions safely and precisely. Recent advances in focused ultrasound technology have made this possible by using controlled acoustic waves to deliver energy with millimeter-scale accuracy. A significant development in this field is the Ultrasound Helmet, a novel device designed to optimize Transcranial Focused Ultrasound Stimulation (TfUS). It contains 256 ultrasound-emitting elements arranged within a specially engineered helmet that directs focused beams to specific brain regions, enhancing or suppressing neuronal activity as needed. A soft plastic face mask ensures stability and accurate targeting during stimulation. This innovation builds on earlier MRI-guided focused ultrasound systems, which are already used in regulated therapeutic procedures. Although the Ultrasound Helmet is currently under clinical trials, early findings suggest high precision, safety, and significant therapeutic potential. In conclusion, the ability to modulate deep brain structures without surgery represents a paradigm shift in neuroscience—offering a safe, reversible, and repeatable method for understanding brain function and developing non-invasive treatments. Still experimental, the Ultrasound Helmet holds a promising future in revolutionizing the management of complex brain disorders.

OP18. DIGITAL TWIN IN CLINICAL TRIALS

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ABSTRACT

Digital twin technology is rapidly transforming oncology and clinical research by offering highly personalized, virtual representations of patients built from multimodal data such as genomics, imaging, and clinical history. These digital twins enable precise modeling of tumor dynamics, simulation of treatment responses, and optimization of therapeutic strategies. Recent advancements have shown the benefits of integrating artificial intelligence and big

data, leading to improved diagnostic accuracy, prediction of disease progression, and individualized treatment plans. In practice, digital twins have demonstrated efficacy in diverse applications, including radiotherapy dose planning, enhancing chemotherapy choices, and facilitating early cancer detection. The use of synthetic patient records, such as those generated by the TWIN framework, addresses key challenges in clinical trials by reducing the need for extensive real-world recruitment, enabling strong predictive modeling even with smaller datasets, and maintaining robust privacy protection for patient data. Global collaboration and public funding have significantly accelerated research on digital twin technology, with substantial contributions from North America, Europe, and Asia. Despite promising results, the field faces ongoing challenges in standardizing data integration, ensuring interoperability across platforms, and managing privacy and ethical concerns. Looking forward, the adoption of unified data-sharing standards, cross-disciplinary research, and continued development of advanced modeling frameworks is essential to realize the full potential of digital twins. As the clinical application of these technologies expands, they are poised to revolutionize patient care and drug development, offering truly individualized, adaptive, and efficient cancer treatment strategies for the future.

OP19. TWICE-YEARLY SIRNA LDL LOWERING (INCLISIRAN / LEQVIO): A STEP TOWARDS EQUITABLE CARDIOVASCULAR CARE

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ABSTRACT

Cardiovascular diseases (CVDs) remain the leading global cause of death, largely driven by elevated low-density lipoprotein cholesterol (LDL-C). Although statins and PCSK9 monoclonal antibodies effectively lower LDL-C, long-term adherence and accessibility remain major barriers, particularly in low-resource settings. *Inclisiran* (Leqvio), a small interfering RNA (*siRNA*)-based therapy, offers a transformative approach by silencing hepatic PCSK9 mRNA, thereby enhancing LDL receptor recycling and reducing LDL-C by approximately 50%. Its twice-yearly dosing schedule—following an initial and 3-month dose—represents a major advancement in simplifying lipid management and improving patient adherence. Clinical studies (ORION-10, ORION-11, and ORION-8) confirm durable LDL-C lowering, a favorable safety profile, and high patient satisfaction. Having received approvals from the EMA, FDA, and CDSCO, *Inclisiran* is the first *siRNA* therapy for LDL reduction globally. By combining molecular innovation with real-world practicality, *Inclisiran* exemplifies how technology can bridge scientific progress and healthcare equity—aligning with the vision of “Healthcare for All” through simplified, sustainable cardiovascular therapy.

OP20. A PHYTO-FUNCTIONALISED NANOFIBROUS SPONGE FOR RAPID HEMOSTASIS IN TRAUMATIC INJURIES

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ABSTRACT

Hemorrhage remains one of the leading causes of preventable mortality in trauma and surgical emergencies, driving an urgent need for hemostatic dressings that not only decrease the bleeding rate but are also anti-bacterial, biocompatible, affordable, and accessible. While several commercial dressings are available, limitations such as high cost, cytotoxicity and lack of anti-bacterial activity and biodegradability restrict their widespread use.. With these limitations in mind, a better alternative which includes natural sources, safer constituents, that are readily biodegradable and also provide excellent biocompatibility can be substituted with the pre-existing commercialised hemostatic gauges or bandages in the market. In this study, a three-dimensional (3D) nanofibrous sponge scaffold was developed as a hemostatic dressing. This nanofibrous sponge architecture provides high porosity and fluid absorption capacity that facilitates the rapid blood absorption at the injury site. Further, Moringa oleifera (Moringa extract), known for its pro-coagulant activity and Azadirachta indica (Neem extract), which can impart antibacterial properties essential to prevent bacterial infection at the injury site, were loaded in the dressing. Comprehensive characterizations such as physiochemical, mechanical properties, release kinetics and biocompatibility of the dressing were performed. In vitro assays demonstrated excellent anti-bacterial activity, enhanced blood absorption, and improved coagulation efficiency. In vivo studies were performed using rat tail amputation and liver injury model to further assess the hemostatic performance of dressing. Together, these results showed that the developed nanofibrous sponge dressing holds great potential as a multifunctional hemostatic dressing for traumatic injuries.

OP21. ELECTRONIC TATTOOS: THE LIVING CIRCUITS TRANSFORMING PATIENT MONITORING

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ABSTRACT

Imagine diagnostics so seamless that your skin itself becomes the testing surface — silently monitoring your body's chemistry and physiology, no needles, no discomfort, no delay. Electronic tattoos (E-tattoos) are transforming this vision into reality. These ultra-thin, flexible, and skin-like biosensors adhere to the body like a temporary tattoo, yet perform with

the precision of advanced medical equipment. Born from the vision that electronics could be as soft and flexible as human skin, electronic tattoos (E-tattoos) are ultra-thin circuits that adhere like temporary tattoos while continuously tracking vital signs and biochemical markers. In pharmaceutical sciences, they hold immense promise for personalized therapy by monitoring pharmacokinetic parameters, physiological responses, and biomarkers such as glucose, lactate, and electrolytes directly from sweat or interstitial fluid. By merging microelectronics with biology, E-tattoos provide real-time, non-invasive insights into how the body responds to drugs — far beyond what traditional blood sampling can reveal. Their potential extends across clinical trials, therapeutic drug monitoring, and remote patient care, bridging the gap between laboratory precision and everyday usability. When coupled with wireless data transfer and AI analytics, these tattoos evolve into intelligent diagnostic companions — capable of alerting clinicians to adverse reactions or therapy inefficacy before symptoms appear. Electronic tattoos redefine how we perceive diagnostics in pharmacy and medicine. They represent a breathtaking step toward living therapeutics — technologies that do not merely observe the body, but coexist with it, making health monitoring as effortless and human as the skin we live in.

OP22. OPTOGENETICS: VISION RESTORATION IN RETINITIS PIGMENTOSA (A NEW RAY OF HOPE IN BLINDNESS)

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ABSTRACT

Inherited retinal diseases (IRDs) affect approximately 1 in 3,000 to 1 in 5,000 individuals and are among the leading causes of blindness in developed countries. Retinitis pigmentosa (RP), a neurodegenerative disorder, leads to the progressive loss of photoreceptors and can result in complete blindness. Until recently, management was largely supportive, lacking curative options.Advances in molecular biology and biomedical engineering have introduced innovative strategies for vision restoration. Among these, optogenetics has emerged as a promising therapeutic approach for late-stage retinal degeneration. It enables genotype-independent visual restoration by rendering secondary or tertiary retinal neurons—such as bipolar cells or retinal ganglion cells—light-sensitive to compensate for lost photoreceptors.This strategy depends on the selection of target retinal cells, optogenetic proteins, and gene delivery systems. In a landmark clinical study, an adeno-associated viral (AAV) vector encoding the light-sensitive protein ChrimsonR was injected intraocularly and paired with engineered goggles. The goggles detected light in real time and projected visual stimuli onto the retina, activating transduced retinal ganglion cells. The treated patient was able to perceive, localize, and identify objects using only the injected eye while wearing the goggles. Electroencephalography confirmed corresponding activity in the visual cortex, whereas no visual perception was possible before treatment or without the goggles. Preclinical data are encouraging, and a Phase I/II clinical trial (ClinicalTrials.gov Identifier:

NCT02556736) is in progress. Although challenges remain in optimizing the ideal molecule, vector, and delivery technique, optogenetics represents a major step toward restoring vision in previously untreatable blindness.

OP23. REVERSAL OF DIABETES USING FIBROBLAST DERIVED STEM CELL THERAPY

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ABSTRACT

Diabetes being a chronic disease affects almost 830 million people globally with India and China leading the count. Methods: Fibroblast derived stem cell therapy reverses diabetes by the following process:1) Isolation: Fibroblasts are isolated from skin of the patient with diabetes. 2) Reprogramming: Fibroblast cells are converted into iPSCs (Induced pluripotent stem cell) which are embryonic -like stem cells with the help of transcription factors like OCT 4, LIN28, cMyC, KLE4 iPSCs. 3) Differentiation: iPSCs are further differentiated to insulin producing cell pancreatic β cells. 4) Transplantation: These newly generated insulin producing cells are transplanted into the patient to restore insulin production. Results: *Stem cell therapy* shows benefit over previous regime in which over administration of insulin leads to reactive hypoglycemia. Stem cell works by producing new β cells and by suppressing autoimmune factors like indole amine 2,3 dioxygenase (ido) which is rate limiting enzyme in tryptophan catabolism. Stem cells are futher multiplied through various in vitro techniques producing sufficient cells for therapy. It being an autologous therapy reduces rejection rate and immunosuppressant's are not required. Conclusion: In future stem cell therapy could play a major role in reversal of diabetes. The macro and micro encapsulation of of β cells could protect immune attack in transplanted β cells.

OP24. ASSESSMENT AND COMPARISON OF QUALITY OF LIFE MEASURES IN EPILEPTIC PATIENTS USING EQ-5D-5L AND EQ-HWB-S AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Epilepsy has a major impact on health-related quality of life (HRQoL) and psychosocial well-being. The more modern and standard instruments for measuring these domains are the EQ-5D-5L and the EQ-HWB-S. Nevertheless, the EQ-5D-5L places a strong emphasis on HRQoL, while EQ-HWB-S addresses more general subjects related to health and well-being. Methods: The study was done in 108 people diagnosed with epilepsy in a government tertiary medical college in India. The participants filled out EQ-HWB-S and EQ-

5D-5L questionnaires in the language of their choice. The direct medical costs were noted, and the cost per QALY was calculated to evaluate the economic value. Results: The average EQ-5D-5L utility score was 0.7463, and the average EQ-HWB-S total score was 18. The Wilcoxon signed-rank test revealed a statistically significant difference, suggesting that EQ-HWB-S includes a greater variety of psychosocial well-being factors. The mean price of the treatment per patient was 18765.74, and the mean price per QALY was 50300, which is far lower than the cost-effectiveness level of 1.9 lakh, and this proves the economic feasibility of the treatment. Conclusion: EQ-HWB-S was found more useful than EQ-5D-5L to assess mental, physical, and social impairments of having epilepsy. In addition, the treatment of epilepsy in the context of the state sector was also proven to be extremely cost-efficient. A combination of these tools, along with economic assessment, forms a solid base for policy building on comprehensive epilepsy care.

OP25. ARTIFICIAL INTELLIGENCE IN DRUG DISCOVERY AND DEVELOPMENT: RE-ENVISIONING THE PHARMACEUTICAL LIFECYCLE USING COMPUTATIONAL INNOVATION

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ABSTRACT

AI has recently appeared as a new tool which is transforming the whole world. In the pharmaceutical field it has also shown its effect and value in redefining processes like drug discovery, development, manufacturing, and post-marketing surveillance. AI has only been possible due to the significant increase in the computational capacity of the world and integration of computer modeling, predictive analytics, and automation. It helps in the rapid identification of molecular targets, accelerated compound screening, and enhanced clinical decision-making. Machine learning (ML) algorithms, in particular, facilitate the interpretation of complex biological datasets, including genomics, proteomics, and real-world evidence, thereby improving the prediction of pharmacodynamic and pharmacokinetic profiles. It's playing a significant role in affecting Digital Health Technologies (DHTs), and Real-World Data (RWD) analytics. The fact that various regulatory agencies are releasing guidelines for the use of AI and a need for algorithmic transparency, data integrity, and ethical accountability further proves that it's something that is being increasingly adopted into real world use more and more. AI's capacity to translate complex biomedical data into therapeutic insights that can be used in the real world is a huge advantage that it offers. However, the application of AI needs collaboration between data scientists, pharmacists, and regulatory bodies to ensure interpretability and trustworthiness. AI represents a fundamental shift toward data-centric pharmaceutical innovation, transforming the conventional drug development paradigm into a more efficient, evidence-driven, and adaptive ecosystem which can basically be summarized as transforming data into therapeutics.

OP26. ASSESSMENT AND EVALUATION OF DEPRESSION SEVERITY INCLUDING NORTH INDIAN PHARMACY INDIVIDUALS THROUGH PHQ-9

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ABSTRACT

Objective: To assess and evaluate the depression severity including north indian pharmacy individuals through PHQ-9. Methods: After receiving approval from the IEC-ISFCP, Moga. This observational and questionnaire based study was carried out for a period of six months. Results: 355 individuals participated in the observation and questionnaire-based study. In this study, it was discovered that the majority of the participants were male (68%, 242 participants) with respect to females (32%, 113 participants) in pharmacy colleges of North India in which the depression severity was found to be minimal according to PHQ-9 as per no-significant (p=0.001) results. Conclusion: The current study concludes that the majority of patients were found to be experiencing minimal depression based on the significant result of comparing the severity of depression to their PHQ 9 scores. The current study had a higher proportion of male respondents than female participants, and the largest group of participants fell into the UG category, followed by the PG category. Upon comparing numerous factors, including gender, age, course, description, state, social habits, and depression severity with PHQ-9, it was discovered that a significant number of factors, including the fact that patients with depression confront discrimination from society, that their depressive state is unchangeable, that they should be kept out of regular classes, and that they are afraid of being close to depression because it can be dangerous.

OP27. ASSESSMENT AND EVALUATION OF SEVERITY LEVEL OF PARKINSON'S DISEASE PATIENTS USING MDS-UPDRS AT TERTIARY CARE HOSPITAL.

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ABSTRACT

Parkinson's disease (PD) is one of the most progressive and complex neurodegenerative disease that affects dopaminergic neurons and causes wide range of both cardinal motor and non-motor symptoms (NMS), leading to significant functional impairment. Evaluation of PD has led to development of Comprehensive rating scales, including Movement Disorder Society-Unified Parkinson's Disease Rating Scale (MDS-UPDRS), that enables clinicians assess overall spectrum of disease severity. The study was carried out for a period of six months, including 97 PD

patients, demographics were collected using patient profile form (PPF), and motor and NMS were evaluated using MDS-UPDRS part I and II. Non-parametric tests where applied due to non-normal distribution of the score, including Wilcoxon signed- rank for paired comparison and to evaluate relationships between MDS-UPDRS scores and disease characteristics Spearman's rank correlation was conducted. All participants exhibit (100%) NMS, most frequent NMS included cognitive impairment, anxiety, apathy and fatigue, and tremor was most frequent motor symptom, followed by speech difficulties. Mean total score was 58.9 & no significant difference was found between Part I & II scores ($p = 0.508$), but strong correlation was observed ($r=0.966$, $p=0.001$). Moderate positive correlation was found between disease duration & total score ($r = 0.367$, $p = 0.001$). The findings support MDS-UPDRS as reliable tool for capturing heterogeneous burden of PD and suggests a strong correlation between symptom domains, with MDS-UPDRS Part I (mean = 30.48) and Part II (mean = 30.77) scores indicate that most patients exoerienced moderate to severe symptoms burden.

OP28. TO STUDY THE IMPACT OF GENDER VARIABILITY ON CHRONIC OLANZAPINE INDUCED WEIGHT GAIN AND EFFECT ON COGNITION IN BALB/C MICE

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ABSTRACT

Atypical antipsychotics (AAPs), particularly olanzapine, are associated with pronounced metabolic disturbances, including obesity, diabetes mellitus, insulin resistance, dyslipidaemia, and cardiovascular abnormalities. These adverse effects are attributed to disruptions in hypothalamic appetite regulation, energy sensing, insulin and leptin signalling, inflammatory pathways, and reward processing. The present study investigated gender-specific differences in olanzapine-induced metabolic and cognitive alterations in BALB/c mice. Male and female mice (18–23 g) received olanzapine (6 mg/kg, p.o.) or normal saline for ten weeks. Weekly assessments included measurements of food and water intake, body temperature, waist circumference, and body weight. Cognitive functions were evaluated at weeks 1, 6, and 10 using locomotor activity, Novel Object Recognition (NOR), and Morris Water Maze (MWM) tests. Serum glucose and lipid profiles were analysed using biochemical methods. After ten weeks of treatment, olanzapine significantly increased food and water intake, body weight, and waist circumference, while reducing body temperature and locomotor activity. It also impaired glucose regulation, evidenced by elevated serum glucose levels and a higher area under the curve in the oral glucose tolerance test. Interestingly, olanzapine-treated mice exhibited enhanced cognitive performance, reflected by higher discrimination and recognition indices in the NOR test, reduced escape latency in the MWM, and an increased number of entries into the target quadrant. Overall, these results indicate that chronic olanzapine administration induces features of metabolic syndrome while simultaneously improving cognition in both male and female mice—an intriguing paradox that warrants further investigation into its underlying mechanisms.

Abstracts of Poster Presentations

Poster Presentation- Pharmaceuticals Sciences		
PP1	Dr. Jatinder Dhaliwal	Dimethylfumarate attenuates diabetic nephropathy in rats by activating the Nrf2/ARE/ Glyoxylase-1 pathway
PP2	Dr. Sangeeta Pilkhwal Sah	Therapeutic Repurposing of an NF-κB Inhibitor in Lipopolysaccharide-Induced Acute Lung Injury
PP3	Mr. Akshay Kumar	Stress degradation studies, development and validation of analytical methods for temozolomide
PP4	Ms. Chetna Pal	Development of Sulfonate Esters of 2-(2-benzylidenehydrazono) 4-Oxothiazolidine-5-acetic acid as α-Glucosidase Inhibitors: Design, Synthesis, Biological Investigations, and in Silico Studies
PP5	Ms. Divya	Exploring the dual action of Bisbenzylisoquinoline Alkaloids and Daruharidra in lung health: Antimicrobial efficacy and anti-inflammatory modulation in Acute Lung Injury
PP6	Mrs. Mini	In-Silico Evaluation of β-Pinene as a Multi-Target Neuroprotective Agent Against Alzheimer’s Disease
PP7	Ms. Namarta Thakur	Exploring the Synergistic Potential of Tamoxifen and Allicin: Integrating Nature and Technology for Empowering Breast Cancer Therapy
PP8	Ms. Pemal Preet Kaur	Development, Characterization and Therapeutic Evaluation of a Dual-Drug Nano-Vesicular System Containing Lidocaine Hydrochloride and Etodolac for Pain and Inflammation
PP9	Mrs. Pratibha Sharma	Unlocking Oral Healing Mechanisms: Bioinspired Nanovesicular Gel of Salivary Peptide for Enhanced Diabetic Wound Healing
PP10	Mr. Roshan Lal	Short-term topical application of pharmacological cold mimicker menthol elicits sympathetic nerves in brown adipose tissue of mice
PP11	Ms. Kanika	Formulation and Evaluation of Mucoadhesive Microbeads of EGCG: A Strategy to Enhance Gastric Retention and Sustained Release
PP12	Mr. Kshitij Rawat	Development of Lignin-Derived Gold-Titanium Dioxide Nanocomposites for Light Assisted Antimicrobial Photodynamic Therapy
PP13	Ms. Aaina	AI for biomarker discovery in Alzheimer's Diseass and dementia
PP14	Mr. Abhay Likhar	Comparative analysis of chromatographic techniques applied to herbal drugs listed in the British and Indian Pharmacopoeia
PP15	Ms. Aditi Kapoor	ADAR1 as Prognostic Marker and Predictor for Chemotherapy Efficacy
PP16	Ms. Akanksha Kumari	Investigating the Synergistic antimicrobial action of Daruharidra with Traditional herbal drugs

PP17	Ms. Anagha Kaundal	ADAR1 as Prognostic marker for Colorectal Cancer and Predictor of Chemotherapy Efficacy
PP18	Ms. Angelina	Nano-Probiotics Synergy:A Next-Gen Drug Delivery System
PP19	Ms. Anjali	Eye Drops 2.0®: Development of a Novel Transparent Micellar Platform for Sustained and Efficient Ocular Cannabidiol Delivery
PP20	Ms. Ankita Sharma	Stability indicating method for eszopiclone and identification of its stress degradation products
PP21	Ms. Anushka Sharma	4D Printing and its Applications
PP22	Mr. Arjun Singh	Revolutionizing Drug Delivery
PP23	Ms. Arpita Dubey	The Dopamine Renaissance:Stem Cells as Architects of Regeneration
PP24	Ms. Arshdeep Kaur	Exploring Minoxidil's Role in Diabetic Wound Healing: A Focus on the HIF-1α/VEGF-A Pathway
PP25	Ms. Arya Singla	Effect of Vitamin D supplement ation on diabetic individuals with elevated Relative Fat Mass
PP26	Mr. Ayush Gupta	Development of N (Pyrimidin 2 yl)alkyl/arylamide derivatives as quorum sensing inhibitors against *Pseudomonas aeruginosa*
PP27	Ms. Bhumika Bhatt	AI for biomarker discovery in alzheimer's disease and dementia
PP28	Ms. Chandanpreet Dhupar	Photodynamic therapy for cancer
PP29	Ms. Dhriti	AI for Biomarker Discovery in Alzheimer's disease and dementia
PP30	Mr. Divansh	GLP-1 Receptor Agonistsl: Transforming Therapeutic Approaches in Diabetes and Obesity
PP31	Mr. Gaurav	Structural and Molecular insights into Arylpiperazine Derivatives as 5α-Reductase Inhibitors
PP32	Ms. Gurleen Kaur	The Dopamine Renaissance: Stem Cells as Architects of Regeneration
PP33	Mr. Gurmail Singh	Development and evaluation of sustained-release Acetazolamide tablet formulation.
PP34	Ms. Isha	Serum Uric Acid: A Key Link Between Type 2 Diabetes and Its Complications
PP35	Ms. Ishita Nagpal	SP-A–Modified Extracellular Vesicles
PP36	Mr. Kailashdeep Singh	Resolution Pharmacology 2.0: Finishing Inflammation with Specialized Pro-Resolving Mediators (SPMs)
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PP38	Ms. Kavya Jha	Code Meets Cure: The Future of Drug Discovery
PP39	Ms. Khushvi	Chromatographic Fingerprinting and Bioactivity Assessment of Alkaloid-Enriched Fractions of Berberis lycium
PP40	Mr. Madhav Vashisht	Next-Generation RNA Vaccines: circRNA and saRNA Platforms for Durable and Scalable Immunity
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PP42	Ms. Muskan Kanwar	Reprogramming Immunity: Tregs as a Therapeutic Frontier in Multiple Sclerosis
PP43	Ms. Nishtha Garg	AI for biomarker discovery in alzheimer's and dementia
PP44	Mr. Panshul Sharma	Nanotheranostics: empowering cancer care through science and innovation
PP45	Mr. Paras	A Frontier Nanobiologic Dressing: Harnessing AMP–Endolysin Synergy to Combat Chronic Diabetic Foot Infections
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PP54	Ms. Roli Gupta	Evaluation of Synergistic Wound Healing Activity of Withania somnifera and Aloe vera against Diabetic Wounds
PP55	Mr. Roshan Nagar	Alcoholic neuropathy: possible mechanisms and future treatment possibilities
PP56	Ms. Sadhana Devi	Nicotinic Acid-Derived HCN1 Channel Modulators: A Novel Therapeutic Strategy for Chemotherapy-Induced Neuropathic Pain
PP57	Ms. Sampriti De	Artificial intelligence and personalised medicines
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PP60	Ms. Sezal	Effect of Metformin on Vitamin B12 absorption in humans
PP61	Mr. Shashi Bhushan Kumar	Chromatographic analysis on selected herbals drugs listed in Indian pharmacopoeia 2018.
PP62	Mr. Shiven Gupta	Repurposing Drugs: Accelerating Innovation Through Existing Molecules
PP63	Ms. Shristy Dhiman	GLP-1 Receptor Agonists: Transforming Therapeutic Approaches in Diabetes and Obesity
PP64	Ms. Shruti Kumari	Proteolysis-Targeting Chimeras (PROTACs): Precision Degraders for Next-Gen Therapeutics
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PP67	Mr. Smarth	GLP-1 Receptor Agonists : Transforming Therapeutic Approaches in Diabetes and Obesity
PP68	Mr. Sunny Chugh	Direct single molecule detection and super resolution imaging with a low cost portable smartphone based microscope
PP69	Mr. Takbeer Alam	In silico screening and 2-d qsar of 1,4-dihydroquinazoline derivatives as potential cox-2 inhibitors
PP70	Ms. Tanvi Kohli	Unlocking Oral Healing Mechanisms: Bioinspired Nanovesicular Gel of Salivary Peptide for Enhanced Diabetic Wound Healing.
PP71	Ms. Vanshika Chayal	A Comparative study on Sivanarvembu : A Siddha Drug of Controversial Origin
PP72	Ms. Vanshika Sharma	ADAR1 as Prognostic Marker of Colorectal Cancer and Predictor of Chemotherapy Efficacy
PP73	Ms. Avneet Kaur Grewal	Lignin-based RB@bimetallic nanoconjugates: a platform for efficient antimicrobial photodynamic therapy against pathogenic bacteria
PP74	Mr. Chinnari Sai Sumanth	Topical formulation of Azelaic acid and Rosemary essential oil for treatment of acne.
PP75	Mr. Nidhaan Singh Davtaal	Lymphatic Uptake Key: Tailored Nanostructured Lipid Carriers for Targeted Drug Delivery
PP76	Mr. Nikhil Choudhary	Liposomal Drug Delivery System: Innovations and Emerging Trends in Nanomedicine.

PP77	Ms. Ojashwini	Formulation of nanocarriers of Acorus calamus Essential Oil for Amelioration of Diabetes-Induced Memory Dysfunction in Rats
PP78	Mr. Parwinder Singh	Sponge-Like Gold Nanoparticles: A Mesoporous Leap Toward Ultra-Sensitive Ovarian Cancer Diagnostics
PP79	Mr. Rizul Singh	Formulation of Lipid bilayer vesicles of origanum vulgure essential oil activity against diabetes.
PP80	Mr. Shivansh Katoch	E-Cigarettes and Tuberculosis: Biological Plausibility, Diagnostic Pitfalls, and Emerging Evidence
PP81	Ms. Simranjeet Kaur	From Insoluble to Bioavailable: A Cocrystal Approach to Drug Solubility Challenges.
PP82	Mr. Sourav Chauhan	Preparation and Evaluation of microemulsion containing Berberine HCl and Callistemon citrinus oil for wound healing
PP83	Santosh Choudhary	Attenuating effect of standardized lyophilized cinnamomum zeylanicum bark extract against streptozotocin-induced experimental dementia of alzheimer‟s type
PP84	Adarsh Kumar	A chemometric-guided approach for extraction optimization and development of a validated hptlc-method for standardization of convolvulus pluricaulis chois
PP85	Anu Chaudhary	Pharmacognostical studies and evaluation of quality parameters of *butea frondosa* leaves

ABSTRACTS OF POSTER PRESENTATIONS

PP1. DIMETHYLFUMARATE ATTENUATES DIABETIC NEPHROPATHY IN RATS BY ACTIVATING THE NRF2/ARE/ GLYOXYLASE-1 PATHWAY

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ABSTRACT

Background: Diabetic nephropathy (DN) is a serious complication of diabetes that eventually leads to end-stage renal disease. Numerous studies have highlighted the beneficial use of Nrf2-inducing strategies in diabetic complications. Therefore, this study aimed to assess the renopreventive effect of the Nrf2 activator dimethylfumarate (DMF) against streptozotocin (STZ) induced diabetes in rats. Methods: DMF (40 and 80 mg/kg), and TEL (10 mg/kg), were administered for 4 weeks, starting one month after induction of diabetes in rats. The protective efficacy of DMF was evaluated by observing blood glucose, HbA1c, renal function markers (serum creatinine, and urinary albumin), renal index, oxidative stress, renal fibrosis (TGF-β1, Smad3), and inflammatory (IL-1β, TNF-α, and NF-κβ) markers. Furthermore, Nrf2, HO-1, NQO1, fibronectin, and nephrin levels along with Glo-1 activity, and advanced glycation end products (AGEs) levels were also measured Results: DMF attenuated diabetes-induced elevations in metabolic and renal functional parameters, oxidative, inflammatory, and fibrotic markers. DMF also activated the Nrf2 signaling pathway which reduced AGEs levels by enhancing Glo-1 activity. Conclusions: These findings concluded that DMF demonstrated renoprotective effects and as such can offer tissue protection due to its anti-fibrotic, anti-oxidant, and anti-inflammatory actions.

PP2. THERAPEUTIC REPURPOSING OF AN NF-KB INHIBITOR IN LIPOPOLYSACCHARIDE-INDUCED ACUTE LUNG INJURY

Sangeeta Pilkhwal sah[1], Jaspreet Kaur[1], Priyanka Rana[1], Neelima Dhingra[1]
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ABSTRACT

Acute lung injury (ALI) and acute respiratory distress syndrome (ARDS) are associated with high morbidity and mortality rates (30–40%). Nuclear factor-kappa B (NF-κB), a key transcription factor, regulates the expression of numerous pro-inflammatory cytokines, driving cytokine storm and contributing significantly to the pathogenesis of ALI/ARDS, including severe COVID-19–related respiratory failure. Given the pivotal role of NF-κB in

ALI, cost-effective in silico approaches were employed to identify potential NF-κB inhibitors based on docking and pharmacokinetic analyses. The most promising candidate was subsequently validated in a lipopolysaccharide (LPS)-induced rodent model of ALI. LPS triggers lung injury by disrupting alveolar membrane integrity, enhancing neutrophil and macrophage recruitment, and inducing excessive cytokine production, ultimately impairing gas exchange. In silico screening identified Olopatadine Hydrochloride (Olo)—an FDA-approved drug—as a novel potential NF-κB inhibitor. Intraperitoneal administration of LPS induced ALI, fulfilling three of the four diagnostic criteria outlined by the ATS 2011 workshop report. Pharmacological evaluation demonstrated that Olo treatment significantly attenuated LPS-induced inflammation, as evidenced by reduced levels of IL-6, NF-κB activation, oxidative stress, neutrophil infiltration, pulmonary edema, and histopathological lung damage. Importantly, Olo treatment improved survival rates, with the medium dose (1 mg/kg) showing effects comparable to dexamethasone. Overall, NF-κB pathway inhibition by Olopatadine Hydrochloride effectively mitigated LPS-induced ALI, protecting lung tissue and improving survival. Since Olo is already clinically approved, it holds promise as a potential therapeutic candidate for ALI/ARDS management. Nevertheless, further preclinical and clinical investigations are warranted, including exploration of its role in COVID-19–associated ARDS and cytokine storm syndromes.

PP3. STRESS DEGRADATION STUDIES, DEVELOPMENT AND VALIDATION OF ANALYTICAL METHODS FOR TEMOZOLOMIDE

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ABSTRACT

Temozolomide alkylates DNA, causing strand breaks and apoptosis and is used to treat glioblastoma. Due to its therapeutic importance and the need for precise dosage control, the development of accurate and validated analytical methods is essential for quality control and regulatory compliance. This study reports the development and validation of two complementary analytical methods for determining temozolomide using LC-UV/PDA and derivative UV spectrophotometry, along with stress degradation studies under various stressors. The LC-UV-PDA method employed a C18 reverse-phase column with a mobile phase composed of acetonitrile and ammonium acetate (pH 5.5) (60:40 v/v), at a flow rate of 0.1 mL/min. The eluent was detected at 256 nm. The method, validated as per ICH guidelines, showed good linearity (10–100 µg/mL), precision (RSD <2%), accuracy (93.38–97.80% recovery), specificity, LOD 0.35 µg/mL, and LOQ 1.06 µg/mL. In parallel, a derivative UV

spectrophotometric method was developed and validated, as it is a simple and cost-effective alternative for the determination of temozolomide. It demonstrated good linearity (5–30 µg/mL), precision (RSD <2%), accuracy (92.73–96.51% recovery), and acceptable LOD and LOQ values. Both methods are reliable for the accurate quantification of temozolomide in bulk and pharmaceutical dosage forms. The LC-UV-PDA method demonstrated superior sensitivity and specificity, making it ideal for detailed analysis, while the derivative UV method provides a rapid and cost-effective alternative suitable for routine quality control. Furthermore, stress degradation studies identify the drug's degradation products. This information is important to ensure the drug remains safe and effective during storage and use.

PP4. DEVELOPMENT OF SULFONATE ESTERS OF 2-(2-BENZYLIDENEHYDRAZONO) 4-OXOTHIAZOLIDINE-5-ACETIC ACID AS A-GLUCOSIDASE INHIBITORS: DESIGN, SYNTHESIS, BIOLOGICAL INVESTIGATIONS, AND IN SILICO STUDIES

Chetna Pal[1], Ramandeep Kaur[1], Ashok Kumar Yadav[1]

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ABSTRACT

This study focuses on the discovery of sulfonate ester derivatives of 2-(2-benzylidenehydrazono)-4-oxothiazolidine-5-acetic acid as potent α-glucosidase inhibitors. A library of these analogues was synthesized, characterized, and screened for biological activities, and their *in vitro* assays revealed that all synthesized compounds demonstrated significant α-glucosidase inhibition when compared with the reference drug, acarbose. Among all the synthesized compounds, compound 7d displayed the strongest inhibition with an IC_{50} value of 29.39 µM. Additionally, antioxidant assays confirmed that several derivatives exhibited notable radical scavenging effects. The cytotoxicity of 7d was assessed using the MTT assay on normal HEK cells, which affirmed its favourable safety profile. To further validate the therapeutic potential, an in vivo disaccharide loading test demonstrated that 7d significantly reduced postprandial blood glucose levels and outperformed acarbose at a dose of 20 mg/kg body weight. Supporting computational studies, including molecular docking, binding free energy calculations, and ADME predictions, confirmed the experimental findings. Overall, these results identify sulfonate ester analogues, particularly compound 7d, as promising candidates for the development of safe and effective antidiabetic agents.

Keywords: α-Glucosidase inhibition, sulfonate ester analogues, antidiabetic activity, and molecular docking.

PP5. EXPLORING THE DUAL ACTION OF BISBENZYLISOQUINOLINE ALKALOIDS AND DARUHARIDRA IN LUNG HEALTH: ANTIMICROBIAL EFFICACY AND ANTI-INFLAMMATORY MODULATION IN ACUTE LUNG INJURY

Divya[1], Prachi Pranamya[1], Abhishek Saini[1], Vikas Gautam[2], Amarjit Singh Naura[3], Maninder Karan[1], Indu Pal Kaur[1]

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ABSTRACT

This study explores the dual therapeutic potential of KVBM, a bisbenzylisoquinoline alkaloid isolated from *Berberis lycium* (Daruharidra), emphasizing its antimicrobial efficacy against multidrug-resistant pathogens and its anti-inflammatory activity in acute lung injury (ALI). Antimicrobial investigations were conducted using clinical bacterial isolates, particularly from respiratory sources. KVBM demonstrated substantial inhibitory activity against critical drug-resistant organisms, including *Acinetobacter baumannii*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, methicillin-resistant Staphylococcus aureus (MRSA), and Streptococcus pyogenes. Remarkably, KVBM showed strong effectiveness against colistin- and carbapenem-resistant strains, with MIC values for resistant K. pneumoniae and MRSA within the CLSI susceptibility range (score 4). Synergistic testing revealed a significant enhancement of efficacy when combined with meropenem, reducing MICs of A. baumannii from 250–500 µg/ml to 31.25 µg/ml, highlighting the potential of combining KVBM with antibiotics in combating resistant respiratory infections. Parallel in vivo studies using an HCl-instillation-induced ALI mouse model demonstrated that the B. lycium extract exhibited a dose-dependent protective effect. While higher doses did not show marked protection, a medium dose (50 mg/kg) effectively mitigated lung injury and inflammation, suggesting an optimal therapeutic window at moderate or lower doses. Overall, these findings underscore the dual pharmacological relevance of B. lycium and its active alkaloid KVBM as potent antimicrobial and anti-inflammatory agents. Their combined potential in addressing both drug-resistant pulmonary infections and inflammatory lung disorders provides a promising foundation for the development of novel non-steroidal therapeutic interventions.

PP6. IN-SILICO EVALUATION OF Β-PINENE AS A MULTI-TARGET NEUROPROTECTIVE AGENT AGAINST ALZHEIMER'S DISEASE

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ABSTRACT

Alzheimer's disease (AD) is a multifactorial neurodegenerative disorder characterized by cholinergic dysfunction, oxidative stress, and abnormal protein phosphorylation. Enzymes such as acetylcholinesterase (AChE), superoxide dismutase (SOD), catalase, and protein phosphatase (PP2A) play pivotal roles in AD pathogenesis. Natural monoterpenes like β-pinene have been reported to exert antioxidant and neuroprotective effects, but their molecular mechanisms remain insufficiently explored. This study employed in silico molecular docking and ADMET analyses to evaluate the interaction of β-pinene with AChE, SOD, catalase, and PP2A. Protein crystal structures were retrieved from the Protein Data Bank and prepared for docking using AutoDock Vina. The ligand β-pinene was energy-minimized, and docking simulations were validated through re-docking of co-crystallized ligands. Binding affinities, interaction residues, and drug-likeness properties were analyzed to assess pharmacological potential. *β-Pinene* exhibited favorable docking affinities toward all four targets, with strong hydrophobic interactions in the active sites. The compound showed notable binding with AChE, indicating potential inhibition of acetylcholine hydrolysis, and with PP2A, suggesting regulation of tau phosphorylation. Interactions with antioxidant enzymes (SOD and catalase) revealed possible enhancement of cellular antioxidant defense, thereby reducing oxidative stress. ADMET predictions confirmed desirable CNS properties, including high lipophilicity, good blood–brain barrier permeability, and low predicted toxicity. The in silico findings support β-pinene as a promising multi-target modulator in *Alzheimer's disease*, capable of attenuating cholinergic dysfunction and oxidative stress while influencing tau phosphorylation pathways. Further in vitro and in vivo studies are warranted to validate its neuroprotective potential.

PP7. EXPLORING THE SYNERGISTIC POTENTIAL OF TAMOXIFEN AND ALLICIN: INTEGRATING NATURE AND TECHNOLOGY FOR EMPOWERING BREAST CANCER THERAPY

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ABSTRACT

Breast cancer is the most common cancer among women worldwide and continues to be a major global health challenge, demanding the development of therapies that are both

effective and less toxic. The present work explores the synergistic potential of Tamoxifen, a selective estrogen receptor modulator, and Allicin, a natural bioactive compound derived from garlic, as a novel integrative approach for breast cancer therapy. Combining a conventional chemotherapeutic agent with a phytoconstituent offers the possibility of enhancing therapeutic outcomes while reducing adverse effects associated with single-drug treatment. The study aims to investigate the combined cytotoxic potential of both agents and to understand their complementary mechanisms in improving anticancer efficacy. Preliminary evaluations indicate a promising synergistic interaction, suggesting that such combinations may offer safer and more affordable alternatives for cancer management. This work highlights the importance of integrating natural compounds with modern therapeutic strategies, reflecting the essence of science and technology in empowering healthcare for all.

PP8. DEVELOPMENT, CHARACTERIZATION AND THERAPEUTIC EVALUATION OF A DUAL-DRUG NANO-VESICULAR SYSTEM CONTAINING LIDOCAINE HYDROCHLORIDE AND ETODOLAC FOR PAIN AND INFLAMMATION

Pemal Preet Kaur[1], Gajanand Sharma[1], Amita Sarwal[1], O.P.Katare[1]

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ABSTRACT

The present work aims to evaluate the potential of nano-vesicular system loaded with local anaesthetic, i.e., Lidocaine hydrochloride (LH) and a nonsteroidal anti-inflammatory (NSAID), i.e., Etodolac (ETO), as a promising approach for the topical therapy of pain and inflammation. The prepared formulation was carried out for micromeritic characteristics, in vitro drug release behaviour, ex vivo skin permeation and retention, dermatokinetics, skin safety, and in vivo efficacy using animal models. The formulation was found to be in a nanometric size of 224.2 ± 31.03 nm with narrow PDI of 0.181 ± 0.012 (<0.3), indicating narrow size distribution and a zeta potential of −21.6 mV, indicating good colloidal stability. In vitro release studies showed 84.34 ± 3.1% and 77.95 ± 2.5% drug release for LH and ETO, respectively. Ex vivo permeation and retention were significantly higher (permeation: 66.71± 2.3% and 58.49 ± 1.8%; retention: 82.66 ± 1.2 µg/cm² and 60.51± 1.0 µg/cm²) than the conventional system ($p<0.05$). Dermatokinetic studies showed higher C_{max} and AUC_0–12h of the developed formulation, confirming improved skin penetration and prolonged retention. Skin safety studies showed no signs of erythema or irritation, indicating good dermatological tolerability. In vivo tail-flick and formalin-induced paw edema models showed significantly enhanced analgesic and anti-inflammatory effects compared to the conventional formulation. Stability studies confirmed good physical and chemical stability. Overall, the developed nano-vesicular system offers a promising topical approach for the synergistic management of pain and inflammation.

PP9. UNLOCKING ORAL HEALING MECHANISMS: BIOINSPIRED NANOVESICULAR GEL OF SALIVARY PEPTIDE FOR ENHANCED DIABETIC WOUND HEALING

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ABSTRACT

Oral wounds exhibit remarkably accelerated and more efficient healing compared to dermal injuries—a phenomenon even observed in animals that instinctively lick their wounds to facilitate recovery. This remarkable healing capability is primarily attributed to saliva and its bioactive constituents, which actively modulate tissue repair by stimulating cellular proliferation, migration, and immune regulation. Among these constituents, histatins are histidine-rich, low molecular weight salivary peptides renowned for their potent antimicrobial and regenerative properties. Histatins contribute to wound healing through their anti-inflammatory effects, promotion of re-epithelialization, fibroblast proliferation, and angiogenesis. The present study focuses on the development of a biofilm-targeted wound dressing predicated on histatin peptides. A patented nanovesicular system (Patent No. 341360) previously developed in our laboratory was employed for the encapsulation of histatins. The NVS exhibited exceptional capability to accommodate hydrophilic biomolecules, safeguarding them from enzymatic degradation while ensuring sustained and localized delivery. To enhance the formulation's applicability on wounds, the peptide-loaded NVS was integrated into a thermosensitive in-situ forming hydrogel that transitions from a low-viscosity solution to a conformal gel upon application. This hybrid nanovesicular hydrogel provides superior adhesivity, enhanced mechanical integrity, and a moist environment conducive to tissue regeneration. Preliminary in-vitro evaluations revealed that the histatin-loaded nanovesicular gel significantly augmented fibroblast migration, accelerated re-epithelialization, and upregulated biomarkers associated with angiogenesis and extracellular matrix remodeling. The developed biomimetic and nanotechnology-enabled formulation represents a promising and clinically translatable strategy that integrates nature's intrinsic healing mechanisms with advanced drug delivery design for the effective management of chronic and infected wounds.

PP10. SHORT-TERM TOPICAL APPLICATION OF PHARMACOLOGICAL COLD MIMICKER MENTHOL ELICITS SYMPATHETIC NERVES IN BROWN ADIPOSE TISSUE OF MICE

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ABSTRACT

Introduction: Menthol, a TRPM8 agonist and pharmacological cold mimic, activates brown adipose tissue (BAT) to increase adaptive thermogenesis and whole-body energy expenditure. BAT is highly innervated with sympathetic nerve fibers. There is existing literature that sympathetic nerves have a critical role in regulating cold effect on energy homeostasis. Here, we ought to investigate whether short-term topical application (3 days) of menthol elicits sympathetic nerves. Methodology and Results: We used chemical denervation models of complete (100 mg/kg; 6-OHDA) and localized (20 µL of 6-OHDA (20 mg/ml) in each BAT lobe) ablation of sympathetic (6-OHDA) innervations to explore their roles in menthol-induced BAT activation and energy expanding phenotype. In the present study we have shown that (i) short-term topical application of menthol (10 % menthol for 3 consecutive days) elicits sympathetic and sensory innervations, and induces thermogenesis, lipolysis and mitochondrial biogenesis in mice BAT; (ii) localized ablation of sympathetic innervation prevented menthol induced BAT activation and lipolysis Conclusions : Collectively, our results suggest that BAT activation following short-term topical application of menthol is dependent primarily but not exclusively on centrally mediated SNS activation. Keywords: Brown adipose tissue, TRPM8, Menthol, 6-OHDA, Sympathetic nerves.

PP11. FORMULATION AND EVALUATION OF MUCOADHESIVE MICROBEADS OF EGCG: A STRATEGY TO ENHANCE GASTRIC RETENTION AND SUSTAINED RELEASE

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ABSTRACT

Epigallocatechin-3-gallate (EGCG), a major polyphenol in green tea, exhibits strong antioxidant and therapeutic properties; however, it faces challenges in oral delivery due to

instability at alkaline pH and rapid degradation. To address this, a gastroretentive drug delivery system (GRDDS) mucoadhesive microbeads were developed using sodium alginate, k-carrageenan, and chitosan via the ionic gelation method. Among various formulations, the 1:4 drug-to-polymer ratio demonstrated optimal characteristics, including the highest drug entrapment efficiency (84.82 ± 1.30%), drug yield (63.8%), and sustained drug release (96.68 ± 1.22% over 8 hours in 0.1 N HCl). This formulation also exhibited superior mucoadhesion (up to 90.02 ± 1.50%) and swelling index, contributing to prolonged gastric retention. Morphological analysis via FE-SEM revealed smooth, spherical, and non-porous microbeads. Drug release kinetics followed the Higuchi model and non-Fickian diffusion mechanism as per the Korsmeyer–Peppas model (n = 0.7359). These results suggest that EGCG-loaded GRDDS mucoadhesive microbeads offer a promising approach for protecting EGCG in gastric conditions and enabling sustained drug release.

PP12. DEVELOPMENT OF LIGNIN-DERIVED GOLD-TITANIUM DIOXIDE NANOCOMPOSITES FOR LIGHT ASSISTED ANTIMICROBIAL PHOTODYNAMIC THERAPY

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ABSTRACT

The excessive use of antibiotics has accelerated the emergence of antibiotic-resistant pathogens, posing a significant global health threat that leads to prolonged hospitalizations, increased healthcare costs, and higher mortality rates. To address this challenge, metal and metal oxide nanoparticles (NPs) have gained attention as promising antimicrobial alternatives due to their ability to interact with key cellular components such as DNA, enzymes, and cell membranes. In this study, lignin-derived gold–titanium dioxide (L@Au–TiO_2) nanocomposites were synthesized and systematically characterized for their potential antimicrobial applications. The photodynamic properties of both Au and TiO_2 generate a synergistic effect, enhancing antimicrobial efficacy under light irradiation. Lignin, an abundant and renewable biopolymer, was utilized as a sustainable precursor for nanocomposite synthesis, supporting an eco-friendly approach. Comprehensive structural, morphological, and optical analyses confirmed the successful formation of L@Au–TiO_2 nanocomposites. Their antimicrobial performance was evaluated against Escherichia coli (Gram-negative), Bacillus megaterium (Gram-positive), and Candida tropicalis (fungal strain) under both illuminated and dark conditions. The findings highlight the strong potential of L@Au–TiO_2 nanocomposites as effective agents for antimicrobial photodynamic therapy, offering sustainable and innovative strategies to combat antibiotic resistance in biomedical applications.

PP13. AI FOR BIOMARKER DISCOVERY IN ALZHEIMER'S DISEASS AND DEMENTIA

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ABSTRACT

Alzheimer's disease and dementia are progressive neurodegenerative disorders characterized by cognitive decline and memory loss. Early and accurate diagnosis remains a major challenge as current diagnostic methods often detect the disease only in advanced stages. Biomarkers, measurable biological indicators of disease onset or progression, can enable earlier diagnosis and better therapeutic decisions. However, traditional biomarker discovery methods are limited by data complexity, small sample sizes, and lack of reproducibility. Artificial Intelligence (AI) provides an advanced approach for large-scale, data-driven biomarker discovery. Machine learning and deep learning algorithms can integrate diverse datasets from genomics, proteomics, metabolomics, and neuroimaging to identify complex patterns beyond human capability. Models such as Support Vector Machines (SVMs), Random Forests, and Convolutional Neural Networks (CNNs) have successfully identified biomarkers like amyloid-beta, phosphorylated tau, and neurofilament light chain, linked to Alzheimer's pathology. AI also aids in detecting non-invasive biomarkers from blood and imaging data, improving accessibility and reducing diagnostic cost. AI-driven biomarker research represents a major step toward precision medicine by improving diagnostic accuracy, predicting disease progression, and enabling personalized treatment. However, challenges such as limited data diversity, algorithmic bias, and lack of standardized validation still hinder clinical translation. These can be overcome through data sharing and explainable AI models, and interdisciplinary collaboration among scientitst, clinicians and data experts.

PP14. COMPARATIVE ANALYSIS OF CHROMATOGRAPHIC TECHNIQUES APPLIED TO HERBAL DRUGS LISTED IN THE BRITISH AND INDIAN PHARMACOPOEIA

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ABSTRACT

The growing popularity of herbal medicines emphasizes the need for quality control practices that ensure their safety and effectiveness. Although the British Pharmacopoeia

(BP) and Indian Pharmacopoeia (IP) include official monographs, there are differences in analytical methods. These differences lead to issues with reproducibility and regulatory compliance. This study compares the chromatographic profiles of two Indian medicinal plants: *Andrographis paniculata* and *Piper nigrum*, as listed in BP 2022 and IP 2018. We used Thin-Layer Chromatography (TLC), High-Performance Liquid Chromatography (HPLC), and TLC densitometry to assess the practical use of the recommended methods. The analysis were first performed using the Pharmacopoeial specifications. The deviation in results were corrected by making suitable modifications in the prescribed specification. The modified method was adopted for the analysis of different samples and it proved to be giving consistent results without error. The results indicate that Pharmacopoeial methods offer a basic framework, laboratory validation and method improvement are essential for consistent results. This study highlights the need for harmonizing analytical standards and emphasizes the importance of practical testing to bridge theoretical protocols with real-world applications. These efforts are crucial for maintaining the global credibility and therapeutic reliability of herbal medicines.

PP15. ADAR1 AS PROGNOSTIC MARKER AND PREDICTOR FOR CHEMOTHERAPY EFFICACY

Vanshika Sharma[1], Aditi Kapoor[1], Anagha Kaundal[1]
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ABSTRACT

Colorectal cancer (CRC) ranks as third most common diagnosed cancer worldwide.It’s percentage occurrence is higher in developing countries due to lifestyle and dietary transitions. Many advances have been made for prognosis,diagnosis and treatment of cancer,especially in the introduction of molecularly targeted therapies. The adenosine deaminase acting on RNA 1 (ADAR1) are RNA-editing enzymes that play essential physiological role including controlling development and immune response.These enzymes are being researched for cancer control. ADAR1 is an RNA-editing enzyme which converts adenosine into inosine.ADAR1 enzyme is produced in higher proportions in cancerous tissue. Higher ADAR1 expression is found to be linked with metastasis of lymph nodes and distant organs. More recent studies have presented ADAR1 to be involved in tumor invasion and metastasis in CRC, promoting tumor aggressiveness and suppressing innate immune responses.ADAR1 editing may alter the functioning of tumor suppressor RNAs and lead to tumor proliferation and metastasis. ADAR1 works as a dual biomarker- as a prognosis tool for CRC and predictor of chemotherapy efficacy. Higher

ADAR1 expression indicates poor prognosis which correlates to lower OS(overall survival) of patient. ADAR1 expression also demonstrates its connection with chemotherapy efficacy. Lower ADAR1 expression stipulate lower resistance to chemotherapy treatment. Further research is required to sustain its clinical application and RNA mechanisms in response to CRC progression. Advances can result in better patient segmentation and clinical outcomes.

PP16. INVESTIGATING THE SYNERGISTIC ANTIMICROBIAL ACTION OF DARUHARIDRA WITH TRADITIONAL HERBAL DRUGS

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ABSTRACT

Infectious diseases remain a significant global health threat, further exacerbated by the rapid rise of antimicrobial resistance (AMR). In response, researchers are increasingly exploring synergistic, plant-based formulations to overcome resistance and enhance antimicrobial efficacy. This study highlights the importance of robust screening methodologies to evaluate the therapeutic potential of such agents. Using the broth-dilution method, the Minimum Inhibitory Concentration (MIC) was determined against multiple human pathogenic bacteria. Antioxidant activity was assessed via DPPH and ABTS assays, measuring IC50 values for radical scavenging. For chemical characterization and quality control, TLC fingerprinting and densitometry were used to quantify biomarkers. The study investigated Daruharidra (*Berberis lycium Royle*) in combination with Apamarga (*Achyranthes aspera*), Black cumin seed oil (*Nigella sativa*), and Turmeric (*Curcuma longa*). Results showed weaker antimicrobial and antioxidant activities than typically reported, likely due to low levels of key bioactives berberine (1.27% w/w), oleanolic acid (0.0015% w/w), and thymoquinone (0.47% w/w). Nonetheless, promising synergistic effects were observed Daruharidra combined with Black cumin seed oil or Turmeric enhanced activity against E. coli ATCC and S. aureus ATCC, respectively. These findings suggest that while individual extracts may be limited by low biomarker content, strategic combinations can improve efficacy. This underscores the necessity for standardization, quality control, and optimized formulations in developing effective polyherbal therapies for combating infectious diseases in the AMR era.

PP17. ADAR1 AS PROGNOSTIC MARKER FOR COLORECTAL CANCER AND PREDICTOR OF CHEMOTHERAPY EFFICACY

Anagha Kaundal[1], Aditi Kapoor[1], Vanshika sharma[1]
[1] *University institute of pharmaceutical sciences*

ABSTRACT

ADAR1 as Prognostic marker for Colorectal Cancer and Predictor of Chemotherapy Efficacy Authors: Aditi Kapoor, Anagha Kaundal , Vanshika Sharma University of Pharmaceutical Sciences(UIPS) Colorectal cancer (CRC) ranks as third most common diagnosed cancer worldwide.It's percentage occurrence is higher in developing countries due to lifestyle and dietary transitions. Many advances have been made for prognosis,diagnosis and treatment of cancer,especially in the introduction of molecularly targeted therapies. The adenosine deaminase acting on RNA 1 (ADAR1) are RNA-editing enzymes that play essential physiological role including controlling development and immune response.These enzymes are being researched for cancer control. ADAR1 is an RNA-editing enzyme which converts adenosine into inosine.ADAR1 enzyme is produced in higher proportions in cancerous tissue. Higher ADAR1 expression is found to be linked with metastasis of lymph nodes and distant organs. More recent studies have presented ADAR1 to be involved in tumor invasion and metastasis in CRC, promoting tumor aggressiveness and suppressing innate immune responses.ADAR1 editing may alter the functioning of tumor suppressor RNAs and lead to tumor proliferation and metastasis. ADAR1 works as a dual biomarker- as a prognosis tool for CRC and predictor of chemotherapy efficacy. Higher ADAR1 expression indicates poor prognosis which correlates to lower OS(overall survival) of patient. ADAR1 expression also demonstrates itsconnection with chemotherapy efficacy. Lower ADAR1 expression stipulate lower resistance to chemotherapy treatment. Further research is required to sustain its clinical application and RNA mechanisms in response to CRC progression. Advances can result in better patient segmentation and clinical outcome.

PP18. NANO-PROBIOTICS SYNERGY:A NEXT-GEN DRUG DELIVERY SYSTEM

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ABSTRACT

Recent advancements in probiotics and nanotechnology offer innovative strategies to enhance health by improving nutrient absorption, modulating gut microbiota, and delivering targeted therapeutics. Probiotics help maintain gut homeostasis, reduce inflammation, and support metabolic and immune functions, yet their stability and efficacy often decline under harsh gastrointestinal conditions. Nanotechnology-based approaches, including nano-encapsulation

and controlled release, can enhance probiotic viability and bioavailability. Our poster explores the synergistic integration of probiotics and nanoparticles as a novel drug delivery system, offering superior therapeutic outcomes compared to either approach alone.

PP19. EYE DROPS 2.0®: DEVELOPMENT OF A NOVEL TRANSPARENT MICELLAR PLATFORM FOR SUSTAINED AND EFFICIENT OCULAR CANNABIDIOL DELIVERY

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ABSTRACT

A novel polymeric micelle (PMs) system was developed and optimized for enhanced ocular delivery of Cannabidiol (CBD), overcoming its poor solubility and stability issues. The optimized CBD-PMs exhibited small size (34 ± 1.62 nm), low PDI (0.239 ± 0.096), high drug content (99%), and high encapsulation efficiency (82%). Characterization (DSC, FTIR, NMR) confirmed no chemical interactions, and in vitro tests showed sustained release over 24 hours.In *in-vivo* studies, FITC-PMs demonstrated a 400% increase in ocular retention time and 354.4% improved corneal penetration compared to free FITC. The PMs also showed a 400% increase in uptake into SIRC cells. Cytotoxicity tests in SIRC and R28 retinal cells confirmed the formulation's safety.In inflammatory models (LPS-induced SIRC cells and Triton X-100-treated rat eyes), CBD-PMs significantly reduced inflammatory biomarkers, IL-6 and TNF-α, achieving anti-inflammatory effects comparable to ACULAR LS™ 0.4%. Furthermore, the formulation reduced chronic inflammation and improved histological outcomes in a rabbit uveitis model. Stability tests, including photostability and simulated tear fluid degradation, confirmed the PMs' robustness. This study supports CBD-PMs as a promising new therapeutic strategy for inflammatory eye disease.

PP20. STABILITY INDICATING METHOD FOR ESZOPICLONE AND IDENTIFICATION OF ITS STRESS DEGRADATION PRODUCTS

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ABSTRACT

The stability of pharmaceutical substances plays a crucial role in maintaining their purity, potency, and safety. Any instability can lead to toxic degradation products or reduced therapeutic efficacy, underscoring the importance of stability-indicating analytical methods (SIAM). These methods detect and quantify both active pharmaceutical ingredients (APIs) and their degradation products, providing insights into degradation pathways. The present study focuses on the development and validation of a stability-indicating analytical method for Eszopiclone, a nonbenzodiazepine hypnotic agent used in insomnia treatment. Forced degradation studies were performed under ICH-recommended conditions, including hydrolytic, oxidative, photolytic, and thermal stress. A reverse-phase UPLC method was developed to separate Eszopiclone from its degradation products, followed by LC-MS/TOF analysis to identify and characterize the resulting degradants. Two major degradation products (I and II) were identified and their structures proposed based on mass fragmentation patterns. The developed method was validated according to ICH Q2(R1) guidelines for parameters such as linearity, precision, accuracy, specificity, and robustness. Satisfactory recovery studies confirmed the suitability of the methods for routine estimation of Eszopiclone in pharmaceutical formulations.

PP21. 4D PRINTING AND ITS APPLICATIONS

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ABSTRACT

Additive Manufacturing (AM) otherwise known as 3D Printing has been evolving over 40 years which enabled researchers to create complex designs that were previously impossible to fabricate using traditional techniques for different application including biomedical and technological advancement .However, the model manufactured by a 3D printing technique or even a conventional manufacturing technique is rigid, and there is no further possibility of a change of shape and size of the printed part. 4D Printing technology is a new extension of 3D Printing that incorporates the element of time, allowing the material to self-assemble, shape or transform into a new form.4D-printed materials are made from smart or stimuli-responsive materials that can change their shape, structure, or function over time in response to external triggers such as temperature, pH, light, moisture, or enzymes. Traditional 3D printing in aerospace allows for complex shapes but produces static structures that cannot adapt to changing flight conditions. 4D printing overcomes this limitation by enabling morphing structures that respond to external stimuli. A 2-meter wingspan fixed-wing drone fabricated with composite additive manufacturing demonstrates wings that can change shape and be effectively controlled. This approach offers automated, cost-effective, and waste-free production of adaptive components, paving the way for intelligent, shape-morphing aerospace structures that enhance aerodynamics, efficiency, and operational flexibility.

PP22. REVOLUTIONIZING DRUG DELIVERY

Arjun Singh[1], Shivam[1], Piyush Bhagi[1], Rohit Sharma[1]
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ABSTRACT

In recent years, major progress in molecular pharmacology and a deeper understanding of how diseases develop have transformed the way medicines are designed and delivered. Today, there is a growing focus on creating therapies that directly target the specific cells responsible for starting and spreading disease. This precision is particularly crucial for treating severe or life-threatening conditions, where drugs often cause serious side effects if they affect healthy tissues. Modern drug delivery systems (DDS) use advanced technologies to transport therapeutic agents efficiently to the exact site of action. By doing so, they increase the drug's effectiveness while reducing unwanted effects on the rest of the body. Compared to traditional delivery methods, these newer systems offer superior accuracy, reliability, and control. Many are based on nanomaterials or miniature devices that are biocompatible, biodegradable, and capable of circulating longer within the body. These innovations have become vital in improving how diseases are managed and treated. This review highlights the evolution and technological advancements in drug delivery, explores their medical applications, and discusses the obstacles still faced in their use. It also looks ahead to future possibilities for developing even smarter and more efficient delivery systems that can further enhance patient outcomes and safety.

PP23. THE DOPAMINE RENAISSANCE:STEM CELLS AS ARCHITECTS OF REGENERATION

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ABSTRACT

Parkinson's disease (PD) is a neurological condition that is mainly marked by the deterioration of dopaminergic (DA) neurons in the substantia nigra. Clinical treatment typically depends on a comprehensive approach involving pharmaceutical interventions (such as levodopa and other drugs) and surgical methods. However, these treatments may only temporarily ease symptoms and can lead to significant side effects, ultimately failing to achieve a therapeutic outcome. Stem cells offer advantages due to their ability to self-renew and differentiate in multiple directions. This capability allows for the replacement of

malfunctioning neurons and the reconstruction of neural circuits, presenting a promising avenue for treating Parkinson's disease. In this approach, a graft containing dopamine-producing cells is transplanted into the striatum to release dopamine directly, mimicking the brain's normal physiology. Stem cells can differentiate into various cell types, including neural cells, and can replace damaged or lost cells in the brain. This therapeutic strategy offers a new perspective for restoring neuronal function and alleviating PD symptoms. Moreover, recent advancements in induced pluripotent stem cell (iPSC), mesenchymal cells, embryonic cells technology provide a promising source for generating neural cells that can be used in cell replacement therapies. The potential to regenerate lost neural cells and enhance cognitive function is highly promising.

PP24. EXPLORING MINOXIDIL'S ROLE IN DIABETIC WOUND HEALING: A FOCUS ON THE HIF-1A/VEGF-A PATHWAY

Arshdeep Kaur[1], Pooja Rani[1], Ajit Yadav[1], Nishika Kapoor[1], Jatinder Dhaliwal[1], Navneet Dhaliwal[1], Kanwaljit Chopra[1]

[1] *UIPS, Panjab University*

ABSTRACT

Background: Diabetic foot ulcer (DFU) is a serious health issue associated with diabetes mellitus. Minoxidil (MXD), a potent vasodilator traditionally used for hypertension and alopecia, has demonstrated potential in promoting burn wound healing. However, its role in diabetic wound healing is still not explored. Therefore, the present study aimed to investigate the potential wound-healing effects of MXD in streptozotocin (STZ)-induced diabetic rats. Methods: In-silico molecular docking and pharmacokinetic analyses were performed to anticipate the interactions of MXD with targets- VEGF-A and HIF-1α, and to evaluate its potential as a topical therapeutic agent. STZ (55mg/kg) was injected intraperitoneally in adult Wistar rats to induce diabetes. A foot ulcer of about 5 mm was created with a sterile biopsy punch. Diabetic rats with induced foot ulcers were treated topically with MXD ointment (2.5% and 5%) for two weeks. Additionally, body weight, blood glucose, oxidative stress (LPO, PCO), antioxidant levels (GSH, SOD), inflammatory markers (TNFα, IL6, ILβ1, COX-2), collagen content, along with HIF-1α &VEGF-A levels were assessed. Results: MXD significantly increased wound closure but failed to alter the STZ-induced increase in metabolic parameters. Furthermore, MXD suppressed proinflammatory markers and oxidative stress, enhancing anti-oxidant defences, HIF-1α, and VEGF-A levels in wound tissues. Conclusions: Our study demonstrates the potential of MXD for improving angiogenesis and wound healing in diabetic rats. The modulation of key molecular pathways such as HIF-1α/VEGF-A and the significant anti-inflammatory and antioxidant effects highlight MXD's multifaceted role in promoting wound healing.

PP25. EFFECT OF VITAMIN D SUPPLEMENT ATION ON DIABETIC INDIVIDUALS WITH ELEVATED RELATIVE FAT MASS

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ABSTRACT

This poster investigates the potential clinical utility of Relative Fat Mass (RFM) as a superior measure to Body Mass Index (BMI) for identifying diabetic patients at high risk of vitamin D deficiency, and discusses the implications for targeted vitamin D supplementation. Obesity is a leading health concern contributing to conditions like diabetes, and low vitamin D status is associated with an increased risk of developing prediabetes and prevalent diabetes in older populations. Data from 59,842 individuals across six NHANES cycles were analyzed, and findings were externally validated in a Chinese cohort of 238 diabetic patients. Logistic and linear regression models were used to examine the relationship between RFM and serum 25-hydroxyvitamin D [25(OH)D] levels in diabetic patients. Higher RFM was significantly associated with increased odds of vitamin D deficiency (defined as [25(OH)D] <20 ng/mL. Every 1-unit increase in RFM raised the odds of deficiency by 5.6\%, and RFM showed the highest predictive ability (AUC = 0.626) compared to BMI (0.592) and WC (0.567). Given the strong association between low vitamin D and increased likelihood of prevalent diabetes [Relative risk ratio(RRR) 1.5] and incident prediabetes (RRR 1.62) . RFM serves as a superior and accessible clinical screening tool for vitamin D deficiency risk in diabetic patients. This suggests that RFM should begin considered as an indicator to target vitamin D supplementation in diabetic individuals, which could potentially reduce the progression of prediabetes to diabetes (observed at 32.5% in a separate cohort) and help optimize glycaemic status in this high-risk population.

PP26. DEVELOPMENT OF N (PYRIMIDIN 2 YL)ALKYL/ARYLAMIDE DERIVATIVES AS QUORUM SENSING INHIBITORS AGAINST *PSEUDOMONAS AERUGINOSA*

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ABSTRACT

The efficacy of treating bacterial infections is seriously threatened by the development of bacterial resistance to antimicrobial medicines. Biofilm development triggered by quorum

sensing (QS) is a significant contributor to antimicrobial resistance. By blocking the QS signaling pathway, QS suppression prevents cells from communicating with one another. The subject of this investigation is *N*-(pyrimidin-2-yl)alkyl/arylamide were created, produced, and evaluated for their capacity to suppress QS. Compounds 3b, 3d, and 3h had the highest QS inhibitory activity among the synthesized compounds (3a–j), with respective inhibition zones of 17.66 ± 6.17, 14.00 ± 6.24, and 17.33 ± 0.66 mm. Moreover, binding affinities between - 8.4 and - 6.3 kcal/mol were found by molecular docking experiments, suggesting robust interactions with the target proteins. Furthermore, the physical characteristics of these compounds were predicted using in-silico techniques. These results highlight that *N*-(pyrimidin-2-yl)alkyl/arylamide derivatives might be potential candidate for QS inhibitors..
Keywords Synthesis · *N*-(Pyrimidin-2-yl)alkyl/arylamides · Quorum sensing · In silico study · Anti-Quorum sensing activity

PP27. AI FOR BIOMARKER DISCOVERY IN ALZHEIMER'S DISEASE AND DEMENTIA

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ABSTRACT

Alzheimer’s disease and dementia are progressive neurodegenerative disorders characterized by cognitive decline and memory loss. Early and accurate diagnosis remains a major challenge as current diagnostic methods often detect the disease only in advanced stages. Biomarkers , measurable biological indicators of disease onset or progression, can enable earlier diagnosis and better therapeutic decisions. However, traditional biomarker discovery methods are limited by data complexity, small sample sizes, and lack of reproducibility. Artificial Intelligence (AI) provides an advanced approach for large-scale, data-driven biomarker discovery. Machine learning and deep learning algorithms can integrate diverse datasets from genomics, proteomics, metabolomics, and neuroimaging to identify complex patterns beyond human capability. Models such as Support Vector Machines (SVMs), Random Forests, and Convolutional Neural Networks (CNNs) have successfully identified biomarkers like amyloid-beta, phosphorylated tau, and neurofilament light chain, linked to Alzheimer’s pathology. AI also aids in detecting non-invasive biomarkers from blood and imaging data, improving accessibility and reducing diagnostic cost. AI-driven biomarker research represents a major step toward precision medicine by improving diagnostic accuracy, predicting disease progression, and enabling personalized treatment. However, challenges such as limited data diversity, algorithmic bias, and lack of standardized validation still hinder clinical translation. These can be overcome through global data sharing explainable ai models , and interdisciplinary collaboration among scientists, clinicians and data experts. AI has the potential to revolutionize biomarker discovery and transform the

diagnosis and management of Alzheimer's disease and dementia.

PP28. PHOTODYNAMIC THERAPY FOR CANCER

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ABSTRACT

Photodynamic therapy (PDT) is a noninvasive and spatially precise phototherapy method with high therapeutic potential. The core mechanism involves three components: photosensitizers (PSs), oxygen, and light. Specific wavelengths of light activate PSs localized in tumor lesions to generate reactive oxygen species (ROS), leading to tumor cell death. PDT provides superior selectivity compared to conventional treatments, achieved through the preferred uptake of PSs by tumors and precise light delivery. However, clinical translation faces hurdles: limited light penetration into deep tissues, and inherent drawbacks of traditional PSs, such as poor water solubility, severe oxygen-dependency, and low targetability. This poster systematically summarizes PDT's principles, mechanisms, PSs, and current applications, spanning from basic research to ongoing clinical trials in diverse cancer types. We focus on lung, head and neck, non-melanoma skin (NMSC), prostate, and breast cancers. In lung cancer, porfimer sodium, chlorin e6, and verteporfin show promising results. PDT with temoporfin, redaporfin, and IR700 is effective as an adjuvant or for recurrent head and neck carcinoma. NMSC is successfully treated using topical methyl aminolevulinate and 5-aminolevulinic acid. Research in prostate and breast cancers is focused on developing targeted PSs to improve tumor-specific uptake and response. In conclusion, PDT continues to evolve as a promising cancer treatment strategy, with ongoing research spanning from fundamental investigations to clinical trials, exploring various photosensitizers and treatment combinations.

PP29. AI FOR BIOMARKER DISCOVERY IN ALZHEIMER'S DISEASE AND DEMENTIA

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ABSTRACT

Alzheimer’s disease and dementia are progressive neurodegenerative disorders characterized by cognitive decline and memory loss. Early and accurate diagnosis remains a major challenge as current diagnostic methods often detect the disease only in advanced stages. Biomarkers, measurable biological indicators of disease onset or progression, can enable earlier diagnosis and better therapeutic decisions. However, traditional biomarker discovery methods are limited by data complexity, small sample sizes, and lack of reproducibility.

Artificial Intelligence (AI) provides an advanced approach for large-scale, data-driven biomarker discovery. Machine learning and deep learning algorithms can integrate diverse datasets from genomics, proteomics, metabolomics, and neuroimaging to identify complex patterns beyond human capability. Models such as Support Vector Machines (SVMs), Random Forests, and Convolutional Neural Networks (CNNs) have successfully identified biomarkers like amyloid-beta, phosphorylated tau, and neurofilament light chain, linked to Alzheimer's pathology. AI also aids in detecting non-invasive biomarkers from blood and imaging data, improving accessibility and reducing diagnostic cost. AI-driven biomarker research represents a major step toward precision medicine by improving diagnostic accuracy, predicting disease progression, and enabling personalized treatment. However, challenges such as limited data diversity, algorithmic bias, and lack of standardized validation still hinder clinical translation. These can be overcome through global data sharing, explainable AI models, and interdisciplinary collaboration among scientists, clinicians and data experts. AI has the potential to revolutionize biomarker discovery and transform the diagnosis and management of Alzheimer's Disease and Dementia.

PP30. GLP-1 RECEPTOR AGONISTSL: TRANSFORMING THERAPEUTIC APPROACHES IN DIABETES AND OBESITY

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ABSTRACT

Background: Glucagon-like peptide-1 (GLP-1) is an incretin hormone secreted by intestinal L-cells in response to nutrient intake. It plays a pivotal role in glucose homeostasis by enhancing glucose-dependent insulin secretion, suppressing glucagon release, delaying gastric emptying, and reducing appetite via central mechanisms. Pharmacological agents that replicate these actions—GLP-1 receptor agonists (GLP-1 RAs)—have redefined the management of type 2 diabetes mellitus and obesity. Objective: To review and summarize the pharmacological mechanisms, therapeutic efficacy, and emerging innovations related to GLP-1 receptor agonists in metabolic disease management. Methods: Recent literature (2018–2025) was systematically reviewed, including pharmacological evaluations of agents such as liraglutide, semaglutide, and tirzepatide. Results: GLP-1 receptor agonists produced significant reductions in HbA1c levels, promoted weight loss, and demonstrated cardiovascular risk reduction relative to conventional antidiabetic therapies. Adverse effects were primarily gastrointestinal and dose-dependent but transient. Conclusion: GLP-1 receptor agonists represent a major advancement in metabolic therapeutics, offering integrated benefits in glucose regulation, weight reduction, and cardiovascular protection. Continued innovation in incretin-based therapy promises next-generation formulations with superior efficacy, safety, and patient adherence.

Keywords: GLP-1 receptor agonists, incretin mimetics, semaglutide, tirzepatide, diabetes mellitus, obesity, metabolic syndrome

PP31. STRUCTURAL AND MOLECULAR INSIGHTS INTO ARYLPIPERAZINE DERIVATIVES AS 5A-REDUCTASE INHIBITORS

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ABSTRACT

Benign Prostatic Hyperplasia (BPH) is a urological disorder characterized by non-cancerous enlargement of the prostate gland, commonly affecting elderly men and often leading to urinary complications. Targeting 5α-reductase, an enzyme responsible for catalyzing the conversion of testosterone into the more potent androgen dihydrotestosterone has emerged as an effective therapeutic approach for managing BPH. The present study aimed to evaluate the binding potential of arylpiperazine derivatives as 5α-reductase inhibitors and ADME predictions using in silico approaches. A Dataset of 10 arylpiperazine derivatives were screened against 5α reductase (PDB ID: 7BW1) using Naftopidil as standard drug on Schrödinger Maestro v12.3 suite. Further, in silico ADME predictions were performed using the QuickProp module. Docking studies revealed all the compounds exhibited D-scores ranging from -7.161 to -6.47, comparable to naftopidil (-7.259) Among 10 compounds compound 1 (1-(3-bromo-4-methoxyphenyl)-2-(4-piperazin-1-yl-2,4-diflouorophenyl)ethan-1-ol showed the best docking score by affording negative D score of -7.161. Further, In silico ADME predictions revealed that all these derivatives had good absorption and solubility characteristics. Overall, the computational findings suggest that arylpiperazine derivatives possess promising 5α-reductase inhibitory potential with favorable pharmacokinetic profiles. These results pave the way for further experimental validation and the development of effective therapeutic agents for the management of BPH.
Keywords- Benign Prostatic Hyperplasia , Naftopidil, Docking studies ,ADME studies.

PP32. THE DOPAMINE RENAISSANCE: STEM CELLS AS ARCHITECTS OF REGENERATION

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ABSTRACT

Parkinson's disease (PD) is a neurological condition that is mainly marked by the deterioration of dopaminergic (DA) neurons in the substantia nigra. Clinical treatment typically depends on a comprehensive approach involving pharmaceutical interventions (such

as levodopa and other drugs) and surgical methods. However, these treatments may only temporarily ease symptoms and can lead to significant side effects, ultimately failing to achieve a therapeutic outcome. Stem cells offer advantages due to their ability to self-renew and differentiate in multiple directions. This capability allows for the replacement of malfunctioning neurons and the reconstruction of neural circuits, presenting a promising avenue for treating Parkinson's disease. In this approach, a graft containing dopamine-producing cells is transplanted into the striatum to release dopamine directly, mimicking the brain's normal physiology. Stem cells can differentiate into various cell types, including neural cells, and can replace damaged or lost cells in the brain. This therapeutic strategy offers a new perspective for restoring neuronal function and alleviating PD symptoms. Moreover, recent advancements in induced pluripotent stem cell (iPSC), mesenchymal cells, embryonic cells technology provide a promising source for generating neural cells that can be used in cell replacement therapies. The potential to regenerate lost neural cells and enhance cognitive function is highly promising.

PP33. DEVELOPMENT AND EVALUATION OF SUSTAINED-RELEASE ACETAZOLAMIDE TABLET FORMULATION.

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ABSTRACT

This study focuses on developing and characterizing extended-release acetazolamide (ACZ) tablets to improve therapeutic efficacy and patient adherence in managing glaucoma, epilepsy, and altitude sickness. Immediate-release tablets of ACZ require frequent dosing and cause fluctuating plasma levels; therefore, extended-release formulations were designed to sustain drug release and maintain consistent therapeutic concentrations. Pre formulation assessments, including melting point analysis, FTIR, and ^{1}H NMR spectroscopy, confirmed the identity of ACZ and its compatibility with selected excipients such as hydroxypropyl methylcellulose (HPMC), xanthan gum, chitosan, and polyvinylpyrrolidone (PVP). A validated UV–visible spectrophotometric method (λ max 264 nm) displayed excellent linearity (R^2 = 0.9996) for quantitative analysis of ACZ. Six formulations (B1–B6) containing 250 mg ACZ were prepared by direct compression using different polymers. The tablets were evaluated for flow properties, weight variation, hardness, friability, content uniformity, and in-vitro dissolution. Among these, formulations B3 and B6 exhibited extended drug release for up to 24 hours with dissolution profiles comparable to the reference DIAMOX sustained-release capsules, showing similarity factor (f_2) values of 71.40 and 73.67, respectively. Drug release followed first-order kinetics governed by diffusion and erosion mechanisms, while rheological evaluation of HPMC solutions indicated

pseudoplastic flow behavior. The optimized formulations effectively reduced dosing frequency and maintained steady drug release, demonstrating strong potential for improving patient compliance and therapeutic outcomes in long-term acetazolamide therapy.

Keywords: Acetazolamide, Extended-release tablets, Hydroxypropyl methylcellulose, Drug release kinetics, Patient compliance, Direct compression, DIAMOX, Polymer optimization.

PP34. SERUM URIC ACID: A KEY LINK BETWEEN TYPE 2 DIABETES AND ITS COMPLICATIONS

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ABSTRACT

The precise relationship between serum uric acid (SUA) levels and the development of diabetes mellitus (DM) is still debated, but evidence strongly links elevated SUA to diabetic chronic complications. Some prospective studies identify high SUA as an independent risk factor for new-onset Type 2 DM (T2DM), with this association being particularly pronounced in women, even at levels considered within the normal range (e.g., 5.0–6.0 mg/dL). Conversely, other studies, such as one utilizing a large US adult sample, found that higher SUA levels were inversely associated with prevalent DM. Proposed mechanisms for SUA's role in T2DM involve the induction of inflammation, oxidative stress, and endothelial dysfunction, all contributing to insulin resistance.Beyond DM onset, elevated SUA is consistently recognized as an independent risk factor for micro- and macrovascular complications. SUA is positively correlated with the progression of Diabetic Nephropathy (DN) , often serving as an early indicator of kidney disease. It is also linked to the severity of Diabetic Retinopathy (DR) and is an important factor associated with Diabetic Peripheral Neuropathy (DPN). Furthermore, increased SUA correlates with markers of subclinical atherosclerosis, including increased carotid intima-media thickness (IMT) and decreased ankle-brachial index (ABI). These findings suggest that monitoring and potentially controlling SUA may be a valuable therapeutic tool for managing T2DM and preventing its complications.

PP35. SP-A–MODIFIED EXTRACELLULAR VESICLES

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ABSTRACT

Targeted Delivery of Anti-Inflammatory microRNA to Alveolar Macrophages via SP-A–Modified Extracellular Vesicles

PP36. RESOLUTION PHARMACOLOGY 2.0: FINISHING INFLAMMATION WITH SPECIALIZED PRO-RESOLVING MEDIATORS (SPMS)

Alisha[1], Isha sandhu[1], Jatin sachdeva[1], Kailashdeep singh[1]
[1] *University institute of pharmaceutical sciences, Panjab university*

ABSTRACT

Inflammation protects against injury and infection, yet conventional anti-inflammatory drugs chiefly suppress—rather than complete—the response. NSAIDs inhibit prostaglandin synthesis; corticosteroids and many biologics blunt cytokine signaling. These approaches relieve symptoms but can impede repair, cause rebound flares, carry adverse effects (GI/renal toxicity, infection risk), and fail to restore homeostasis—hence steroid resistance and dose burdens in chronic care. Specialized pro-resolving mediators (SPMs)—lipoxins, resolvins, protectins, and maresins—are enzymatically generated from ω-6/ω-3 fatty acids during the resolution phase and actively terminate inflammation while promoting tissue repair. Through GPCRs (ALX/FPR2, GPR32, ChemR23, LGR6), SPMs limit neutrophil influx, reprogram macrophages for efficient efferocytosis, temper cytokine–chemokine networks, and coordinate angiogenesis and matrix remodeling. Preclinical data in arthritis, asthma, and neuroinflammation support steroid-sparing combinations—"Resolution Pharmacology 2.0." Next-generation work prioritizes metabolically stabilized analogs (e.g., 17R-RvD1, LXA4-methyl ester), targeted delivery (lipid nanoparticles, hydrogels), and AI-guided design anchored by lipidomic biomarkers. Key hurdles include rapid inactivation, short half-lives, context dependence, manufacturing standardization, and unsettled regulatory classification (drug versus nutraceutical). A clinical path requires rigorous PK/PD, receptor-occupancy readouts, and mechanism-anchored endpoints (efferocytosis indices, pro-resolving lipid profiles) in Phase I/II trials. Bottom line: resolution ≠ suppression; finishing inflammation—rather than merely dampening it—offers restored function and quality-of-life across chronic diseases with fewer trade-offs.

PP37. NEXT-GENERATION RNA VACCINES: CIRCRNA AND SARNA PLATFORMS FOR DURABLE AND SCALABLE IMMUNITY

Kamaljit Kaur[1], Devyanshi Bhatt[1], Madhav Vashisht[1]
[1] *UIPS Panjab University*

ABSTRACT

Abstract: Circular RNA (circRNA) and self-amplifying RNA (saRNA) vaccines represent

next-generation RNA vaccine platforms with improved stability and efficacy over conventional mRNA vaccines. Unlike linear mRNA, circRNA forms a covalently closed loop, making it resistant to exonuclease degradation, thereby ensuring longer-lasting protein expression. Similarly, saRNA encodes replicase enzymes that enable intracellular RNA amplification, producing higher antigen levels from smaller doses. These features result in prolonged immune responses, enhanced protection, and reduced manufacturing costs. Due to their extended durability, circRNA and saRNA vaccines hold immense potential for infectious diseases, cancer immunotherapy, and pandemic preparedness. Together, they mark a promising advancement in RNA vaccine technology with superior stability, efficiency, and scalability.

PP38. CODE MEETS CURE: THE FUTURE OF DRUG DISCOVERY

Kritika Longia[1], Simran[1], Radhika Sharma[1], Kavya Jha[1]

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ABSTRACT

Drug discovery has traditionally been a complex, time-consuming, and costly process, often requiring more than 10–15 years and billions of dollars to bring a single drug to market. This inefficiency delays the availability of essential medicines and limits global access, particularly in low- and middle-income nations. Artificial Intelligence (AI) is transforming this landscape by integrating computational intelligence with biomedical research to accelerate innovation, reduce cost, and enhance precision. AI algorithms analyze enormous datasets from genomics, proteomics, and chemical libraries to identify novel drug targets, design promising molecules, predict absorption, distribution, metabolism, excretion (ADME), and toxicity, and even optimize clinical trials through patient stratification and success prediction. Technologies such as DeepMind's AlphaFold, which accurately predicts protein structures, and Insilico Medicine's AI-designed fibrosis drug developed in under 18 months, illustrate AI's revolutionary impact on modern drug discovery. By minimizing trial-and-error experimentation, AI reduces R&D expenditure, shortens development timelines, and enables faster delivery of affordable therapies. However, challenges like data bias, model transparency, ethical concerns, and regulatory uncertainties must be addressed for responsible implementation. AI is not a replacement for human expertise but a powerful ally—augmenting creativity, precision, and efficiency. With proper regulation, collaboration, and ethical oversight, AI-driven drug discovery can democratize healthcare and ensure equitable access to life-

saving medicines worldwide. AI is not just advancing technology—it is empowering humanity through smarter, faster, and fairer science.

PP39. CHROMATOGRAPHIC FINGERPRINTING AND BIOACTIVITY ASSESSMENT OF ALKALOID-ENRICHED FRACTIONS OF BERBERIS LYCIUM

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ABSTRACT

Berberis species are well known for their rich content of biologically active isoquinoline alkaloids, particularly berberine, palmatine, and jatrorrhizine, which possess significant antioxidant and antimicrobial properties. This study aimed to develop and evaluate efficient extraction and fractionation techniques to enrich alkaloid content from the roots of Berberis lycium and to characterize the resulting fractions using chromatographic and bioactivity assays. Crude ethanolic root extract was prepared and systematically fractionated to yield five alkaloid-rich fractions (A–E). Each fraction was analyzed through TLC-densitometry and reverse-phase HPLC to identify and compare alkaloid profiles. Antioxidant activity was assessed using $ABTS^+$ and DPPH radical-scavenging assays, while antibacterial potential was determined by evaluating minimum inhibitory concentrations (MICs) against selected bacterial strains. Chromatographic analysis revealed berberine in all fractions, with palmatine and jatrorrhizine predominantly enriched in fractions C–E; magnoflorine was present in most fractions except D. Quantitative fingerprinting confirmed distinct alkaloid enrichment patterns, demonstrating the efficiency of the fractionation method. Antioxidant assays indicated dose-dependent radical scavenging activity, correlating with the distribution of alkaloid markers. Antibacterial testing showed that some enriched fractions effectively inhibited the growth of tested bacteria. Overall, the optimized extraction and fractionation methods successfully produced alkaloid-rich fractions from Berberis lycium with clear chemical profiles and strong antioxidant and antibacterial activities. These findings suggest that the developed process can be used to obtain useful bioactive alkaloids for further research and therapeutic studies.

PP40. NEXT-GENERATION RNA VACCINES: CIRCRNA AND SARNA PLATFORMS FOR DURABLE AND SCALABLE IMMUNITY

Madhav Vashisht[1], Devyanshi Bhatt[1], Kamaljit Kaur[1]
[1] *UIPS Panjab University*

ABSTRACT

Circular RNA (circRNA) and self-amplifying RNA (saRNA) vaccines represent next-generation RNA vaccine platforms with improved stability and efficacy over conventional mRNA vaccines. Unlike linear mRNA, circRNA forms a covalently closed loop, making it resistant to exonuclease degradation, thereby ensuring longer-lasting protein expression. Similarly, saRNA encodes replicase enzymes that enable intracellular RNA amplification, producing higher antigen levels from smaller doses. These features result in prolonged immune responses, enhanced protection, and reduced manufacturing costs. Due to their extended durability, circRNA and saRNA vaccines hold immense potential for infectious diseases, cancer immunotherapy, and pandemic preparedness. Together, they mark a promising advancement in RNA vaccine technology with superior stability, efficiency, and scalability.

PP41. RACE AGAINST AMR-NOVEL THERAPEUTICS AND DIAGNOSTICS FOR TURNING THE TIDE

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ABSTRACT

From Alexander Fleming's 1928 penicillin breakthrough to penicillin-resistant Staphylococcus aureus by 1942, the antibiotic era has been a race between discovery and microbial adaptation. That race accelerated with the 2008 detection of NDM-1–producing Klebsiella in India and the rising tide of carbapenem resistance—signals that even last-resort drugs can be outpaced. Today AMR already causes an estimated 1.27 million deaths annually, and—according to the WHO—if we do not act promptly, AMR could cause more deaths than cancer by 2050. Roughly 1 in 6 bacterial infections are

antibiotic-resistant (global median ≈17.2%), with regional peaks near 33%.Science is fighting back — but in clearer, more practical ways. New diagnostics are becoming faster and smaller: "lab-on-a-chip" devices give results at the bedside in under an hour, sequencing reads every microbe's DNA to spot resistance, and CRISPR-based tests act like molecular detectives that light up when a resistance gene is present. Treatments now include smarter antibiotics having the ability to bypass common resistance mechanisms, targeted bacteriophages that hunt a patient's specific pathogen, and microbiome therapies that restore the gut's natural defences.Reports warn that by 2050, without urgent action, this global health crisis in the making could lead to ~1.91 million attributable and ~8.22 million associated deaths. Yet, by combining rapid diagnostics, targeted therapies, antibiotic stewardship, and equitable access, we can still avert millions of deaths and preserve the power of antibiotics for generations to come.

PP42. REPROGRAMMING IMMUNITY: TREGS AS A THERAPEUTIC FRONTIER IN MULTIPLE SCLEROSIS

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ABSTRACT

Multiple sclerosis (MS) is a chronic autoimmune disorder characterized by immune-mediated demyelination and neurodegeneration within the central nervous system, leading to progressive motor, sensory, and cognitive impairment. Current therapeutic approaches mainly suppress immune activity but often fail to re-establish self-tolerance or prevent long-term neuronal damage. Regulatory T cells (Tregs) are essential for maintaining immune homeostasis by suppressing autoreactive lymphocytes and controlling inflammatory responses. In Multiple Sclerosis, Treg number, stability, and suppressive function are often compromised, resulting in persistent immune activation and continued myelin destruction. Emerging therapeutic strategies aimed at reprogramming or enhancing Tregs—through adoptive Treg transfer, pharmacological modulation, or genetic engineering—show promising potential in restoring immune regulation and promoting remyelination. Therefore, harnessing the therapeutic potential of Tregs offers a precise and innovative approach to re-establish immune balance and achieve sustained neuroprotection in multiple sclerosis.

PP43. AI FOR BIOMARKER DISCOVERY IN ALZHEIMER'S AND DEMENTIA

Aaina[1], Bhumika bhatt[1], Dhriti puri[1], Nishtha garg[1]
[1] *University institute of pharmaceutical sciences*

ABSTRACT

Alzheimer's disease and dementia are progressive neurodegenerative disorders characterized by cognitive decline and memory loss. Early and accurate diagnosis remains a major challenge as current diagnostic methods often detect the disease only in advanced stages. Biomarkers measurable biological indicators of disease onset or progression, can enable earlier diagnosis and better therapeutic decisions. However, traditional biomarker discovery methods are limited by data complexity, small sample sizes, and lack of reproducibility. Artificial Intelligence (AI) vc bhi provides an advanced approach for large-scale, data-driven biomarker discovery. Machine learning and deep learning algorithms can integrate diverse datasets from genomics, proteomics, metabolomics, and neuroimaging to identify complex patterns beyond human capability. Models such as Support Vector Machines (SVMs), Random Forests, and Convolutional Neural Networks (CNNs)have successfully identified biomarkers like amyloid-beta, phosphorylated tau, and neurofilament light chain , linked to Alzheimer's pathology. AI also aids in detecting non-invasive biomarkers from blood and imaging data, improving accessibility and reducing diagnostic cost. AI-driven biomarker research represents a major step toward precision medicine by improving diagnostic accuracy, predicting disease progression, and enabling personalized treatment. However, challenges such as limited data diversity, algorithmic bias, and lack of standardized validation still hinder clinical translation. These can be overcome through global data sharing, explainable AI model,and interdisciplinary collaboration among scientists,clinicians,and data experts. AI has the potential to revolutionize biomarker discovery and transform the diagnosis and management of alzheimer's diseases and demetia.

PP44. NANOTHERANOSTICS: EMPOWERING CANCER CARE THROUGH SCIENCE AND INNOVATION

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ABSTRACT

Nanotheranostics represents an interdisciplinary field within nanomedicine which combines diagnostics imaging and targeted therapeutic functions into a single nanoscale platform which facilitates personalized treatment. It incorporates advanced nanocarriers like polymer conjugates, dendrimers, micelles, liposomes, gold and magnetic nanoparticles and various imaging agents like quantum dots and iron oxide nanoparticles to transform cancer management. Imaging technologies like MRI, CT, fluorescent imaging and PET blended with molecular probes are used for accurate localization and response monitoring using methods like surface functionalization for active targeting, stimuli-responsive release, photothermal, photodynamic therapies, oral chemotherapeutics and many more. It unites multiple imaging capabilities with various therapeutic approaches in a single system and is also versatile for gene therapy and siRNA therapy. It is cost efficient and has compact designs that promise broad accessibility and lead to empowerment of communities by making advanced, personalized cancer care available for all and commanding a new era for nationwide healthcare. It has shown promising results in treatment of cardiovascular, neurodegenerative, infectious and viral diseases. The combination of AI with deep learning and machine intelligence alters the nanoparticle design according to the data available which enables the development of personalized treatment by allowing precise early detection. AI enhances modeling, therapeutics, drug discovery, multiomics data synthesis, and patient tailored oncology solutions by promoting deep learning and machine intelligence. This technique resolves present medical obstacles to improve cancer management and increase survival rates worldwide.

PP45. A FRONTIER NANOBIOLOGIC DRESSING: HARNESSING AMP–ENDOLYSIN SYNERGY TO COMBAT CHRONIC DIABETIC FOOT INFECTIONS

Meet Yashraj Singh[1], Paras Goyal[1], Sakshi[1], Vanshika Sangal[1]

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ABSTRACT

Chronic diabetic foot infections (DFIs) is one of the most concerning complications of diabetes which leads to persistent inflammation, biofilm formation, antimicrobial resistance and eventually major or minor foot/limb amputation. Present therapies including antibiotics and topical agents often lack in proper healing due to complications like poor tissue penetration, loss of local efficacy and biofilm mediated tolerance. This work focusses on these challenges and proposes a frontier nano-biologic dressing which integrates antimicrobial peptides (AMPs) and phage-derived endolysins into a single synergistic formulation. AMPs have a broad-spectrum bactericidal action as it disrupts microbial membranes along with it also modulate the local immune microenvironment to promote tissue regeneration. Endolysins are the enzymes which are derived from bacteriophages which can synergistically complement the effect of AMPs by their action of specifically degrading bacterial cell walls and dismantling resilient biofilms. A co-formulation of AMPs and Endolysins within a biocompatible nanogel matrix holds a potency of maximizing antimicrobial and tissue regenerative effects while minimising the risk of systemic toxicity. This nanobiologic approach highlights a next generation strategy for chronic wound care while combining antibiofilm activity with pro-regenerative potential by directly targeting infection, inflammation and impaired healing. The synergistic effect of AMP-endolysin co-formulation proposes a transformative breakthrough in management of diabetic foot infections including diabetic foot ulcers (DFUs) reducing the risk of major and minor amputations significantly. This innovative dressing holds immense promise as a paradigm shift in infection responsive wound therapy aiming to redefine diabetic wound care towards complete and functional recovery.

PP46. ARTIFICIAL INTELLIGENCE IN PHARMACOGNOSY: FROM MEDICINAL PLANT RECOGNITION TO DRUG–TARGET DISCOVERY

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ABSTRACT

Artificial Intelligence (AI) has been rapidly evolving and reshaping various aspects of modern science, including pharmacognosy. This review provides a comprehensive overview of AI-driven innovations in pharmacognosy, emphasizing the growing role of deep learning (DL) and machine learning (ML) techniques in various domains. Among deep learning (DL) architectures, Convolutional Neural Networks (CNNs) have demonstrated exceptional performance in image segmentation and pattern recognition, enabling precise identification, classification, and disease diagnosis of medicinal plants. Beyond morphological characterization AI advancements has streamlined metabolite discovery, structural elucidation, and comprehensive phytochemical profiling. Additionally, computational tools such as Computer-Assisted Structure Elucidation (CASE) accelerate the interpretation of intricate chemical datasets. Furthermore, AI-driven predictive models are reshaping bioactivity screening and drug–target interaction analysis, allowing accurate prediction of therapeutic potential, toxicity, and molecular interactions of plant-derived compounds. These advancements collectively bridge the gap between traditional pharmacognosy and computational drug discovery, fostering a new era of intelligent, data-guided natural product research. Overall, this review underscores the transformative potential of AI in revolutionizing and driving innovation in natural product research and precision medicine.

PP47. DEVELOPMENT OF N-(PYRIDIN-2/3-YL)ALKANAMIDES AS QUORUM SENSING INHIBITORS AGAINST PSEUDOMONAS AERUGINOSA

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ABSTRACT

The development of bacterial resistance to chemical therapy poses a severe threat to the efficacy of treating bacterial infections. One of the primary causes of antibiotic resistance in

bacteria is the formation of biofilm. As an alternative treatment, quorum sensing (QS) inhibitors were created by making novel antibiofilm drugs. Communication between cells is impeded by QS inhibition, which targets the QS signalling system. Designing novel QS inhibitors to combat *Pseudomonas aeruginosa* is the goal of this project. It was perposed to create and synthesise *N*-(Pyridin-2/3-yl)alkanamide derivatives as QS inhibitors. The QS inhibitor activity of compounds (3a-1, 4a-h) was assessed. Compounds 3k, 4a, and 4c exhibited the highest QS inhibitor activities, measuring 11.66 ± 0.11, 14.66 ± 0.15, and 10.66 ± 0.05 mm, respectively. The binding affinity values between -7.1 and -9.3 kcal/mol were moderate to good in subsequent molecular docking investigations. The physicochemical properities of synthesised compounds were investigated using the in silico approach. To better understand the stability of the protein and ligand complexes of compounds 3k, 4a, and 4c, molecular dynamic were conducted. The study's overall conclusions suggested that *N*-(pyridin-2/3-yl)alkanamide derivatives could be important for the creation of more effective QS inhibitors.

PP48. MICROBES ON DEFENSE, HUMANS ON DEADLINE : DECODING THE AMR CRISIS

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ABSTRACT

In the 20th century, Sir Alexander Fleming cautioned that excessive and improper use of antibiotics could promote resistance, and in 2025, the consequences of that warning are increasingly evident. Antibiotics, once hailed as groundbreaking treatments for bacterial infections, are losing effectiveness as bacteria evolve strategies to survive drug exposure. These adaptations have produced multidrug-resistant (MDR) and extensively drug-resistant (XDR) strains that complicate treatment worldwide. The 2014 review by Lord Jim O'Neill, "Antimicrobial Resistance: Tackling a Crisis for the Health and Wealth of Nations," estimated that AMR could lead to 10 million deaths per year by 2050. Despite global awareness, infection rates and resistance continue to rise. Governments and international organizations, including the World Health Organization (WHO) and the United Nations (UN), are actively implementing strategies to address this challenge. This review highlights three key mechanisms of bacterial resistance—reducing intracellular antibiotic levels, modifying drug targets, and enzymatic inactivation—and examines current and emerging measures to combat these threats.

PP49. PRISM: SHINING LIGHT ON COUNTERFEIT DRUGS

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ABSTRACT

Counterfeit and contaminated pharmaceuticals remain a severe threat to global health, particularly in developing nations where incidents such as diethylene glycol-induced poisonings in children reveal systemic failures in last-mile drug verification. Existing laboratory-based testing methods, though precise, are costly, time-consuming, and inaccessible to smaller distributors and rural pharmacies. To address this critical gap, we propose PRISM (Portable Raman Inspection and Spectral Mapping)-an Al-driven, portable spectroscopy device enabling rapid and non-destructive chemical verification of drugs at the point of dispensing. PRISM integrates Raman and Near-Infrared (NIR) spectroscopy to record each drug's molecular spectral fingerprint. This data is analyzed through a cloud-based Al model trained on reference spectra of authentic formulations. Within seconds, PRISM identifies anomalies such as incorrect active ingredients, dosage inconsistencies, or toxic adulterants like methanol and diethylene glycol. Accompanied by a smartphone interface and regulatory dashboard connectivity, PRISM enhances traceability and enables real-time intervention. By uniting spectroscopy, artificial intelligence, and digital pharmacovigilance, PRISM transforms drug verification from a reactive laboratory process into a proactive safeguard for public health.

PP50. PREPARATION, CHARACTERIZATION, AND EVALUATION OF COCRYSTAL FORM OF FINASTERIDE TO ENHANCE BIOPHARMACEUTICAL ATTRIBUTES

Rahul Gour[1], Deepak Askar[1], Mansi Prashar[1], Renu Chadha[1], Neelima Dhingra[1]

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ABSTRACT

Finasteride (FIN), a drug used in the treatment of benign prostatic hyperplasia , is classified as a Biopharmaceutical Classification System (BCS) Class II compound on account of its low aqueous *solubility* and limited oral *bioavailability*. Present study aimed to enhance physicochemical properties by preparing its novel *cocrystal* with hippuric acid (HIP), a

Generally Recognized as Safe (GRAS) coformer, using the liquid-assisted grinding technique. The prepared Finasteride–Hippuric Acid (FIN–HIP) *cocrystal* was characterized using Differential Scanning Calorimetry (DSC), Fourier-Transform Infrared Spectroscopy (FT-IR), and Powder X-ray Diffraction (PXRD). Distinct thermal and spectral profiles confirmed the formation of a new crystalline phase. The FIN–HIP *cocrystal* demonstrated 2.4 and 3.45 fold improved *solubility* and Intrinsic Dissolution Rate in Phosphate buffer pH 6.8, respectively. Further relative *bioavailability* was found to be improved by 1.7 fold as compared to the pure drug. These findings suggested that *cocrystal*lization served as an effective crystal engineering strategy to overcome the *solubility* limitations of Finasteride by enhancing its biopharmaceutical performance.

PP51. BACTERIOPHAGES VS. SUPERBUGS: THE DAWN OF TARGETED ANTIMICROBIAL THERAPY

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ABSTRACT

Antibiotic-resistant bacteria pose an increasingly globalized health threat, rendering many traditional treatments useless. Bacteriophage (phage) therapy—deploying viruses that specifically target and kill bacteria—is a direct and promising new alternative to traditional antibiotics. This poster examines recent breakthroughs revolutionizing phage therapy as a valuable weapon against resistant infection. Synthetic biology can be used to design phages with increased bacterial-targeting capabilities or deliver CRISPR-Cas systems to inactivate antibiotic resistance genes. Phage cocktails, which consist of a mixture of phages, enhance host range and lower the likelihood of developing resistance upon treatment. Phage matching using AI speeds up the discovery of potent phages for specific patients, allowing for tailor-made antimicrobial therapy. Phage enzymes such as endolysins are also becoming new rapid-acting, highly specific antimicrobials that can act without the use of whole phages. These future plans represent a transition away from the traditional broad-spectrum antibiotics towards targeted treatments. As superbugs evolve further, phage therapy provides a timely and groundbreaking solution to one of medicine's most pressing problems. With technologies from synthetic biology, artificial intelligence, and molecular engineering, phage-based solutions are set to revolutionize the course of infectious disease therapy.

PP52. PHARMACOGNOSTIC STUDIES ON CELASTRUS PANICULATUS WILLD. AND ITS ROLE IN 3- NITROPROPIONIC ACID INDUCED HUNTINGTON DISEASE IN RATS

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ABSTRACT

Abstract Huntington's disease (HD) is a progressive neurodegenerative disorder marked by motor dysfunction, cognitive decline, and psychiatric symptoms. Celastrus paniculatus Willd., known as "Jyotishmati" or the "Intellect Tree," has long been valued in Ayurveda for enhancing memory and providing neuroprotection. The present study aimed to carry out pharmacognostic evaluation of C. paniculatus and assess its neuroprotective potential in a 3-nitropropionic acid (3-NP)-induced model of Huntington's disease in rats. Comprehensive pharmacognostic studies were performed, including macroscopic, microscopic, physicochemical, and phytochemical analyses to establish the authenticity and quality of the plant material. Phytochemical screening confirmed the presence of alkaloids, flavonoids, saponins, tannins, sterols, and essential oils, compounds associated with antioxidant and neuroprotective activities. In the pharmacological evaluation, HD was experimentally induced in Wistar rats using 3-NP, and the animals were treated with ethanolic seed extract of C. paniculatus. Behavioral, biochemical, and histopathological assessments revealed that the extract significantly improved motor coordination, restored antioxidant enzyme levels (superoxide dismutase and catalase), and reduced lipid peroxidation and neuroinflammatory changes. Histopathological studies of the striatum showed decreased neuronal degeneration in treated groups compared to disease controls. The results demonstrate that C. paniculatus possesses potent neuroprotective and antioxidant effects against 3-NP-induced neurotoxicity. This study provides scientific validation for its traditional use in neurological disorders and supports its potential as a phytopharmaceutical candidate for the management of Huntington's disease.

Keywords: Celastrus paniculatus, Huntington's disease, 3-nitropropionic acid, neuroprotection, pharmacognosy, oxidative stress.

PP53. NANOTECHNOLOGY IN HERBAL MEDICINE

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ABSTRACT

ABSRACT The advancement of phytopharmacological and phytochemical sciences has enabled the understanding of structural, chemical and biological activities of various phytochemicals. However, these phytoconstituents are highly sensitive to several environmental and physiological factors such as pH, oxygen, heat, temperature, humidity, stomach acid, enzymes, and light. Hence, there is need for the development of a drug delivery system that can protect the phytoconstituents from both internal and external conditions. Many biologically active phytochemicals like flavonoids tannins alkaloids terpenoids etc. have various constraints like poor bioavailability, in vivo stability, aqueous insolubility, amalgamated with their inability to efficiently cross lipid-cell membranes due to their large molecular size, considerably hinders their absorption. By lowering toxicity and raising bioavailability, nanotechnology not only helps to combat non-compliance by minimizing the need for repeated administration, but it also contributes to the enhancement of therapeutic value Conventional therapy does not address these issues. Techniques like liposomes, solid lipid nanoparticles (SNLPs), polymeric nanoparticles, etc. thus improving the solubility preventing the herbal formulation from degradation, prolongs its action and permits site specific action to particular tissues also by the help of these techniques we can combine incompatible herbal drugs enabling synergistic effects.

Keywords: Phytochemicals, Nanotechnology, Drug delivery system, Bioavailability, Stability

PP54. EVALUATION OF SYNERGISTIC WOUND HEALING ACTIVITY OF WITHANIA SOMNIFERA AND ALOE VERA AGAINST DIABETIC WOUNDS

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ABSTRACT

The study evaluated the synergistic wound healing potential of an ointment combining *Withania somnifera* (WS) root extract and *Aloe vera* (AV) gel for diabetic lesions. After confirming the authenticity of plant materials, physicochemical parameters were assessed,

and WS extract was standardized using a TLC densitometric method based on its major constituent concentration (0.72%). Diabetes was induced in Wistar rats with streptozotocin (STZ), followed by excision wound creation. Ointments containing 1:1 mixtures of WS and AV at concentrations of 20%, 40%, and 60% were topically applied for 14 days. Treatment efficacy was evaluated by measuring wound size reduction and calculating the percentage of wound closure, with Soframycin used as the standard and a blank ointment serving as the control. Among all formulations, the 60% combination (AW 60%) exhibited the most significant healing activity, achieving the highest rate of wound closure and reduction in wound size. The enhancement in healing was further supported by biochemical and histological findings, which demonstrated improved tissue regeneration and collagen deposition. These outcomes indicate a synergistic effect between WS and AV bioactive compounds, highlighting the combination's superior efficacy over individual extracts and standard treatment. The results suggest that AW 60% ointment may serve as a promising natural therapeutic agent for diabetic wound management, warranting further exploration of its mechanism and formulation optimization.

PP55. ALCOHOLIC NEUROPATHY: POSSIBLE MECHANISMS AND FUTURE TREATMENT POSSIBILITIES

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ABSTRACT

Chronic alcohol consumption produces painful peripheral neuropathy for which there is no reliable successful therapy, mainly due to lack of understanding of its pathobiology. Alcoholic neuropathy involves coasting caused by damage to nerves that results from long term excessive drinking of alcohol and is characterized by spontaneous burning pain, hyperalgesia and allodynia. The mechanism behind alcoholic neuropathy is not well understood, but several explanations have been proposed. These include activation of spinal cord microglia after chronic alcohol consumption, oxidative stress leading to free radical damage to nerves, activation of mGlu5 receptors in the spinal cord and activation of the sympathoadrenal and hypothalamo-pituitary-adrenal (HPA) axis. Nutritional deficiency (especially thiamine deficiency) and/or the direct toxic effect of alcohol or both have also been implicated in alcohol-induced neuropathic pain. Treatment is directed towards halting further damage to the peripheral nerves and restoring their normal functioning. This can be achieved by alcohol abstinence and a nutritionally balanced diet supplemented by all B vitamins. However, in the setting of ongoing alcohol use, vitamin supplementation alone

has not been convincingly shown to be sufficient for improvement in most patients. The present review is focused around the multiple pathways involved in the development of peripheral neuropathy associated with chronic alcohol intake and the different therapeutic agents which may find a place in the therapeutic armamentarium for both prevention and management of alcoholic neuropathy. nerve damage caused by excessive, long-term alcohol consumption, leading to symptoms like pain, numbness, tingling, and weakness in the arms and legs.

PP56. NICOTINIC ACID-DERIVED HCN1 CHANNEL MODULATORS: A NOVEL THERAPEUTIC STRATEGY FOR CHEMOTHERAPY-INDUCED NEUROPATHIC PAIN

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ABSTRACT

Chemotherapy-induced neuropathic pain remains one of the most debilitating side effects of cancer therapy, arising from aberrant neuronal signaling and peripheral nerve degeneration. Paclitaxel (PT), a widely used chemotherapeutic agent, induces painful neuropathy, severely impacting patients' quality of life. The pain occurs due to nerve damage caused by paclitaxel accumulating in the dorsal root ganglia, which can trigger inflammation, ion channel dysfunction, and mitochondrial damage. In this study, six novel nicotinic acid derivatives (NDAK1-NDAK6) were synthesized, and screened for binding potential aganist hyperpolarization-activated cyclic nucleotide-gated (HCN1) channels—key regulators of neuronal pacemaker activity associated with pain signaling. All the newly synthesized compounds exhibited good binding affinity toward the HCN1 channel, by affording docking scores from -6.6 to -7.3…unit, comparable to that of Ivabradine (IVB,-6.8). Further, all the synthesised compounds were subjected for ADME predictions indicated that all the synthesized compound signified good plasma protein binding and absorption and successfully qualified drug likeness properties such as Lipinski rule of five ,CMC- like rule and WDI-like rule. Among all derivatives, 3′-(4-dimethylphenyl)pyridine-3-carboxylate (NDAK-6) showed the strongest binding affinity and the most favourable docking score (D-score), correlating well with excellent pharmacokinetic predictions. These findings suggest that NDAK-6 may serve as a potential therapeutic candidate for the management of chemotherapy-induced neuropathic pain.

Keywords - Neuropathic pain, Hyperpolarization-Activated Cyclic Nucleotide-Gated Channels, Paclitaxel, Ivabradine, Chemotherapy.

PP57. ARTIFICIAL INTELLIGENCE AND PERSONALISED MEDICINES

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ABSTRACT

Artificial intelligence (AI) is rapidly transforming drug discovery and delivery, opening new possibilities for personalized medicine. With machine learning and deep learning innovations, AI helps researchers analyse massive genomic and clinical datasets to identify promising drug targets, predict responses, and maximize formulas, speed, and precision. AI-driven algorithms enable scientists to design new molecules, repurpose existing drugs, and simulate clinical scenarios, reducing the time and cost needed to bring medicines from bench to bedside. In pharmacogenomics, AI uncovers the complex relationship between genes and drug efficacy or safety, guiding healthcare providers to tailor treatments and dosages to each person's unique genetic makeup. The integration of big data, AI analytics, and patient-specific information enables clinicians to minimize adverse drug events and enhance clinical outcomes, particularly in oncology and rare diseases. Recent advances also include the use of AI in predicting the critical attributes of formulations, designing nanomedicines, and manufacturing personalized drug dosages using technologies such as 3D printing. But even though AI has huge potential in personalized medicine, there are still some big challenges, which include protecting patient privacy, making sure the technology is easy to understand, meeting health regulations, and getting experts from different fields to work together. Moving forward, effective partnerships among clinicians, technologists, and policy makers will be essential for responsible and wide-scale adoption of AI in healthcare. Overall, AI is moving forward in the direction of patient-centric therapies, promising a future where treatment is more precise, effective, and accessible.

PP58. A WHIFF TO WELLNESS: EXPLORING THE NOSE-TO-BRAIN PATHWAY

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ABSTRACT

Nasal drug delivery is a non-invasive, patient-friendly route that exploits the nasal cavity's highly vascularized mucosa and large surface area to achieve rapid onset, thereby bypassing hepatic first-pass metabolism. This makes it especially suitable for molecules with poor gastrointestinal absorption or instability, such as peptides, proteins, and vaccines.

Contemporary platforms encompass metered-dose sprays, gels, dry powders, and aerosol atomizers, alongside advanced carriers, including mucoadhesive microspheres, lipid/polymeric nanoparticles, nanoemulsions, and in-situ gelling systems, which are engineered to prolong residence and modulate release. Critically, intranasal administration offers a direct "nose-to-brain" pathway via the olfactory epithelium and trigeminal nerves, providing a viable alternative to oral and intravenous routes, which are limited by the blood-brain barrier. This approach holds promising implications for Alzheimer's disease, epilepsy, brain tumors, acute pain, and neuroinflammation. A few limitations include enzymatic degradation, limited epithelial permeability, anatomical variability, and strict dose-volume constraints. However, these are being addressed through mucoadhesive polymers (e.g., chitosan, carbomers), permeation enhancers and enzyme inhibitors, surface-modified and ligand-targeted nanocarriers (e.g., PEGylated or lipid nanoparticles, dendrimers), and device innovations that optimize deposition in the olfactory region. As materials science, formulation design, and device engineering converge with rigorous attention to safety, long-term tolerability, manufacturability, and regulatory compliance, intranasal delivery is emerging as a practical, scalable platform for both systemic therapy and precise central nervous system targeting via the olfactory route.

PP59. STABILITY INDICATING METHOD FOR ELTROMBOPAG OLAMINE AND IDENTIFICATION OF ITS STRESS DEGRADATION PRODUCTS

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ABSTRACT

The present research was designed to develop and validate stability-indicating methods for eltrombopag olamine and characterise its stress degradation products. Eltrombopag olamine is a thrombopoietin (TPO) receptor agonist that stimulates the production of platelets. It works by binding to the transmembrane 4 domain of the TPO receptor (c-mpl), initiating a signalling cascade that promotes the proliferation and differentiation of megakaryocytes (platelet precursors). Stress testing is intended to identify the likely degradation pathways and to validate the stability-indicating procedures. Drug molecules possess several reactive sites that are susceptible to degradation under various stress conditions of hydrolytic, oxidative, thermal, and photolytic stress, which can lead to the formation of various degradation products or impurities, which not only reduce the active drug content but can also contribute to the toxic effects of the drug, thus limiting the therapeutic use. The developed methods were validated as per the ICH guidelines (ICHQ2(R1)) (ICH, 1997) with respect to linearity and range, accuracy and precision, limit of detection (LOD) and limit of quantification

(LOQ), and robustness. Stability, indicating the nature of the assays, has been assessed by the drug recovery studies from fortified degraded solutions. The chromatographic method for the stress degradation solutions has been additionally extended to LC-MS/TOF studies in order to identify and characterise the various degradation products formed by stressor studies. LC-MS/TOF studies were used to study the mass fragmentation pattern and to postulate the probable degradation route for the generation of various degradation products.

PP60. EFFECT OF METFORMIN ON VITAMIN B12 ABSORPTION IN HUMANS

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ABSTRACT

Metformin is widely prescribed as the first-line medicine for controlling type 2 diabetes mellitus because of its effectiveness and safety. However, continuous use of metformin can lower the body's ability to absorb vitamin B_{12}. This happens mainly because metformin interferes with the normal calcium-dependent process through which the vitamin B_{12}–intrinsic factor complex attaches to receptors in the lower part of the small intestine. When this attachment is disturbed, less vitamin B_{12} is absorbed, leading to a gradual decline in its levels over time. A prolonged deficiency may cause problems such as numbness, tingling, nerve pain, fatigue, anemia, or even heart-related nerve damage, which can worsen diabetic complications. People taking higher doses of metformin, using it for many years, or also taking acid-reducing medicines are at greater risk. Studies suggest that adding calcium supplements can help restore vitamin B_{12} absorption. Therefore, regular monitoring of vitamin B_{12} levels and timely supplementation are important for patients on long-term metformin therapy. Understanding this calcium-dependent mechanism helps in maintaining the benefits of metformin while protecting overall nerve and blood health.

PP61. CHROMATOGRAPHIC ANALYSIS ON SELECTED HERBALS DRUGS LISTED IN INDIAN PHARMACOPOEIA 2018.

Shashi Bhushan Kumar[1], Prachi Choudhary[1], Maninder Karan[1], Jai Malik[1]

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ABSTRACT

This study investigates the methodological limitations and inconsistencies present in the official monographs of selected herbal drugs as documented in the Indian Pharmacopoeia

2018 (IP 2018), with particular emphasis on Thin-Layer Chromatography (TLC) and High-Performance Liquid Chromatography (HPLC) protocols. A review of two herbal drug monographs revealed that existing specifications lacked essential details, affecting the validity and reproducibility of identification and quantitative analysis. To improve the methods, new, sensitive, and rapid HPLC techniques were developed for analyzing key markers: Glycyrrhizic acid in Yasti, and Quercetin in Amarbel. The modified HPLC methods significantly reduced run times compared to IP 2018 procedures, achieving faster analysis with improved peak characteristics. The analysis were first performed using the pharmacopoeial specifications. The deviation in results were corrected by making suitable modifications in the prescribed specification. The modified method was adopted for the analysis of different samples and it proved to be giving consistent results without error. The study also identified gaps in the TLC methods, where Rf values and clear visualization were often missing. To address this, TLC tests with pure markers were conducted, allowing for the establishment of reliable Rf values and clear band visualization. The improved HPLC and TLC methods offer enhanced quality control and standardization for these herbal drugs, providing a more robust and reproducible approach for analysis.

PP62. REPURPOSING DRUGS: ACCELERATING INNOVATION THROUGH EXISTING MOLECULES

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ABSTRACT

The process of discovering new drugs is often time-consuming, expensive, and uncertain. Drug repurposing, also known as drug repositioning, provides a faster and more economical way to find new treatments by exploring new uses for already approved or existing molecules. Since the safety, pharmacological, and formulation data of these drugs are already known, the chances of success in clinical development are much higher compared to discovering a new molecule from scratch. Successful examples such as thalidomide, now used in multiple myeloma, and remdesivir, repurposed for COVID-19, show how this approach can quickly respond to urgent health challenges. With the help of computer-based screening, artificial intelligence, and bioinformatics tools, scientists can identify new therapeutic potentials for old drugs more effectively. This poster focuses on the importance, methods, and future opportunities of drug repurposing in the pharmaceutical field. It highlights how this strategy supports cost-effective innovation, reduces research time, and promotes the development of safer and more accessible medicines for society.

PP63. GLP-1 RECEPTOR AGONISTS: TRANSFORMING THERAPEUTIC APPROACHES IN DIABETES AND OBESITY

Shristy Dhiman[1], Smarth Sharma[1], Siya Uppal[1], Divansh[1]
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ABSTRACT

Abstract Background: Glucagon-like peptide-1 (GLP-1) is an incretin hormone secreted by intestinal L-cells in response to nutrient intake. It plays a pivotal role in glucose homeostasis by enhancing glucose-dependent insulin secretion, suppressing glucagon release, delaying gastric emptying, and reducing appetite via central mechanisms. Pharmacological agents that replicate these actions—GLP-1 receptor agonists (GLP-1 RAs)—have redefined the management of type 2 diabetes mellitus and obesity. Objective: To review and summarize the pharmacological mechanisms, therapeutic efficacy, and emerging innovations related to GLP-1 receptor agonists in metabolic disease management. Methods: Recent literature (2018–2025) was systematically reviewed, including pharmacological evaluations of agents such as liraglutide, semaglutide, and tirzepatide. Results: GLP-1 receptor agonists produced significant reductions in HbA1c levels, promoted weight loss, and demonstrated cardiovascular risk reduction relative to conventional antidiabetic therapies. Adverse effects were primarily gastrointestinal and dose-dependent but transient. Conclusion: GLP-1 receptor agonists represent a major advancement in metabolic therapeutics, offering integrated benefits in glucose regulation, weight reduction, and cardiovascular protection. Continued innovation in incretin-based therapy promises next-generation formulations with superior efficacy, safety, and patient adherence.

Keywords: GLP-1 receptor agonists, incretin mimetics, semaglutide, tirzepatide, diabetes mellitus, obesity, metabolic syndrome

PP64. PROTEOLYSIS-TARGETING CHIMERAS (PROTACS): PRECISION DEGRADERS FOR NEXT-GEN THERAPEUTICS

Aayush Goyal[1], Shruti Kumari[1], Shubham Dogra[1], Tanmay Pandey[1]
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ABSTRACT

The vast majority of the human proteome remains inaccessible to conventional small-molecule inhibitors due severely lacking suitable binding pockets, which presents a fundamental limitation in medicinal chemistry. This "undruggable" fraction includes many key drivers of complex diseases. Proteolysis-Targeting Chimeras (PROTACs) offer a

revolutionary pharmacological approach, utilizing the cell's native ubiquitin-proteasome system (UPS) to catalyse the degradation of disease-causing target proteins. PROTACs are heterobifunctional molecules that hijack an E3 ubiquitin ligase to tag a protein of interest (POI) for destruction. This catalytic, event-driven mechanism allows PROTACs to bypass traditional affinity requirements, enabling the successful targeting of scaffolds and transcription factors previously deemed intractable, primarily in oncology. Beyond their established success in cancer, PROTAC technology is rapidly expanding its therapeutic footprint. Emerging applications demonstrate potential for eliminating key pathogenic proteins involved in chronic autoimmune disorders, degrading proteins responsible for neurodegenerative diseases and promise a new generation of antibiotics by targeting previously undruggable bacterial proteins. By converting ligand-binding into protein-degradation signals, PROTACs are fundamentally redefining the druggable landscape. This technology promises a transformative, broad-spectrum path toward next-generation medicines for diseases ranging from oncology and autoimmunity, neurodegenerative diseases to infectious threats like AMR.

PP65. EXPLORING THE THERAPEUTIC POTENTIAL OF BERBERINE LOADED PHYTOSOMES AGAINST DEPRESSION THROUGH PRECLINICAL STUDIES: EVIDENCES FROM BEHAVIOURAL & BIOCHEMICAL STUDIES USING CUMS MODEL IN WISTAR RATS

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ABSTRACT

Background: Depression is linked to oxidative stress and neurochemical imbalances, emphasizing the need for innovative therapeutic strategies. Berberine (BBR) exhibits antidepressant potential but has limited bioavailability. This study aimed to develop BBR-loaded phytosomes (BBR-PS) as a targeted delivery system to modulate reactive oxygen species (ROS) in a chronic stress model. Methods: BBR-PS was formulated via thin-film hydration using varying drug-lipid-cholesterol ratios. The optimized formulation was characterized for vesicle size, zeta potential, entrapment efficiency (%EE), drug loading (%DL), and in-vitro release profile. Morphology was examined using FESEM and HRTEM. Antidepressant efficacy was evaluated in Wistar rats subjected to the Chronic Unpredictable Mild Stress (CUMS) model, with biochemical markers (corticosterone, MDA, GSH, CAT) analyzed for oxidative balance and neuroprotection. Results: The optimized BBR-PS showed

a vesicle size of 107 nm, zeta potential of –33.2 mV, %EE of 73%, and %DL of 14.6%, displaying sustained drug release. In vivo, BBR-PS treatment significantly reduced serum corticosterone (23.03 ng/ml) and hippocampal MDA levels (0.35 ± 0.01 nmoles/mg), while enhancing GSH (0.0017 ± 0.0009 nM/mg) and CAT activity (1.24 ± 0.04 U/mg) compared with pure BBR solution. Conclusion: BBR-PS improved bioavailability, antioxidant defense, and antidepressant efficacy in the CUMS model, indicating enhanced neuroprotection through ROS modulation. These findings highlight BBR-PS as a promising strategy for depression management; however, further clinical evaluation is necessary to confirm safety and long-term therapeutic potential.

PP66. GLP-1 RECEPTOR AGONIST : TRANSFORMING THERAPEUTIC APPROACHES IN DIABETES AND OBESITY

Shristy Dhiman[1], Divansh[2], Siya Uppal[2], Smarth Sharma[2]

[1] *University Institute of Pharmaceutical Sciences ences, Panjab University, Chandigarh, India,* [2] *University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh, India*

ABSTRACT

Background: Glucagon-like peptide-1 (GLP-1) is an incretin hormone secreted by intestinal L-cells in response to nutrient intake. It plays a pivotal role in glucose homeostasis by enhancing glucose-dependent insulin secretion, suppressing glucagon release, delaying gastric emptying, and reducing appetite via central mechanisms. Pharmacological agents that replicate these actions—GLP-1 receptor agonists (GLP-1 RAs)—have redefined the management of type 2 diabetes mellitus and obesity. Objective: To review and summarize the pharmacological mechanisms, therapeutic efficacy, and emerging innovations related to GLP-1 receptor agonists in metabolic disease management. Methods: Recent literature (2018–2025) was systematically reviewed, including pharmacological evaluations of agents such as liraglutide, semaglutide, and tirzepatide. Results: GLP-1 receptor agonists produced significant reductions in HbA1c levels, promoted weight loss, and demonstrated cardiovascular risk reduction relative to conventional antidiabetic therapies. Adverse effects were primarily gastrointestinal and dose-dependent but transient. Conclusion: GLP-1 receptor agonists represent a major advancement in metabolic therapeutics, offering integrated benefits in glucose regulation, weight reduction, and cardiovascular protection. Continued innovation in incretin-based therapy promises next-generation formulations with superior efficacy, safety, and patient adherence.

Keywords: GLP-1 receptor agonists, incretin mimetics, semaglutide, tirzepatide, diabetes mellitus, obesity, metabolic syndrome

PP67. GLP-1 RECEPTOR AGONISTS : TRANSFORMING THERAPEUTIC APPROACHES IN DIABETES AND OBESITY

Shristy Dhiman[1], Siya Uppal[1], Smarth Sharma[1], Divansh Mahajan[1]
[1] *University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh, India*

ABSTRACT

Background: Glucagon-like peptide-1 (GLP-1) is an incretin hormone secreted by intestinal L-cells in response to nutrient intake. It plays a pivotal role in glucose homeostasis by enhancing glucose-dependent insulin secretion, suppressing glucagon release, delaying gastric emptying, and reducing appetite via central mechanisms. Pharmacological agents that replicate these actions—GLP-1 receptor agonists (GLP-1 RAs)—have redefined the management of type 2 diabetes mellitus and obesity. Objective: To review and summarize the pharmacological mechanisms, therapeutic efficacy, and emerging innovations related to GLP-1 receptor agonists in metabolic disease management. Methods: Recent literature (2018–2025) was systematically reviewed, including pharmacological evaluations of agents such as liraglutide, semaglutide, and tirzepatide. Results: GLP-1 receptor agonists produced significant reductions in HbA1c levels, promoted weight loss, and demonstrated cardiovascular risk reduction relative to conventional antidiabetic therapies. Adverse effects were primarily gastrointestinal and dose-dependent but transient. Conclusion: GLP-1 receptor agonists represent a major advancement in metabolic therapeutics, offering integrated benefits in glucose regulation, weight reduction, and cardiovascular protection. Continued innovation in incretin-based therapy promises next-generation formulations with superior efficacy, safety, and patient adherence.

Keywords: GLP-1 receptor agonists, incretin mimetics, semaglutide, tirzepatide, diabetes mellitus, obesity, metabolic syndrome

PP68. DIRECT SINGLE MOLECULE DETECTION AND SUPER RESOLUTION IMAGING WITH A LOW COST PORTABLE SMARTPHONE BASED MICROSCOPE

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ABSTRACT

Detecting single molecules, which represents the ultimate level of sensitivity, is typically achieved with research grade equipment. Here we present a low cost, portable smartphone based fluorescence microscope capable of detecting single molecule fluorescence

directly, i.e. without the need for any signal amplification. The setup leverages the image sensors and data handling capacity of mass produced smartphones, it is adaptable to different smart phones and capable of detecting single molecules across the visible spectral range. We show case this capability through single molecule measurements on DNA origami models and super resolution microscopy of cells by single molecule localization microscopy. Last, we illustrate its potential as a point of care (POC) device by implementing a single molecule bioassay for RNA detection. This development paves the way for innovative applications of massively distributed or personalized assays with single molecule sensitivity in various fields such as digital bioassays, POC diagnostics, field expeditions, STEM outreach and life science education.

PP69. IN SILICO SCREENING AND 2-D QSAR OF 1,4-DIHYDROQUINAZOLINE DERIVATIVES AS POTENTIAL COX-2 INHIBITORS

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ABSTRACT

Cyclooxygenase-2 (COX-2) is an inducible enzyme involved in the synthesis of prostaglandins responsible for inflammation and pain. Conventional nonsteroidal anti-inflammatory drugs (NSAIDs) inhibit both COX-1 and COX-2, often leading to gastrointestinal and renal side effects. Therefore, developing selective COX-2 inhibitors is a promising approach to achieve effective anti-inflammatory activity with reduced toxicity. In this study, 1,4-dihydroquinazoline derivatives were evaluated through in silico molecular docking and 2-D QSAR analysis to identify potential selective COX-2 inhibitors. Molecular docking was performed using the COX-2 crystal structure to examine ligand–protein interactions. The compounds exhibited strong binding affinities, forming key hydrogen bonds and hydrophobic interactions with amino acid residues such as Arg120, Tyr355, and Ser530 within the COX-2 active site. These findings indicate a strong potential for COX-2 inhibitory activity. A 2-D QSAR model was developed using multiple linear regression (MLR) to correlate physicochemical descriptors, including hydrophobicity (log P), molar refractivity, and electronic parameters, with biological activity. The model showed good statistical significance. Further, ADMET analysis confirmed that the selected derivatives possessed favourable pharmacokinetic profiles and complied with Lipinski's rule of five, suggesting good oral bioavailability and safety. Overall, this integrated computational study demonstrates that 1,4-dihydroquinazoline derivatives can serve as promising scaffolds for the design of novel, selective COX-2 inhibitors, providing a foundation for future synthesis and biological evaluation of potent anti-inflammatory agents.

PP70. UNLOCKING ORAL HEALING MECHANISMS: BIOINSPIRED NANOVESICULAR GEL OF SALIVARY PEPTIDE FOR ENHANCED DIABETIC WOUND HEALING.

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ABSTRACT

Oral wounds exhibit remarkably accelerated and more efficient healing compared to dermal injuries—a phenomenon even observed in animals that instinctively lick their wounds to facilitate recovery. This remarkable healing capability is primarily attributed to saliva and its bioactive constituents, which actively modulate tissue repair by stimulating cellular proliferation, migration, and immune regulation. Among these constituents, histatins are histidine-rich, low molecular weight salivary peptides renowned for their potent antimicrobial and regenerative properties. Histatins contribute to wound healing through their anti-inflammatory effects, promotion of re-epithelialization, fibroblast proliferation, and angiogenesis. The present study focuses on the development of a biofilm-targeted wound dressing predicated on histatin peptides. A patented nanovesicular system (NVS, Patent No. 341360) previously developed in our laboratory was employed for the encapsulation of histatins. The NVS exhibited exceptional capability to accommodate hydrophilic biomolecules, safeguarding them from enzymatic degradation while ensuring sustained and localized delivery. To enhance the formulation's applicability on wounds, the peptide-loaded NVS was integrated into a thermosensitive in-situ forming hydrogel that transitions from a low-viscosity solution to a conformal gel upon application. This hybrid nanovesicular hydrogel provides superior adhesivity, enhanced mechanical integrity, and a moist environment conducive to tissue regeneration. Preliminary in-vitro evaluations revealed that the histatin-loaded nanovesicular gel significantly augmented fibroblast migration, accelerated re-epithelialization, and upregulated biomarkers associated with angiogenesis and extracellular matrix remodeling. The developed biomimetic and nanotechnology-enabled formulation represents a promising and clinically translatable strategy that integrates nature's intrinsic healing mechanisms with advanced drug delivery design for the effective management of chronic and infected wounds.

PP71. A COMPARATIVE STUDY ON SIVANARVEMBU : A SIDDHA DRUG OF CONTROVERSIAL ORIGIN

Gurleen Kaur[1], Prof. Maninder karan[1], Vanshika chayal[1], Prof. Jai Malik[1]
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ABSTRACT

The present study focuses on a comparative pharmacognostic and phytochemical evaluation of two different botanical sources of Sivanarvembu, namely Justicia tranquebariensis and Indigofera aspalathoides, which are both used in Siddha medicine for their anti-inflammatory and wound-healing properties. Since both species are interchangeably used under the same vernacular name, this study aims to differentiate them through detailed pharmacognostic and phytochemical analyses. A comparative macroscopic evaluation was performed to observe distinguishing morphological features such as leaf shape, size, color, and texture. Microscopic and quantitative microscopic evaluations were carried out to study the anatomical differences, including stomatal index, vein-islet number, vein termination number, and trichome characteristics. Physicochemical parameters, such as loss on drying, total ash, acid-insoluble ash, water-soluble ash, and extractive values (in different solvents), were determined to assess the quality and purity of both samples. Furthermore, a comparative Thin Layer Chromatography (TLC) fingerprint profile was developed for both species to identify characteristic phytochemical patterns and establish distinguishing markers. Preliminary phytochemical screening revealed the presence of alkaloids, flavonoids, tannins, glycosides, and phenolic compounds in both plants, with quantitative variations between them. The findings of this study provide reliable diagnostic, analytical, and phytochemical parameters that help differentiate the two sources of Sivanarvembu. This work supports the correct identification, authentication, and standardization of the drug and ensures its safe and effective use in traditional and modern herbal formulations

PP72. ADAR1 AS PROGNOSTIC MARKER OF COLORECTAL CANCER AND PREDICTOR OF CHEMOTHERAPY EFFICACY

Aditi Kapoor[1], Anagha Kaundal[1], Vanshika Sharma[1]
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ABSTRACT

Colorectal cancer (CRC) ranks as third most common diagnosed cancer worldwide.It's percentage occurrence is higher in developing countries due to lifestyle and dietary transitions. Many advances have been made for prognosis,diagnosis and treatment of

cancer,especially in the introduction of molecularly targeted therapies. The adenosine deaminase acting on RNA (ADAR1) are RNA-editing enzymes that play essential physiological role including controlling development and immune response.These enzymes are being researched for cancer control. ADAR1 is an RNA-editing enzyme which converts adenosine into inosine.ADAR1 enzyme is produced in higher proportions in cancerous tissue. Higher ADAR1 expression is found to be linked with metastasis of lymph nodes and distant organs. More recent studies have presented ADAR1 to be involved in tumor invasion and metastasis in CRC, promoting tumor aggressiveness and suppressing innate immune responses.ADAR1 editing may alter the functioning of tumor suppressor RNAs and lead to tumor proliferation and metastasis. ADAR1 works as a dual biomarker- as a prognosis tool for CRC and predictor of chemotherapy efficacy. Higher ADAR1 expression indicates poor prognosis which correlates to lower OS(overall survival) of patient. ADAR1 expression also demonstrates its connection with chemotherapy efficacy. Lower ADAR1 expression stipulate lower resistance to chemotherapy treatment. Further research is required to sustain its clinical application and RNA mechanisms in response to CRC progression. Advances can result in better patient segmentation and clinical outcomes.

PP73. LIGNIN-BASED RB@BIMETALLIC NANOCONJUGATES: A PLATFORM FOR EFFICIENT ANTIMICROBIAL PHOTODYNAMIC THERAPY AGAINST PATHOGENIC BACTERIA

Avneet Kaur Grewal[1], Dr Seema Kirar[2], Dr Moushumi Ghosh[3], Dr Jayeeta Bhaumik[2]

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ABSTRACT

Lignin, the second most plentiful constituent of lignocellulosic biowaste, can be readily refined from agricultural and industrial plant waste fractions. This renewable and aromatic biopolymer is sustainable and cost-effective, and offers a biocompatible platform for fabricating multifunctional nanomaterials due to its inherent structural and chemical versatility. Due to its polyphenolic nature, it possesses antioxidant and antibacterial properties, which make it an excellent reducing and stabilizing agent. Rose Bengal (RB) is an inexpensive, highly water-soluble dianionic fluorescent dye with significant therapeutic potential. However, RB remains limited to diagnostic use due to its hydrophilicity and short half-life, restricting membrane permeability, cell uptake, and biodistribution. To minimize these disadvantages of RB, it could be conjugated with a biopolymer to give aPDT for microbial cell eradication via the generation of reactive oxygen

species (ROS) when irradiated with an appropriate wavelength of light. This study uses lignin as a stabilizing matrix to synthesize gold-silver bimetallic nanoparticles (NPs). Further, it is loaded with Rose Bengal (RB) to form nanoconjugates (NCs) for enhanced antimicrobial photodynamic therapy (aPDT). The synthesized RB@Bim NCs were characterized by UV-Vis spectroscopy, dynamic light scattering (DLS) analysis for size and zeta potential, and FTIR, which confirmed the nanoscale size distribution, successful bimetallic nanoparticle synthesis, and their conjugation with RB, respectively. These nanoconjugates showed efficient bactericidal action (aPDT) against *Staphylococcus aureus* and *Escherichia coli*.

PP74. TOPICAL FORMULATION OF AZELAIC ACID AND ROSEMARY ESSENTIAL OIL FOR TREATMENT OF ACNE.

Chinnari sai sumanth[1], Shikha Mahant[1]

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ABSTRACT

Abstract Acne vulgaris affects over 20% of individuals aged 16 and above, with peak prevalence (28.3%) among those aged 16–24 years. Globally, cases have surged from 132 to 184 million, with India contributing over 30 million. Acne vulgaris is one of the most common chronic inflammatory skin diseases of the pilosebaceous unit characterized by comedones, papules, pustules, and acne scars. The main pathogenic mechanisms of the disease, i.e. follicular hyperkeratinization, seborrhea, proliferation of Cutibacterium acnes, and inflammation, determine the treatment regimens. The use of Traditional drugs in the treatment of acne is often accompanied by symptoms, such as dry skin, irritation, and resistance to microbial agents, thereby necessitating the search for better alternatives. This article reviews the therapeutic potential of a topical azelaic acid and rosemary essential oil combination in acne management. Azelaic acid confers antimicrobial, anti-inflammatory, and keratolytic effects, and rosemary essential oil delivers antioxidant, antibacterial, and sebum-regulating activities through its bioactive molecules such as cineole, camphor, and α-pinene. The formulation is intended to improve skin-targeted delivery, effectiveness, and patient compliance with less toxicity. Conclusion Overall, the therapeutic use of azelaic acid in combination with rosemary essential oil represents a natural, patient-friendly, and promising strategy for acne management. This combination effectively targets both microbial and inflammatory pathways while enhancing the cosmetic appearance and overall treatment outcome.

PP75. LYMPHATIC UPTAKE KEY: TAILORED NANOSTRUCTURED LIPID CARRIERS FOR TARGETED DRUG DELIVERY

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ABSTRACT

Introduction: Nanostructured lipid carriers (NLCs) are partially crystalline lipid nanoparticles that improve loading and oral delivery of lipophilic drugs. Poor oral bioavailability—driven by intestinal degradation and hepatic first-pass metabolism is a major limitation for many lipophilic therapeutics; targeted intestinal lymphatic uptake via oral NLCs offers a practical solution. Methods: (formulation & evaluation): NLCs use optimized solid:liquid lipid blends (e.g., Precirol or Compritol with LCT), 1.5–5% surfactant, and scalable production methods including high-pressure homogenization, solvent methods, melt emulsification with ultrasonication, and solvent-diffusion. Key evaluations include particle size and zeta potential, entrapment efficiency, in vitro release, ex-/in-vitro intestinal permeability , and in vivo pharmacokinetics with lymphatic tracing. Results: Optimized NLCs from the comparison produced particle sizes clustered ~55–205 nm, low PDI (≤ ~0.3) and typically negative zeta potentials (≈ −25 to −44 mV), indicating good colloidal stability. FTIR and PXRD showed reduced crystalline ordering, supporting improved apparent solubilization. Entrapment efficiencies were generally high—commonly >85% and often approaching quantitative entrapment—while loading capacity correlated with lipid composition and drug–lipid compatibility. Drug loading increased as the liquid-lipid fraction and overall lipid solubilization were optimized. Manufacturing methods achieved controlled particle size, low PDI, high entrapment and scalable yields by tuning temperature, shear, solvent removal rate and surfactant levels, with reproducible batch-to-batch performance. Conclusion: Rational NLC design selecting long-chain lipids, suitable surfactants, and protective strategies can substantially enhance intestinal lymphatic uptake and oral bioavailability of lipophilic drugs. A standardized pipeline of physicochemical, permeability, and in vivo lymphatic PK testing will streamline to accelerate translational development.

PP76. LIPOSOMAL DRUG DELIVERY SYSTEM: INNOVATIONS AND EMERGING TRENDS IN NANOMEDICINE.

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ABSTRACT

Abstract: Liposomal drug delivery systems represent a versatile and promising approach in the field of nanomedicine, offering improved drug solubility, bioavailability, and targeted delivery. Liposomes are nanoscale vesicles composed of one or more phospholipid bilayers surrounding an aqueous core. Their unique structural properties allow the encapsulation of both hydrophilic and lipophilic drugs, making them suitable for a wide range of therapeutic applications. The design flexibility of liposomes enables precise control over drug release kinetics, biodistribution, and cellular uptake. Surface modifications such as PEGylation can enhance circulation time by reducing immune recognition, while ligand-based targeting strategies can direct liposomes to specific tissues or cells, minimizing off-target effects. Furthermore, advancements in stimuli-responsive liposomes triggered by changes in pH, temperature, or enzyme activity enable site-specific release, enhancing therapeutic efficacy while reducing systemic toxicity. Liposomal systems are being explored for applications across various disease areas, including cancer, infectious diseases, inflammatory disorders, and gene therapy. In addition to therapeutic delivery, liposomes are increasingly used as carriers for vaccines and diagnostic agents, highlighting their multifunctional potential. This poster will provide an overview of the latest developments in liposomal drug delivery, including formulation strategies, delivery mechanisms, current research applications, and emerging trends. As the demand for targeted and personalized therapies continues to grow, liposomal carriers are poised to play a central role in shaping the future of drug delivery and nanomedicine.
Keywords: Liposomal drug delivery, Nano medicine, targeted drug delivery.

PP77. FORMULATION OF NANOCARRIERS OF ACORUS CALAMUS ESSENTIAL OIL FOR AMELIORATION OF DIABETES-INDUCED MEMORY DYSFUNCTION IN RATS

Ojashwini[1], Rizul[1], Dr. Lakshita Rao[1]
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ABSTRACT

Memory dysfunction is a common and serious complication of diabetes mellitus, resulting from persistent hyperglycemia-induced oxidative stress and impairment of the cholinergic

system. This review explores the potential of *Acorus calamus* essential oil (ACEO) formulated as solid lipid nanoparticles (SLNs) for management of diabetes-induced cognitive deficits. Existing literature on SLN formulation methods, including hot homogenization and ultrasonication, lipid and surfactant selection, and nanoparticle characterization techniques such as dynamic light scattering (DLS) and transmission electron microscopy (TEM), is summarized. Behavioral and biochemical evidence from in vivo studies using streptozotocin (STZ)-induced diabetic models is reviewed, focusing on cognitive assessment through behavioral tests and markers including acetylcholinesterase activity and oxidative stress. The review highlights how nanoencapsulation strategies improve the brain bioavailability and sustained release of ACEO, enhancing its neuroprotective effects. The comprehensive analysis suggests that SLN-based delivery of *Acorus calamus* essential oil holds promise as a novel approach to counteract diabetes-associated memory impairment. This review synthesizes current research on the formulation and therapeutic potential of *Acorus calamus* essential oil-loaded solid lipid nanoparticles for neuroprotection in diabetic cognitive dysfunction. By consolidating formulation techniques and preclinical evidence, it provides critical insights into how nanotechnology can overcome delivery challenges of phytoconstituents to the brain. The information presented offers a scientific foundation for future experimental designs aiming to develop effective nanotherapeutics targeting oxidative stress and cholinergic deficits in diabetes-induced memory decline.

PP78. SPONGE-LIKE GOLD NANOPARTICLES: A MESOPOROUS LEAP TOWARD ULTRA-SENSITIVE OVARIAN CANCER DIAGNOSTICS

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ABSTRACT

Introduction: Early detection of ovarian cancer remains a major clinical challenge due to the extremely low concentration of tumor biomarkers in biological fluids. Gold nanoparticles (AuNPs) have long been valued for their optical and electrochemical properties, yet their solid morphology limits sensitivity. Scope: This study explores mesoporous gold nanoparticles (mAuNPs)—a novel, sponge-like nanostructure engineered to enhance biomolecular detection through increased surface area and electron transfer efficiency. Methodology: mAuNPs were synthesized using a block copolymer-directed micellization approach, followed by nucleation and controlled growth to yield uniformly

porous particles. The nanoparticles were characterized by SEM, TEM, and UV–Vis spectroscopy, and evaluated for biosensing performance using ovarian cancer biomarkers (CA-125, HE4). Result and Discussion: The mesoporous design significantly improved probe immobilization and facilitated rapid electron/optical signal transduction. Comparative analyses revealed up to a tenfold increase in signal intensity and a 1000-fold reduction in detection limit compared to non-porous AuNPs. Conclusion: mAuNPs offer a powerful, next-generation platform for ultrasensitive, label-free ovarian cancer diagnostics, with strong potential for integration into miniaturized, point-of-care biosensing devices.

Keywords: Mesoporous gold nanoparticles; Ovarian cancer biomarkers; Nanobiosensors; Plasmonic enhancement; Electrochemical detection; CA-125; Point-of-care diagnostics.

PP79. FORMULATION OF LIPID BILAYER VESICLES OF ORIGANUM VULGURE ESSENTIAL OIL ACTIVITY AGAINST DIABETES.

Rizul[1], Ojashwini[1], Dr. Lakshita Rao[1]

[1] *School of Pharmaceutical Sciences, Shoolini University, Solan 173229*

ABSTRACT

Diabetes mellitus is a chronic metabolic disorder characterized by hyperglycemia that results in oxidative stress and inflammatory complications. *Origanum vulgare* (oregano) essential oil contains carvacrol and thymol, which are highly potent antioxidant, anti-inflammatory, and antidiabetic agents. However, essential oils have limited applications due to their poor water solubility, instability, and rapid degradation. Liposomal delivery systems are a viable option to enhance essential oil's bioavailability, stability, and controlled release. In this work, liposomes loaded with *Origanum vulgare* essential oil were prepared by the thin film hydration method and phospholipid-to-oil ratios and hydration conditions were optimized to obtain a high encapsulation efficiency. Particle size, zeta potential, and transmission electron microscopy were used to evaluate the liposomes' physicochemical characteristics. The entrapment efficiency and the in vitro release profiles were used to evaluate the stability of the formulation. In vitro assays such as α-glucosidase and α-amylase inhibition as well as antioxidant assays like DPPH radical scavenging were used to test the antidiabetic activity of the liposomal formulation.The main aim of this work is to assess how the liposomal formulation of *Origanum vulgare* essential oil enhances stability, bioavailability, and provides a controlled release, thus potentiating the antidiabetic and antioxidant activities by inhibiting carbohydrate-digesting enzymes and lessening oxidative stress, thereby providing a safer natural alternative solution to diabetes management.

PP80. E-CIGARETTES AND TUBERCULOSIS: BIOLOGICAL PLAUSIBILITY, DIAGNOSTIC PITFALLS, AND EMERGING EVIDENCE

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ABSTRACT

In 2023, TB case notifications hit record highs, revitalising global concern about the spread of preventable respiratory disease. Meanwhile, e-cigarette use has seen an upsurge, especially among young adults and those quitting combustible tobacco, raising a public health question: could e-cigarettes increase TB vulnerability? Evidence is emerging, but current findings suggest the need for further study. The poster explores potential links between e-cigarettes and TB in biological mechanisms, clinical observations, and population data. While epidemiologic data on TB incidence among exclusive e-cigarette users are limited, lab studies show that e-cigarette aerosols can impair alveolar macrophages, reduce phagocytosis of *Mycobacterium tuberculosis*, alter cytokine responses, and increase oxidative stress, factors key to early TB control failure. Clinically, case reports link E-Cigarettes to non-tuberculous mycobacterial infections and lung injuries resembling miliary TB, risking misdiagnosis. Since traditional smoking is a known TB risk factor, E-Cigarettes might pose similar or additive risks, especially among dual users. With TB rising worldwide, especially in high-incidence countries like India, urgent cohort studies are needed to determine e-cigarette-related risks. Until then, clinicians should assess E-Cigarettes during TB evaluations and be cautious with radiologic findings that may mimic TB.

Keywords: tuberculosis; *Mycobacterium tuberculosis*; electronic cigarettes; E-Ciggaretes; ENDS; alveolar macrophages; phagocytosis; non-tuberculous mycobacteria; EVALI; respiratory infection; dual use; diagnostic mimicry

PP81. FROM INSOLUBLE TO BIOAVAILABLE: A COCRYSTAL APPROACH TO DRUG SOLUBILITY CHALLENGES.

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ABSTRACT

Pharmaceutical cocrystals have gained significant attention in recent years as a novel strategy to optimize the physicochemical properties of active pharmaceutical ingredients (APIs)

without altering their pharmacological activity. Comprising the API and a pharmaceutically acceptable coformer in a defined stoichiometric ratio, cocrystals are held together by non-covalent interactions such as hydrogen bonding, π–π stacking, or van der Waals forces. This unique approach offers a versatile platform to improve drug solubility, dissolution rate, stability, and bioavailability—key challenges in the development of poorly water-soluble drugs. With an increasing number of APIs falling under BCS Class II and IV, cocrystallization has become a valuable tool in formulation science. In addition to enhancing solubility, cocrystals can improve mechanical properties, compressibility, and even taste masking, thereby supporting both manufacturing efficiency and patient compliance. The FDA and EMA have recognized pharmaceutical cocrystals as distinct solid forms, which has further accelerated research and regulatory acceptance. This poster will highlight recent advances in cocrystal design, screening methods, and scalable production techniques such as solvent evaporation, neat and liquid-assisted grinding, and supercritical fluid processes. Furthermore, analytical characterization using PXRD, DSC, FTIR, and single-crystal X-ray diffraction will be explored to confirm cocrystal formation and purity. In conclusion, pharmaceutical cocrystals represent a transformative approach in drug formulation, offering significant advantages in overcoming solubility and stability barriers in modern pharmaceutical development.

Keywords: Pharmaceutical co-crystals, active pharmaceutical ingredient, coformer, solubility enhancement.

PP82. PREPARATION AND EVALUATION OF MICROEMULSION CONTAINING BERBERINE HCL AND CALLISTEMON CITRINUS OIL FOR WOUND HEALING

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ABSTRACT

This study aimed to develop and evaluate a microemulsion gel containing Berberine HCl and *Callistemon citrinus oil* to enhance wound healing. The microemulsion was prepared using a spontaneous emulsification technique, and stability, compatibility, globule size, and morphology were thoroughly characterized. The optimized formulation (mean globule size: 24.33 nm) was incorporated into a Carbopol 940 gel to improve topical delivery and viscosity. Key evaluations included rheology, spreadability, ex vivo skin permeation and retention, and in vivo wound

healing in murine excision models. Results showed desirable pseudoplastic rheology and increased spreadability; further, the microemulsion gel exhibited significantly improved skin permeation and retention compared to a plain gel. In vivo, the microemulsion gel group demonstrated faster wound contraction and reduced epithelization time versus controls. In conclusion, the developed Berberine HCl and *Callistemon citrinus oil* microemulsion gel facilitates effective topical drug delivery and noticeably accelerates wound healing by maximizing permeation and harnessing the synergistic effects of its natural constituents

PP83. ATTENUATING EFFECT OF STANDARDIZED LYOPHILIZED CINNAMOMUM ZEYLANICUM BARK EXTRACT AGAINST STREPTOZOTOCIN-INDUCED EXPERIMENTAL DEMENTIA OF ALZHEIMER'S TYPE

Santosh Choudhary[1], Kavita Munjal[1], Rahul Deshmukh[1], Jai Malik[1] [1]University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh

ABSTRACT

The bark of Cinnamomum zeylanicum (CZ; family Lauraceae), a valued spice, has long been recognized for its stimulant and nervine tonic properties. This study evaluated the neuroprotective effect of standardized lyophilized aqueous extract of CZ bark (LCZE) on streptozotocin (STZ)-induced dementia of Alzheimer's type in mice. LCZE was standardized by high-performance thin-layer chromatography (HPTLC) using cinnamaldehyde as a marker compound. Mice were administered LCZE orally at doses of 50, 100, and 200 mg/kg. Cognitive performance was assessed through the Morris water maze (MWM) and object recognition test (ORT). Oxidative stress parameters and acetylcholinesterase (AChE) activity were analyzed in the cerebral cortex and hippocampus. LCZE significantly ($p < 0.05$) and dose-dependently attenuated STZ induced cognitive deficits. Treatment with LCZE (100 and 200 mg/kg) markedly improved spatial learning and memory in the MWM test, evidenced by increased time spent in the target quadrant and reduced transfer latency. In the ORT, LCZE-treated animals demonstrated enhanced discrimination between familiar and novel objects. Furthermore, LCZE restored altered oxidative stress markers and normalized AChE activity in both brain regions. These findings indicate that LCZE exerts potent neuroprotective and memory-enhancing effects, likely mediated through its antioxidant and anti-AChE mechanisms. Thus, Cinnamomum zeylanicum bark extract holds therapeutic potential in the management of dementia of Alzheimer's type.

Keywords: Cinnamomum zeylanicum, oxidative stress, dementia, acetylcholinesterase, memory enhancement, dalchini

PP84. A CHEMOMETRIC-GUIDED APPROACH FOR EXTRACTION OPTIMIZATION AND DEVELOPMENT OF A VALIDATED HPTLC-METHOD FOR STANDARDIZATION OF CONVOLVULUS PLURICAULIS CHOIS

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ABSTRACT

Convolvulus pluricaulis is an indigenous Indian herb used as a Medhya Rasayana (nervine tonic) for memory enhancement and other CNS disorders. The memory enhancing activity of this plant has been attributed to scopoletin and scopolin. Most of the analytical methods that have been developed use scopoletin as the marker compound. The present investigation aimed to develop and validate a high performance thin layer chromatography (HPTLC) method for quantification of scopolin in the extract, and to optimize extraction procedure for the plant. A new HPTLC method for scopolin quantification was developed using a chloroform: methanol (8.5: 1.5 v/v) as mobile phase, and was validated for precision, robustness, linearity, and recovery per ICH guidelines. To optimize the extraction procedure, plant material was extracted using reflux, Soxhlet, maceration, and sonication with 50% ethanol. Maximum yield of marker compounds was the parameter used for optimization. The results showed that sonication for 45 minutes with 50% aqueous ethanol provided the optimum balance of marker yield and time efficiency. Though Ayurveda suggest the use of aerial parts, but our study showed that amongst different plant parts roots contained the maximum content of both marker compounds, followed by stems and leaves. Furthermore, according to Ayurveda, best period for collecting C. pluricaulis is April-September but our study showed that the samples that were collected in December had higher content of both the bioactive markers.

PP85. PHARMACOGNOSTICAL STUDIES AND EVALUATION OF QUALITY PARAMETERS OF *BUTEA FRONDOSA* LEAVES

Anu Chaudhary[1], Munish Kumar[2], Jai Malik[1],
[1]I.S.F. College of Pharmacy, Moga, (Punjab), India, [2]University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh

ABSTRACT

Butea frondosa Roxb. & Koen. syn. *B. monosperma* Lam. (Leguminosae or Fabaceae), known as flame of the forest in English and palasa in Sanskrit, is a medium-size deciduous tree that grows all over India. Bark, flowers, seeds, and gum are mostly utilized in traditional medicines to treat diabetes, snake bites, and other ailments. Establishing the pharmacognostical and quality control criteria of *Butea frondosa* leaves was the goal of the current study. Numerous microscopic characteristics were identified, including the transverse section of the leaf and quantitative parameters such as the size of the trichomes, vein-islet and termination number, stomatal number, and stomatal index. Fluorescence analysis and powder microscopic investigations were also carried out. Additionally, physio-chemical parameters were measured, including moisture content (0.1% w/w), extractive values (alcoholic and aqueous), foreign matter (1.2%), total, water-soluble, and acid-insoluble ash (3.75, 0.75, and 0.65% w/w, respectively). The hydro-alcoholic extract's initial phytochemical analysis revealed the presence of sugars, steroids, flavonoids, and saponins. TLC fingerprint profile was also developed for the extract. The present study will help in establishing the identification and purity of the crude raw material. : Scopolin, Scopoletin, HPTLC.

PHYSICAL SCIENCES

- **Physics**
- **Nanoscience & Nanotechnology**
- **Medical Physics**

Sectional President
Prof S.K. Tripathi

Sectional Secretary
Dr Gulsheen Ahuja
Dr Neeru Chaudhary

CHASCON 2025

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November 06 - 08, 2025

Section: Physical sciences

Program

November 07, 2025

Venue: Seminar hall

Sectional President	**Sectional Secretary**
Name – Prof S.K. Tripathi Mobile - 9876581267	Name – Dr. Neeru Chaudhary, Dr. Gulsheen Ahuja Mobile – 8288892075; 9814012666

Time	**Program**
09:30-10:00	Inauguration of Sectional Program ***Venue: Seminar hall***
10:00-11:00	**Session Chair:** Prof. Ashok Bhati **Speaker:** Dr Amit Bahl, Professor, Department of Radiotherapy and Oncology, PGIMER, Chandigarh ***Title "Cancer awareness: The Present and Future"***
11:00-11:30	Tea Break
11:30-13:00	Oral Presentation (Physical Sciences) ***Venue: Seminar hall*** Oral Presentation (Management sciences) ***Venue: Main auditorium***
13:00-14:00	Lunch
14:00-4:00	Poster Presentation (Physical and Management sciences) **Venue:** Department of Physics (Ground floor) **Tea break from 16:00-17:00**

Abstract of Invited Talk

Title: Cancer Awareness: The Present and Future

Dr Amit Bahl, Professor, Department of Radiotherapy and Oncology, PGIMER, Chandigarh

Cancer is a dreaded disease characterized by abnormal and unregulated cell proliferation. Cancer cells invade adjacent healthy tissues and can spread to distant organs. A rising trend of this disease has been observed in our country in recent times making it a significant public health problem. Head and neck , breast , cervical and GI cancers are showing an increasing incidence in our country. Being aware of the different aspects of this disease and its presenting symptoms is necessary as there is still a lot of misinformation about cancers in general public. Understanding the etiology can help promote a healthy attitude towards cancer prevention and also help early detection and improve treatment outcomes. Screening programs and vaccines have also been developed to prevent the disease. Lifestyle factors are increasingly being implicated in the causation of this disease making community health education very useful. Smoking and alcohol consumption have merged as significant risk factors for this disease.

Surgery, radiotherapy, chemotherapy are the main therapeutic modalities used for treating cancer patients. Targeted therapy and immunotherapy are newer emerging treatment modalities. Recent advances in diagnosis and management have improved treatment outcomes and increased survival rates in cancer patients.

7th November is observed as the National Cancer Awareness day in our country to highlight the fact that cancer can be prevented and cured if detected at an early stage.

Abstracts of Oral Presentations

Oral Presentation- Physical Sciences		
OP1	Dr. Manish Dev Sharma	Indigenous technique for the preparation of monolayered cellular smears as an affordable healthcare for all
OP2	Mr. Basant Sura	Investigation of Dissipation Effects in Fusion–Fission Dynamics of 19F + 181Ta and 16O + 184W Systems Forming 200Pb
OP3	Ms. Komal	ER-gated spin distribution measurements
OP4	Dr. Rajneet Kaur	Influence of Higher-Order Corrections on High-Frequency Solitons in Multicomponent Plasmas
OP5	Ms. Versha Rani	Exploring Fritzsch like texture specific mass matrices
OP6	Ms. Aru Mittal	Nanophysics for targeted drug delivery: Empowering healthcare at the Nanoscale
OP7	Ms. Havisha	Primordial Black Hole and Neutrino Interaction in the Context of Cosmic 21-cm Signal
OP8	Ms. Khushpreet Kaur	Quality checks of gem detector and analysis of noise rate at mild radioactivity
OP9	Ms. Nandini Chaudhary	The Physics of the Invisible: How Marie Curie’s Curiosity Lit Up Human Health

ABSTRACTS OF ORAL PRESENTATIONS

OP1. INDIGENOUS TECHNIQUE FOR THE PREPARATION OF MONOLAYERED CELLULAR SMEARS AS AN AFFORDABLE HEALTHCARE FOR ALL

Dr Shelly Sharma[1], Dr Manish Dev Sharma[2]
[1] Department of Cytology PGIMER Chandigarh, [2] Department of Physics Panjab University Chandigarh

ABSTRACT

Smears for monolayered cellular 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. For preparing single layered cellular smears in remote areas and in laboratories where there is limited workload, this innovative and novel technique can be utilized in routine laboratory indigenous technique as a big help in affordable health care.

OP2. INVESTIGATION OF DISSIPATION EFFECTS IN FUSION–FISSION DYNAMICS OF 19F + 181TA AND 16O + 184W SYSTEMS FORMING 200PB

Basant Sura[1], B. R. Behera[1]
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ABSTRACT

A systematic study of fusion–fission dynamics has been performed for the systems 19F + 181Ta and 16O + 184W, both leading to the same compound nucleus 200Pb. The objective of this work is to investigate the role of nuclear dissipation on pre-scission neutron emission and fission dynamics. Statistical model calculations have been carried out using the VECSTAT code with varying dissipation strength (β) and the CCFULL code to obtain fusion cross sections and spin distributions. The calculations include effects of shell correction, rotational collective enhancement, and level density modification. The predicted pre-scission neutron multiplicities (νpre) and fusion cross sections have been compared with available experimental data. The results show that (νpre) increases with increasing dissipation strength, and at energies above the Coulomb barrier, the calculated values reproduce experimental trends well. However, at sub-barrier energies, discrepancies remain even at higher dissipation values, suggesting the need for refined theoretical treatments or additional experimental measurements at lower excitation energies.

OP3. ER-GATED SPIN DISTRIBUTION MEASUREMENTS

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ABSTRACT

Fusion excitation function data alone are not enough to test fusion models properly. To evaluate these models, one needs either very accurate measurements of the fusion excitation function or information about higher moments of the partial-wave distribution. The first moment of this distribution, called the mean spin (⟨l⟩), is the most accessible experimentally. It can be obtained from measurements of gamma-ray multiplicities, isomer ratios, or rotational state distributions. In this work, we focus on determining the mean spin using the gamma-ray multiplicity technique. Measurements have been taken place using the HYRA (HYbrid Recoil mass Analyser) facility coupled with TIFR 4π spin spectrometer at IUAC, New Delhi. We have detected the gamma-rays using the array of 29 NaI(Tl) detectors in coincidence with ERs at focal plane of HYRA in gas filled mode. We will describe the main steps of the data analysis from the conversion of fold to mean spin of gamma-rays and explain the role of different response matrices used in the process. These matrices are essential for converting the measured fold distributions into angular momentum distributions. We will show some preliminary results from the data for the 48Ti+122Sn system at beam energy 204 MeV and will show how it is consistent with the previous data in literature.

OP4. INFLUENCE OF HIGHER-ORDER CORRECTIONS ON HIGH-FREQUENCY SOLITONS IN MULTICOMPONENT PLASMAS

Rajneet Kaur[1], Samarjit Sihotra[1]

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ABSTRACT

The study of electron acoustic solitons (EASs) has gained considerable attention in recent years due to their occurrence in various plasma environments, including astrophysical and space plasmas, and their wide range of applications. These solitons arise from the coexistence of two electron populations with different temperatures: the cold electrons provide inertia, while the hot electrons generate the pressure needed to form the restoring force—similar to ion acoustic solitons (IASs) in electron–ion plasmas. In EAS dynamics, ions are generally treated as a stationary background because of their much slower response time compared to electrons. In this work, the evolution of electron acoustic and higher-order electron acoustic solitons in a non-Maxwellian plasma with an electron beam is investigated. Using the reductive perturbation method, nonlinear Korteweg–de Vries (KdV)-type inhomogeneous equations incorporating higher-order nonlinear and dispersive effects are derived. The obtained solutions reveal the influence of the electron beam and other plasma parameters on the characteristics of EASs and higher-order EASs. These results contribute to understanding nonlinear structures in space and laboratory plasmas, particularly within Earth's magnetosphere.

OP5. EXPLORING FRITZSCH LIKE TEXTURE SPECIFIC MASS MATRICES

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ABSTRACT

It seems that fermion masses and mixings provide a fertile ground to hunt for physics beyond the SM as well as pose a big challenge to understand these from more fundamental considerations. It may be noted that mixing angles and CP violating phases are very much related to the corresponding mass matrices, therefore, in view of this relationship, one has to essentially formulate the fermion mass matrices to unravel some of the deeper aspects of flavor physics. The mass matrices, having their origin in the Higgs fermion couplings, are arbitrary in the SM, therefore the number of free parameters available with a general mass matrix is larger than the physical observables. To this end, the idea of texture zero mass matrices wherein some of the entries of the mass matrices were proposed to be zero. As a result, a fewer number of free parameters imparted more predictability to mass matrices. In the present work, we have investigated in detail some of the ideas explored in the above reference. In particular, we have found the entire range of the viability of hierarchy defining parameters in the context of presently refined data.

OP6. NANOPHYSICS FOR TARGETED DRUG DELIVERY: EMPOWERING HEALTHCARE AT THE NANOSCALE

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ABSTRACT

The integration of nanoscience and physics has opened transformative possibilities in the field of healthcare. *Nanophysics*, which studies phenomena at dimensions between 1 and 100 nanometers, enables the manipulation of materials whose optical, electrical, and magnetic properties differ significantly from their bulk behavior. These nanoscale interactions are now being harnessed to develop targeted drug delivery systems, designed to release therapeutic agents precisely at diseased sites. Unlike traditional treatments that affect both healthy and unhealthy tissues, nanoparticle-based delivery utilises physical principles such as quantum confinement, diffusion dynamics, surface plasmon resonance, and magnetic guidance to achieve controlled and site-specific drug transport. Nanocarriers including liposomes, polymeric nanoparticles, gold nanorods, and magnetic nanoparticles are engineered using both passive targeting through the enhanced permeability and retention (EPR) effect and active targeting by ligand attachment to specific cellular receptors. Applications such as photothermal therapy, MRI enhanced drug guidance, and quantum dot imaging demonstrate the real world success of nanophysics in medicine. These advancements promise affordable, effective, and accessible healthcare, especially for regions lacking advanced medical infrastructure. Thus, nanophysics exemplifies how the smallest scales of matter can drive the largest transformations in human well being, aligning seamlessly with the CHASCON 2025 theme—"Empowering Humanity: Science, Technology and Healthcare for All."

OP7. PRIMORDIAL BLACK HOLE AND NEUTRINO INTERACTION IN THE CONTEXT OF COSMIC 21-CM SIGNAL

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ABSTRACT

This study investigates the impact of primordial black holes (PBHs) and neutrino interactions on the cosmic 21-cm signal, a cosmologically sensitive probe of the early universe. it examines deviations from the universal cosmological model (ΛCDM) by

considering unusual effects such as PBH formation and subsequent Hawking radiation with special focus on the energy injection in the intergalactic medium (IGM). The analysis comprises the neutrino self-interaction (νSI), a beyond-standard-model (BSM) effect where neutrinos scatter via a new mediator particle. The scattering leads to radiative scattering, producing photons that heat the IGM, thereby changing the 21-cm signal . The study explores the effects of the variation in the strengths of neutrino self-interactions on the 21-cm brightness temperature (T21), for varying scales of energy for emitted neutrinos. Results show that raising the effective self-interaction neutrino coupling results in diminishing the permissible range of β, which is a parameter for the fraction of the universe's total energy density being in the form of PBHs at their time of formation. This reduction in β, in turn, decreases the absorption dip in the cosmic 21-cm signal, proposing a possible mechanism for how theoretical predictions and observed outcomes from experiments such as EDGES (Experiment to Detect the Global Epoch of Re-ionization Signature) might be reconciled. The results provide further insight into the evolution of the universe during the dark ages and provide information about the nature of dark matter and physics of the early universe.

OP8. QUALITY CHECKS OF GEM DETECTOR AND ANALYSIS OF NOISE RATE AT MILD RADIOACTIVITY

Khushpreet Kaur[1], Bhawana[2], Dr. Sushil Singh Chauhan[3]

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ABSTRACT

The scope of this work is the quality check of 10*10 GEM detector and analysis of noise rate under mild radioactivity. These checks ensure the desirable and proper working of the detector under intense experimental conditions. Firstly, the foils are inspected for any mechanical defects through optical inspection. Then the electrical insulation of foils is accessed via resistance measurements at high voltages. After assembly of the foils into the detector, proper electrical isolation is confirmed via checking the electrical insulation between foils between them. Later, a gas leak test is performed verifying the mechanical integrity and gas tightness of the assembled GEM detector, ensuring no significant leakage chamber to maintain the gas purity necessary for consistent charge amplification. At last, the linearity test of the high voltage divider assesses the uniform voltage distribution across GEM foils to ensure homogeneous gain, preventing localized over- or under-amplification. Finally, intrinsic noise rate measurements characterize the detector's baseline electronic noise using mild radioactive sources, ensuring the detector can reliably discriminate true

particle signals from background fluctuations. Only foils and detectors that satisfy these rigorous QC criteria are approved for use, guaranteeing their performance and durability in the challenging experimental environment such as CMS or ATLAS.

OP9. THE PHYSICS OF THE INVISIBLE: HOW MARIE CURIE'S CURIOSITY LIT UP HUMAN HEALTH

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ABSTRACT

The theme "Empowering Humanity: Science, Technology, and Healthcare for All" highlights the responsibility of scientific progress to serve human well-being. In this spirit, the life and work of Marie SkÅ‚odowska Curie offer a timeless example of how knowledge, perseverance, and inquiry can together transform the world. Curie's discovery of radioactivity and her isolation of radium and polonium not only expanded the frontiers of physics and chemistry but also revolutionized medical treatment through the use of radiotherapy. Despite limited resources and institutional bias, Curie maintained exceptional scientific precision in her experimental methods, setting new standards for analytical measurement and material isolation. Her refusal to patent her findings prefigures today's debates on intellectual property and access to life-saving technology. During World War I, she applied her understanding of radiation to develop mobile X-ray units, marking an early integration of physics into clinical practice. This presentation revisits Curie's papers, Nobel lectures, and published archival materials to trace how her research practices anticipated principles of data transparency central to modern reproducibility. It then maps the enduring impact of her ethos in medical physics, linking her foundational studies to present-day imaging and cancer therapy. The analysis reveals how her legacy continues to define what it means to empower humanity through science and healthcare. Ultimately, Curie's legacy challenges modern science to measure progress not only by discovery, but by its willingness to serve humanity.

Abstracts of Poster Presentations

Poster Presentation- Physical Sciences		
PP1	Professor Samarjit Sihotra	High spin states in 96Ru
PP2	Dr. Amandeep Kaur	Investigating the Role of Centrifugal Potential on Microscopic Partitioning of Evaporation Residues Originating from 170Hf* formed via Different Entrance Channels
PP3	Mr. Amit	Role of Non-Collective Excitations in Shaping the Barrier Distribution of 20Ne + 90,92Zr Systems
PP4	Ms. Ankita Nain	Exploring unique texture for quark mass matrices
PP5	Mr. Chirag Garg	Implications of neutrino oscillations data on textures of leptonic mass matrices
PP6	Mr. Dikshit Gupta	Influence of equation of state on transport phenomena in heavy-ion collisions
PP7	Ms. Kiran	Systematic Study of Entrance Channel Effects on Fission Time Scales in the Medium Mass Region
PP8	Dr. Ritu	Investigation of Optical Properties of $Si_{10}As_{30}S_{60}$ Chalcogenide Glasses Using Spin Coating
PP9	Ms. Shakshi	Upconversion Nanoparticle-Based Biodegradable Nanocomposite Films for Advanced Packaging Applications
PP10	Ms. Neelam	Nanotechnology-Driven Elicitation: A Novel Approach to Enhance Secondary Metabolites, Antioxidant Defense, and Gene Expression in Ocimum tenuiflorum
PP11	Ms. Sushila Devi	Nanotechnology-Driven Comparative Investigation of Metal-Derived Mono- and Bimetallic Carriers for Effective Thymol Delivery
PP12	Ms. Anisha Yadav	Optical Dispersion of RF Magnetron Sputtered Molybdenum Oxide (MoO3) thin films using SPR Technique
PP13	Ms. Garima	Solid state nuclear strack detector
PP14	Ms. Gurnaman Kaur	Spin, splitting and scanning : the physics behind MRI
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PP16	Ms. Mansi	Single-Exposure Polarization Holography for Multi-Field Imaging Applications
PP17	Ms. Sahaj	Next-generation photovoltaics: the rise of lead-free perovskite solar cells
PP18	Ms. Jasleen Kaur Nagpal	Applications of Gamma-Gamma Coincidence Technique in Medical Imaging
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PP20	Upasana Sharma	An Insight To Pelletron Accelerator: A Tool for Nuclear And Material Sciene Research

ABSTRACTS OF POSTER PRESENTATIONS

PP1. HIGH SPIN STATES IN 96RU

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ABSTRACT

Nuclei in the A 100 mass region exhibit a wide variety of nuclear shapes ranging from spherical to highly deformed. High spin states in deformed odd-odd nuclei in the rare-earth are of utmost important during the recent past because of observation of a number of interesting phenomena. For the Ru nuclei approaching Z=50 from below, the proton Fermi surface lies near the oblate-driving high-ï • — orbitals of the intruder ï • °g9/2 subshell. The relevant intriguing triaxiality based phenomena such as magnetic rotation and degenerate twin bands and octupole corelations have been reported in this mass region [1]. The present work reports in-beam ï • §-ray spectroscopic measurements to study level structures in 96Ru nucleus. Excited states in 96Ru nucleus were populated in the 75As (28Si, 3p4n) fusion-evaporation reaction at Elab=120 MeV.

PP2. INVESTIGATING THE ROLE OF CENTRIFUGAL POTENTIAL ON MICROSCOPIC PARTITIONING OF EVAPORATION RESIDUES ORIGINATING FROM 170HF* FORMED VIA DIFFERENT ENTRANCE CHANNELS

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ABSTRACT

In the present work, the influence of centrifugal potential on evaporation residue (ER) cross-sections of 170Hf* formed in the reactions 28Si+142Ce and 46Ti+124Sn is explored. The analysis is carried out via the Dynamical Cluster-decay Model (DCM) by employing two prescriptions of the moment of inertia: the sticking and non-sticking approach. It has been observed earlier that, although the experimental ER cross-sections at a common reduced energy (Ecm/VB) are essentially identical for the two chosen reactions, the DCM calculated individual fragment contributions toward the ER differ. The use of sticking versions of the moment of inertia required relatively higher neck value and consequently smaller values of lmax. This may be attributed to the inherent definitions of the two versions of the moment of

inertia. Both the approaches confirm entrance-channel independence of ER cross-sections, but the microscopic partitioning of ER channels is significantly affected. Particularly, the non-sticking approach suggests relatively larger contributions from emission channels A2=2,3,4 as compared to the sticking case, due to the reduced centrifugal hindrance associated with lighter fragments. However, 1n channel continues to dominate the overall ER yield. These findings establish that, while the macroscopic ER yield remains robust, the microscopic decay pathways are sensitive to the treatment of centrifugal potential and entrance-channel dynamics.

PP3. ROLE OF NON-COLLECTIVE EXCITATIONS IN SHAPING THE BARRIER DISTRIBUTION OF 20NE + 90,92ZR SYSTEMS

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ABSTRACT

It is well known that the coupling between the internal degrees of freedom of colliding nuclei—such as static deformations, collective excitations (rotational and vibrational), and weak channels like nucleon transfer—modifies the effective fusion barrier, giving rise to a distribution of fusion barriers. A detailed study of this barrier distribution (BD) provides valuable insight into the nature of these couplings and hence the underlying fusion dynamics. The standard CCFULL model has successfully explained the shape of the BD for many nuclear systems. However, recent measurements of the quasi-elastic barrier distribution for the 20Ne + 90,92Zr systems have shown a striking difference: for 90Zr, a well-defined multi-peaked structure was observed, whereas for 92Zr, the BD appeared smooth, forming a broad single peak despite the large deformation of 20Ne. This observation contradicts the predictions of the CCFULL model. The origin of this difference has been attributed to couplings with non-collective excitations. Although these couplings are individually weak, their large number in 92Zr leads to an overall smoothing of the BD. To describe this effect, theoretical calculations have been performed using the CC+RMT code, which employs the random matrix model to incorporate non-collective excitations into the coupled-channels framework. In the present work, we reproduce the results for the Ne + 90,92Zr systems using the CC+RMT code. The calculations successfully explain the observed smoothing of the barrier distribution for 92Zr, highlighting the significant role of non-collective couplings in near-barrier nuclear reactions.

PP4. EXPLORING UNIQUE TEXTURE FOR QUARK MASS MATRICES

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ABSTRACT

One of the central challenges in modern High-Energy Physics is to understand the vast hierarchy of fermion masses and their connection to the corresponding mixing angles and mass matrices. Despite remarkable experimental progress in measuring quark masses and Cabibbo–Kobayashi–Maskawa (CKM) mixing parameters, a comprehensive and compelling theory of flavor is still lacking. Even for quarks, where precision data exist, the understanding is primarily based on phenomenological "bottom-up" approaches. In this context, identifying a minimal and viable structure for quark mass matrices serves as a crucial step toward resolving the flavor riddle. In the present work, we analyze the quark mass matrices within the Standard Model framework by employing Weak Basis (WB) transformations, the texture zero approach, and the principle of naturalness. Starting from the most general hermitian mass matrices, WB transformations reduce these to texture 2-zero forms with zeros in the (1,3) and (3,1) elements. By imposing naturalness i.e. (1,i)<(2,j)<(3,3); i=1,2,3; j=2,3, it is found that the smallest diagonal elements (EU and ED) are redundant, resulting in the more predictive texture 4-zero structure. Numerical analysis using current quark masses and CKM data demonstrates that this specific texture uniquely reproduces all observed mixing parameters and CP violation. Hence, texture 4-zero quark mass matrices emerge as the most viable and minimal framework for describing quark mixing, providing valuable insights towards a unified flavor structure.

PP5. IMPLICATIONS OF NEUTRINO OSCILLATIONS DATA ON TEXTURES OF LEPTONIC MASS MATRICES

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ABSTRACT

One of the key challenges in the present day high energy physics is to understand vast spectrum of fermion masses and their relationships with the corresponding mixing angles

as well as mass matrices. Despite impressive advances in the measurements of fermion masses and mixing parameters, we are far from having compelling theory of flavor physics. In terms of phenomenological models having their roots in the bottom up approach, texture specific mass matrices can perhaps provide clues for the final theory to emerge. In the context of leptonic sector, continuous refinements in the various neutrino oscillation parameters provide a good approximation to explore the viability of texture specific mass matrices . In this context, in the present work, we explore the viability of difference textures in the case of flavor basis allowed by the Weak basis transformations. Specially, we would be exploring the case considering charged lepton mass matrices to be diagonal and texture would be imposed on neutrino mass matrices. Further, considering neutrino to be Dirac like, we would be carrying out analysis for the case of normal hierarchy of neutrino masses. The analysis would incorporate the following constraints on neutrino oscillation parameters.

PP6. INFLUENCE OF EQUATION OF STATE ON TRANSPORT PHENOMENA IN HEAVY-ION COLLISIONS

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ABSTRACT

The equation of state (EoS) and momentum-dependent interactions influence the transport behavior of nuclear matter in heavy-ion collisions. We performed calculations using both a soft EoS and a soft momentum-dependent (SMD) EoS to examine the role of mean-field momentum dependence on entropy density (s), shear viscosity (η), and the ratio η/s and nuclear stopping observables. The degree of nuclear stopping was also analyzed to provide a quantitative measure of how effectively the colliding nuclei slow down and lose their initial longitudinal momentum, which reflects the extent of thermalization achieved in the reaction zone and the overall strength of dissipative processes governing momentum and energy transfer within the system. Our calculations are based on reactions for central collisions of Au+Au measurements using Isospin-dependent Quantum Molecular Dynamics (IQMD) model at intermediate energies (order of 40 - 400 MeV/nucleon). The soft EoS yields a lower η/s ratio than the SMD EoS, while nuclear stopping is higher for the SMD. These calculations indicate inverse correlation between microscopic transport dynamics linked to the macroscopic compressibility and dissipation of the nuclear medium.

PP7. SYSTEMATIC STUDY OF ENTRANCE CHANNEL EFFECTS ON FISSION TIME SCALES IN THE MEDIUM MASS REGION

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ABSTRACT

This work presents a systematic study of fission time scales to investigate the dynamics of compound nucleus (CN) formation and decay in the medium mass region. We examine the influence of entrance channel mass asymmetry (α) and the Critical Businaro–Gallone mass asymmetry (αBG) on fission dynamics. The correlation between fission delay time and pre-scission neutron multiplicity is explored, revealing that an increase in delay time corresponds to a higher neutron multiplicity, signifying a longer-lived compound system. Pre-scission neutron multiplicity is also found to increase with CN fissility. The results indicate that reactions with smaller entrance channel mass asymmetry have a longer CN formation time, leading to the observed differences in fission times. This study enhances the understanding of entrance channel effects in heavy-ion-induced fission reactions.

PP8. INVESTIGATION OF OPTICAL PROPERTIES OF $Si_{10}As_{30}S_{60}$ CHALCOGENIDE GLASSES USING SPIN COATING

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ABSTRACT

Chalcogenide glasses have emerged as promising materials for infrared photonics and integrated optical devices due to their wide transmission window, high refractive index, and strong nonlinear optical properties. In this study, thin films of $Si_{10}As_{30}S_{60}$ chalcogenide glass were successfully fabricated using the spin coating technique with ethanolamine as a solvent. The spin-coated films were annealed at optimized temperatures to improve film uniformity and structural stability. Optical characterization was carried out using UV–Vis–NIR spectroscopy to determine the absorption spectra and optical band gap, analyzed through Tauc's plot. The refractive index and extinction coefficient were evaluated from transmission data, and the optical constants were correlated with film thickness and annealing temperature. The results indicate that the $Si_{10}As_{30}S_{60}$ films exhibit good optical transparency in the visible to near-infrared region, with an optical band gap suitable for photonic and optoelectronic applications. This study demonstrates the potential of spin-coated $Si_{10}As_{30}S_{60}$ thin films as a cost-effective route for developing high-performance optical coatings and integrated waveguide structures.

Keywords: Chalcogenide glass, $Si_{10}As_{30}S_{60}$ spin coating, optical properties, thin films, Tauc's plot

PP9. UPCONVERSION NANOPARTICLE-BASED BIODEGRADABLE NANOCOMPOSITE FILMS FOR ADVANCED PACKAGING APPLICATIONS

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ABSTRACT

Biodegradable nanocomposite films have become more popular as a result of growing environmental concerns and the demand for clever, sustainable packaging. This work focuses on creating bioplastics based on upconversion nanoparticles (UCNP) for sophisticated food packaging usage. UCNPs, which are usually made of $NaYF_4$:Yb^{3+}, Er^{3+}, were created and surface-modified with silica or polymeric coatings to improve their compatibility and dispersion in biodegradable polymer matrices like starch, polylactic acid (PLA), and poly(vinyl alcohol) (PVA). The flexible, translucent films were created by fabricating the nanocomposites using melt-extrusion and solvent-casting processes. The mechanical strength, thermal stability, and barrier qualities of the films were greatly enhanced by the addition of modest UCNP concentrations while preserving biodegradability.The implanted UCNPs provided special optical properties that transformed near-infrared light into visible emission, potentially finding application in non-invasive food freshness sensors, UV-protective coatings, and anti-counterfeiting labels. Additional evidence for the material's biocompatibility came from early cytotoxicity testing. The UCNP-reinforced bioplastic films combine sustainability and optical intelligence to provide improved performance and multifunctionality overall. This study emphasizes the potential of biopolymers combined with UCNP as next-generation environmentally friendly materials that can increase food shelf life, enhance product safety, and facilitate smart packaging technologies that support the ideas of the circular economy.

PP10. NANOTECHNOLOGY-DRIVEN ELICITATION: A NOVEL APPROACH TO ENHANCE SECONDARY METABOLITES, ANTIOXIDANT DEFENSE, AND GENE EXPRESSION IN OCIMUM TENUIFLORUM

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ABSTRACT

Nanotechnology offers an innovative and sustainable approach to regulating plant growth and metabolic activities. Among various nanomaterials, silver nanoparticles (AgNPs) have emerged as potent nanoelicitors, capable of enhancing secondary metabolite biosynthesis. In this study, AgNPs were biosynthesized using *Catharanthus* leaf extract and characterized through SEM, TEM, and XRD analyses to confirm their morphology and crystalline nature. The biologically synthesized AgNPs were then applied to *Ocimum tenuiflorum* at five concentrations (20, 40, 60, 80, and 100 ppm). Among these treatments, 60 ppm AgNPs exhibited the most pronounced stimulatory effect, significantly promoting the accumulation of key secondary metabolites. HPLC analysis revealed marked increases in eugenol (57.89 µg/ml) and rosmarinic acid (50.40 µg/ml) compared to the control plants (13.47 and 7.39 µg/ml, respectively). At the molecular level, AgNPs treatment led to substantial upregulation of genes associated with the phenylpropanoid pathway, including EGS (6.40-fold), RAS (5.47-fold), CAD (4.71-fold), and 4CL (2.88-fold). These molecular responses suggest that AgNPs effectively activate signaling mechanisms that enhance secondary metabolite biosynthesis. Overall, this study demonstrates that nanotechnology, through the use of biologically synthesized AgNPs, serves as a powerful tool to boost both phytochemical production and gene expression in medicinal plants. This work underscores the transformative role of nanotechnology in sustainable agriculture and the large-scale production of valuable medicinal compounds.

PP11. NANOTECHNOLOGY-DRIVEN COMPARATIVE INVESTIGATION OF METAL-DERIVED MONO- AND BIMETALLIC CARRIERS FOR EFFECTIVE THYMOL DELIVERY

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ABSTRACT

Thymol, a naturally occurring monoterpenoid phenol, possesses remarkable pharmacological properties including antioxidant, anti-inflammatory, and antimicrobial activities. However, its therapeutic potential is limited by poor aqueous solubility, low stability, and reduced bioavailability. Nanotechnology offers an effective strategy to overcome these limitations by enabling targeted delivery, improved solubility, and controlled release of bioactive compounds. In this context, the present study focuses on the development of thymol-loaded copper–silver bimetallic nanocomplexes and compares their activities with monometallic (Cu and Ag) nanocarriers to investigate potential synergistic effects. Formulation parameters were systematically optimized using a Central Composite Design (CCD) approach to achieve minimal particle size and maximum encapsulation efficiency. The optimized bimetallic nanocomplexes were characterized using UV–Vis spectroscopy, dynamic light scattering (DLS), Fourier-transform infrared spectroscopy (FTIR), and transmission electron

microscopy (TEM). The CuAg nanocomplexes exhibited an average particle size of 144 nm and an encapsulation efficiency of 90.47%. TEM analysis revealed spherical nanoparticles ranging from 25 to 30 nm. evaluations demonstrated sustained drug release with significantly enhanced antioxidant (96 ± 0.2%) and anti-inflammatory (96 ± 0.2%) activities, comparable to standard controls (98.7 ± 0.1% and 98.1 ± 0.15%, respectively). Overall, this study underscores the role of nanotechnology in enhancing the therapeutic efficacy of hydrophobic phytoconstituents like thymol through the design of metal-derived nanocarrier systems. The synergistic combination of copper and silver in bimetallic nanocomplexes offers a promising approach for efficient encapsulation, improved bioactivity, and targeted delivery of natural therapeutics

PP12. OPTICAL DISPERSION OF RF MAGNETRON SPUTTERED MOLYBDENUM OXIDE (MOO3) THIN FILMS USING SPR TECHNIQUE

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ABSTRACT

Intriguing researchers in recent years with its peculiar dual nature as a transitioning semiconductor and plasmonic material, the transition metal oxide, molybdenum oxide has garnered significant attention and acclaim for the unique properties it exhibits. In the present study, MoO3 thin films were fabricated by RF-magnetron sputtering method at optimized parameters and were characterized for its structural, morphological and optical properties via XRD, SEM and UV spectrophotometry. The band gap of MoO3 comes out to be 3.901 eV from the Tauc plot. The effect of wavelength variation of the incident electromagnetic wave on the dielectric and optical properties of Molybdenum Oxide (MoO3) thin films have been studied using Surface Plasmon Resonance (SPR) technique. Due to high sensitivity to change in refractive index at the metal-dielectric interface, SPR is an efficient optical technique to study the dielectric properties of any media. The complex dielectric constant and refractive index of MoO3 thin films were evaluated by fitting the experimental SPR reflectance curves with theoretical Fresnel's equations. The real part of the complex dielectric constant and refractive index is found to decrease with an increase in the incident wavelength. In contrast, the imaginary part, which represents the dielectric losses, decreases in the wavelength range of UV (355nm) till red (633 nm) and then increase until infrared. The dispersion of refractive index for MoO3 thin film was found to follow the sellmeier behaviour.

PP13. SOLID STATE NUCLEAR STRACK DETECTOR

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ABSTRACT

Activity of given radioactive source Am-241 (which is primarily a source of alpha particles) was calculated using solid state nuclear track detector (here for CR-39 detector) using aqueous solution of NaOH with concentration around 6-7 N solution . Etching was performed on the detector material using the NaOH solution for observation of the tracks which are normally difficult to observe in their original state. This process was done over a specific constant temperature .The number density was observed for the tracks formed by the alpha particles of the radioactive material which was observed with the help of microscope with 40x magnification and calibrated accordingly. Then the activity of the material was studied using the average number density of various divisions of the CR-39 detector material.

PP14. SPIN, SPLITTING AND SCANNING : THE PHYSICS BEHIND MRI

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ABSTRACT

The Zeeman Effect, discovered by Pieter Zeeman in 1896, revealed how atomic energy levels split under the influence of a magnetic field — a cornerstone in understanding the magnetic behavior of matter. This quantum phenomenon laid the foundation for Nuclear Magnetic Resonance (NMR), where nuclei with intrinsic spin exhibit similar magnetic splitting, leading to transitions detectable through radiofrequency radiation. This principle was later harnessed in Magnetic Resonance Imaging (MRI), a revolutionary medical diagnostic tool that maps the internal structure of the human body without invasive procedures. This research explores the conceptual and mathematical link between electronic Zeeman splitting and nuclear magnetic resonance, highlighting how the same physical laws govern both microscopic quantum transitions and macroscopic imaging technology. Through simplified models and comparative analysis, it traces the evolution from fundamental atomic interactions to applied medical imaging, emphasizing how quantum physics shapes real-world innovation. The study demonstrates that understanding spin dynamics and energy-level splitting not only deepens our grasp of atomic behavior but also connects directly to technological advancements that save lives.

PP15. QUARTZ TUNING FORK SENSORS AS PROBES IN He^4 STUDIES: A LITERATURE REVIEW

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ABSTRACT

He^4 is a unique liquid, that when cooled below 2.17K (the λ-point), transitions to a superfluid phase with zero viscosity and bizarre quantum behaviour on the macroscopic scale. Studying the properties of He^4 provides insights into vortex dynamics, quantum turbulence and even astrophysical phenomena, as similar principles apply in systems such as neutron stars and early universe. Vibrating structures such as grids, wires and spheres have long been used as probing tools for cryogenic studies since the discovery of superfluid helium. Among these, quark tuning forks(QTF) have emerged as versatile and reliable vibrating sensors for investigating the unique hydrodynamic and quantum properties of He^4 at low temperatures (in mK range) owing to their high sensitivity, mechanical stability, piezoelectric properties and minimal hysteresis. By analyzing the resonance response of QTFs at varied external conditions (such as temperature and pressure), valuable insights can be gained into the surrounding fluid's viscosity, mutual friction, and quantum turbulence. This poster presents a literature-based review on the use of quartz tuning fork (QTF) sensors as vibrating probes for investigating liquid helium, both in the normal and superfluid phases. The review consolidates results from past experiments and design improvements, highlighting the effectiveness of QTFs in studying the quantum fluidic properties of He^4 and their continuing significance in advancing low-temperature experimental physics.

PP16. SINGLE-EXPOSURE POLARIZATION HOLOGRAPHY FOR MULTI-FIELD IMAGING APPLICATIONS

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ABSTRACT

A novel single-shot double-field-of-view (FOV) quantitative polarization digital holography technique is proposed. The technique enables simultaneous acquisition of polarization-resolved information over two distinct spatial regions recorded within a single exposure. The proposed approach integrates polarization-sensitive detection with an angular–spatial multiplexing strategy, allowing full-Stokes parameter reconstruction across both FOVs without mechanical scanning or temporal delay. The recorded hologram encodes complete polarization and phase information, which is numerically demodulated using the angular spectrum method to retrieve the vectorial light field distributions. Experimental validation

using anisotropic and birefringent samples, including a USAF resolution target and cellophane-taped structures, demonstrates accurate reconstruction of amplitude, phase, and full-Stokes parameters across both FOVs. The results confirm the capability of the technique for real-time, wide-area, and polarization-sensitive imaging, offering promising applications in biomedical imaging, material characterization, optical metrology, and remote sensing.

PP17. NEXT-GENERATION PHOTOVOLTAICS: THE RISE OF LEAD-FREE PEROVSKITE SOLAR CELLS

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ABSTRACT

The escalating global energy demand has driven a transition toward renewable and sustainable sources. Among emerging photovoltaic technologies, perovskite solar cells (PSCs) have gained remarkable attention for their potential to combine high efficiency and low cost. Traditional lead-based perovskites, though highly efficient, face significant challenges due to lead toxicity and long-term instability, which hinders their large-scale commercialization. Lead-free alternatives such as bismuth-, tin-, antimony-, and silver-based perovskites offer a promising path forward, maintaining favourable optoelectronic properties including high absorption coefficients, tunable bandgaps, and efficient charge transport. Over recent years, these materials have shown rapid progress in stability, device architecture, and performance optimization. Beyond solar energy conversion, lead-free PSCs are being explored for energy harvesting in IoT devices, building-integrated photovoltaics (BIPV), flexible electronics, and self-powered sensors. With ongoing research focused on defect passivation and stability engineering, lead-free perovskites hold strong potential to shape the future of safe, sustainable, and scalable solar technologies. This poster presents the fundamental principles, recent advancements in lead-free perovskite solar cells, emphasizing innovations that enhance their efficiency, durability, and eco-compatibility. Furthermore, this poster also discusses the key degradation mechanisms in lead-free perovskites and outlines effective strategies to mitigate them. Approaches such as compositional tuning and interface engineering are highlighted to enhance long-term device stability.

PP18. APPLICATIONS OF GAMMA-GAMMA COINCIDENCE TECHNIQUE IN MEDICAL IMAGING

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ABSTRACT

We conducted a gamma–gamma coincidence experiment using Na-22 and Co-60 sources to explore angular correlation and timing resolution principles. Co-60's cascade gamma rays

(1.17 MeV and 1.33 MeV) were used to determine the scintillation detection system's resolving time, measured at 54.96 ns through chance-coincidence analysis. Na-22, emitting positrons that annihilate with free electrons to produce 511 keV photons, was used to study delay time and angular correlation. This experiment is directly related to *Positron Emission Tomography* (PET), where 18F is used as a positron source, emitting two gamma rays during annihilation .Traditional PET scanners use bismuth germanate detectors with a long decay time of 300 ns. To improve the image resolution, PET is combined with Time of Flight (TOF) technique and detector material of shorter decay time is preferred. Recent advancements include cerium-doped lanthanum bromide (*LaBr3*) with a decay time of ~16 ns and Silicon photomultipliers (SiPM), achieving TOF performance of 300-400 ps. More recently, breakthroughs have led to *sub-200 ps* TOF resolution, significantly enhancing image quality and enabling faster, lower-dose brain amyloid and tau brain imaging. The impact of detector crystal decay time is critical; longer decay times require a wider coincidence window, increasing the risk of random coincidence events, which degrades image resolution. Thus, the link between random coincidence and scanning efficiency is vital. Improving TOF performance reduces scan duration while maintaining high-quality images. This study bridges nuclear-physics experimentation with medical imaging, demonstrating how enhanced timing resolution leads to safer and more efficient cancer and Alzheimer's diagnostics.

PP19. A REVIEW STUDY: NANOPARTICLES AS EARLY DETECTION TOOLS IN THE ERA OF DIAGNOSTIC HEAD AND NECK CANCER

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Early detection of Head and Neck Cancer (HNC) remains a significant clinical challenge due to its asymptomatic nature during the initial stages of development. Current data indicate that only approximately one-third of HNC cases are diagnosed, as the malignancy originates primarily from the squamous epithelial cells lining the nasal cavity, oral cavity, and pharynx. Conventional diagnostic approaches have demonstrated limited efficacy in identifying early-stage tumors, underscoring the urgent need for innovative detection methodologies. Recent literature highlights the remarkable potential of nanotechnology, particularly the application of nanoparticles, not only in cancer therapy but also as a transformative tool for diagnostic advancements. Among various nanomaterials, curcumin-derived nanoparticles exhibit promising dual functionality in both diagnosis and treatment of HNC owing to their biocompatibility and exceptional physicochemical properties. Nanoparticles such as metallic and metal oxide nanoparticles, polymeric nanoparticles, quantum dots, liposomes, and nanomicelles offer unique advantages due to their nanoscale size and high surface-to-volume ratio. Studies have identified key biomarkers in HNC, including P16 and Interleukin-8, while the detection of human papillomavirus (HPV) remains challenging because of its low concentration in early disease stages. In this context, nanosensors engineered from these advanced nanomaterials demonstrate superior specificity, sensitivity, and precision compared to conventional sensor technologies. In essence, although extensive research has concentrated on therapeutic strategies for head and neck cancers, there remains a critical gap in developing effective nanotechnology-based systems for early detection at the onset of disease progression.

PP20 AN INSIGHT TO PELLETRON ACCELERATOR: A TOOL FOR NUCLEAR AND MATERIAL SCIENE RESEARCH

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ABSTRACT

In early 1960's scientists at NEC developed the advanced accelerator aiming to improve high voltage performance,thus it is a evolution of VanDe Graff accelerator ,under the leadership of Dr.Karl T.F Walton.The Pelletron accelerator is a versatile electrostatic accelerator widely employed in nuclear physics, materials science, and ion beam analysis by using specialised electrodes thus gives uniform field. It operates on the principle of charge transport through a moving chain of metallic pellets and nylon wires.Pelletron system enables the generation of highly stable, continuous ion beams at energies ranging from a few hundred keV to several MeV. This study presents an overview of the design, operation, and experimental applications of a Pelletron accelerator facility. Key components—such as the high-voltage terminal, charging system, pellet belt, vacuum chamber, and beamline instrumentation—are described with emphasis on beam stability, energy calibration, and maintenance of ultra-high vacuum conditions. It is Unit Double (UD) accelerator.The accelerator's performance was evaluated using standard beam diagnostics including Faraday cups and beam profile monitors. Typical results demonstrate excellent energy resolution and reproducibility, validating its reliability for precision. In India, there is a 14UD pelletron accelerator at TIFR,Mumbai and • 15UD accelerator at IUAC, New Delhi.

Shodh Samvad

SS1 A LYSM DOMAIN-CONTAINING PROTEIN TALYSM1-A CONFERS SALINITY AND DROUGHT TOLERANCE IN TRANSGENIC *ARABIDOPSIS*

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ABSTRACT

LysM domain-containing proteins are associated with stress response in plants. Herein, we found upregulated expression of *TaLysM1-A* in the presence of salinity and drought stress in bread wheat, which indicates its role in stress response. *TaLysM1-A*-expressing transgenic Arabidopsis plants displayed significant tolerance with improved morpho-physio-biochemical parameters during salinity and drought stress conditions. The transgenic lines showed superior phenotypic traits, such as seedling growth, leaf androsette area, overall plant growth and silique yield as compared to wild-type (WT). The reactive oxygen species (ROS), like H2O2 and superoxide radicals, and MDA contents were significantly reduced; whereas, ascorbic acid accumulation and activity of antioxidant enzymes, such as catalase (CAT), ascorbate peroxidase (APX), guaiacol peroxidase (POD), and superoxide dismutase (SOD) were considerably improved in transgenic lines than in the WT plants during salinity and drought treatments. The results suggested reduced oxidative damage in *TaLysM1-A*-expressing transgenic plants. Additionally, the accumulation of proline, lignin, chlorophylls, carotenoids and RWC was increased in transgenic plants, which suggested improved osmoprotection, cell wall strength and photosynthesis under both the stress conditions. The study unveiled *TaLysM1-A*role in salinity and drought stress tolerance; however, the detailed mechanism needs to be explored in future studies.

Keywords: Arabidopsis, Drought, LysM, Salinity, *TaLysM1-A*, Transgenic

SS2 MY STORY OF SCIENCE TO SOCIETY

From a Student's Desk to the National Standard: My Journey Designing India's Wheel-Based Kibble Balance

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Department of Mechanical Engineering, UIET, Panjab University, Chandigarh Under the mentorship of Dr. Manu Sharma, Coordinator, TEC, Panjab University and Dr. Nidhi Singh, Senior Principal Scientist, CSIR - NPL, New Delhi In collaboration with CSIR–National Physical Laboratory (NPL), New Delhi

ABSTRACT

Every measurement—from a drop of medicine to the thrust of a rocket—depends on the kilogram. When I learned that the world's definition of the kilogram had changed in 2019, I wanted to explore how India could realize this constant-driven standard independently. That curiosity became the seed of my undergraduate thesis at CSIR–NPL, India's national metrology institute.

During my six-month project, I studied the Kibble Balance, the remarkable device that equates mechanical power to electromagnetic power, enabling mass to be defined through the Planck constant. However, I soon discovered that conventional equal-arm designs, though historically precise, suffered from beam-tilt errors, mechanical hysteresis, and alignment instabilities that limited repeatability.

To overcome these limitations, I developed a wheel-based Kibble Balance prototype using SolidWorks CAD modeling. The wheel structure replaces the knife-edge pivot with a circular motion path, ensuring purely vertical coil movement and eliminating lateral drift. The model integrates key components—magnet yoke, coil assembly, velocity stage, and damping unit—engineered for rigidity and balance. Simulation studies demonstrated superior motion control, reduced parasitic torque, and minimized systematic uncertainty compared to traditional designs.

What began as a mechanical design problem evolved into a mission: creating a cost-effective, indigenous precision instrument that could assist NPL in its national goal of realizing the kilogram in terms of the Planck constant. By simplifying design and using locally available materials, this prototype brings high-accuracy measurement within reach of Indian laboratories and universities, empowering the next generation of engineers and scientists to participate in global metrology.

The greatest satisfaction came when I extended the model's principle to develop a hydraulic hand dynamometer calibration setup, linking fundamental metrology to healthcare applications. It proved that precision engineering is not confined to national laboratories—it can directly improve lives.

My journey from classroom curiosity to contributing to India's standard of mass transformed how I view engineering—it is not merely design or data, but a dialogue between precision and purpose. This experience taught me that when science serves society, even a student's prototype can become a nation's asset. I hope my work inspires others to translate their laboratory ideas into instruments that empower people, because in the end, precision in science is precision in progress.

Acknowledgment:

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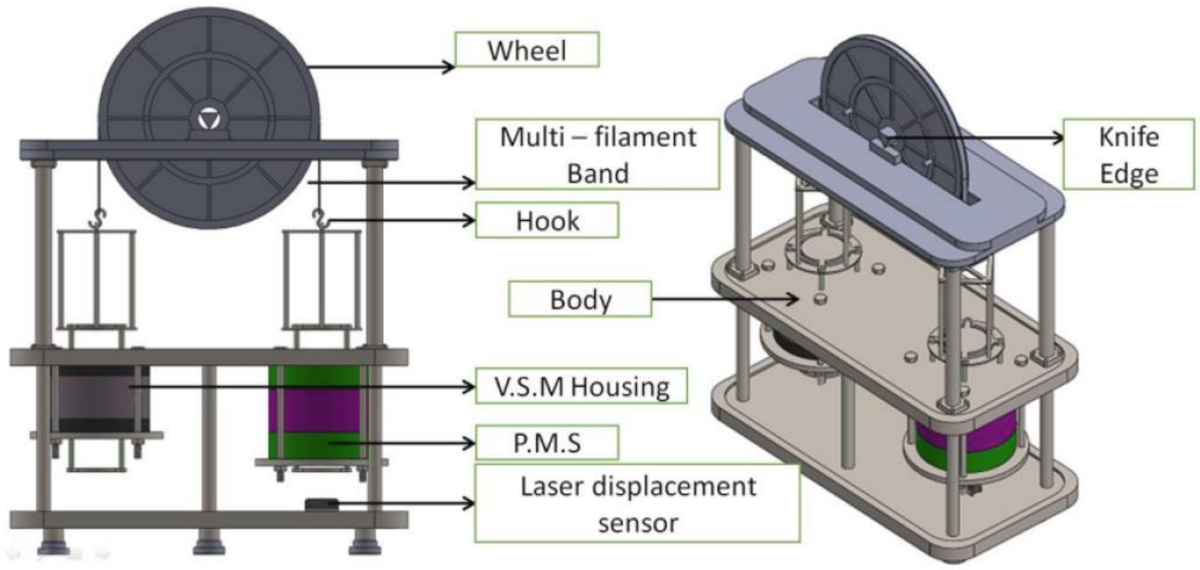

Figure 4.1: Mechanical model of the Wheel based Kibble Balance prototype

SS3 THE PRAZOSIN HYDROCHLORIDE PUZZLE: CO-CRYSTAL INNOVATION FOR ENHANCED BIOPHARMACEUTICAL ATTRIBUTES, EMPOWERING HUMANITY

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ABSTRACT

Prazosin hydrochloride, a vital therapeutic agent for anti-hypertensive conditions, yet one burdened by its significant limitation: inherently poor aqueous solubility that hindering its bioavailability and clinical efficacy. This ‘solubility scourge’ meant that despite its therapeutic promise, prazosin hydrochloride full potential remained untapped. Our quest was to find a molecular companion that could transform its properties.

Our journey began in the digital realm, where advanced predictive models played matchmaker, meticulously screening potential co-formers for prazosin hydrochloride. Through computational analysis of supramolecular synthons and hydrogen bond propensities, we identified niacinamide as a promising candidate- a stable, GRAS- approved molecule with ideal chemical complementarity. This *in silico* prediction guided our experimental investigations.

We then transitioned to the laboratory, gently coaxing prazosin hydrochloride and niacinamide into a profound molecular embrace through solvent evaporation. The result was a novel co-crystal, a meticulously ordered crystalline solid confirmed by Powder X-ray Diffraction analysis. This new partnership fundamentally altered the character of prazosin hydrochloride. The *in vitro* studies demonstrated that the prazosin hydrochloride-niacinamide co-crystal exhibited a 9.1-fold increase in solubility and 99.8% enhancement in dissolution rate compared to pure prazosin hydrochloride. Pharmacokinetic evaluations revealed a 4.0-fold increase in peak plasma concentration (Cmax) and significantly improved bioavailability. *In vivo* pharmacodynamic studies further validated its superior antihypertensive efficacy, along with notable antioxidant and anti-inflammatory properties.

Encouraging observations have been filed for a provisional patent to protect the intellectual property associated with these specific outcomes, vide application number **202511058685**.

This co-crystallisation story highlights the power of integrating predictive models with rigorous experimental validation to overcome inherent prazosin hydrochloride limitations. By creating its superior pharmaceutical solid, we have tried to pave the way for improved drug performance, ultimately empowering patients with more effective and reliable treatment options. This is not just chemistry; it's about crafting molecular partnerships for better human health.

Acknowledgement

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SS4 INCIDENCE OF DEMODICOSIS IN DOGS AND ITS THERAPEUTIC MANAGEMENT WITH SPECIAL REFERENCE TO HERBAL NANO FORMULATION

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ABSTRACT

Present investigation was conducted for incidence of demodicosis in dogs and its therapeutic management with special reference to herbal nano formulation. 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% (35/1200). Month wise incidence study revealed highest incidence in summer season (April-July) and lowest in the winter season (October-March). Dogs of 0-6 months and >3 years age group was found more susceptible to demodicosis during the study period. Sex wise incidence showed males were more susceptible to demodicosis. Breed wise incidence revealed crossbred dogs (34.28%) were more affected followed by American Pitbull (17.14%). The typical characteristics of *Demodex* spp. were confirmed in (20/35) 57.14% cases by skin scraping examination while PCR examination demonstrated (35/35) 100% by the amplification of an approximately 483bp. Sequencing of PCR products were analyzed by BLAST & the results indicated 99.7% identical to available sequences of *D. canis* MG372354 (1:99.7) and 98.8 identical with *D. canis* KU253790 (33:98.8) & MG372359 (1:96.8). 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 ($p<0.01$) increased in globulin, blood glucose, total protein were the characteristics haemato-biochemical changes in canine demodicosis. Among DLC, % of Lymphocyte were significantly ($p<0.01$) decreased, whereas granulocyte count was significantly ($p<0.01$) increased in *Demodex* infected dogs as compared to healthy dogs in the present study. Study of oxidant-antioxidant status of demodicosis, revealed a significant ($p<0.01$) reduction in the mean values TA (0.76 ± 0.04 mM), GSH (0.33 ± 0.03μM), SOD (3.41 ± 0.20μ/ml), LPO (0.06 ± 0.00nmol) in *Demodex* infected 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: Demodicosis, Dog, Molecular Technique, Haemato-Biochemical, Oxidant-Antioxidant, Herbo Nano Medicine.

SS5 OVER-EXPRESSION OF *VVLNCRNA182459* NEGATIVELY REGULATES BIOTIC AND ABIOTIC STRESS TOLERANCE IN *ARABIDOPSIS THALIANA*

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ABSTRACT

Plant activated multilayered defense system when attacked by pathogens. Recent studies are highlighting the understanding of regulatory mechanisms of lncRNAs under stress conditions. Various studies have done about computational identification of lncRNAs in plants but studies related to functional characterization of lncRNAs are very few. 71-PM responsive lncRNAs were identified in our lab from grapevine previously. Of which, we functionally characterized *VvlncRNA182459* which exhibited up-regulation during PM infection in grape leaves. We confirmed its non-coding potential through its transient over-expression in onion peels. We developed its over-expression *Arabidopsis* lines which showed enhanced growth after MeJA treatment. Transgenic lines were exhibiting sensitivity towards PM infection as compared to WT (Col-0). Further, JA levels were also reduced in transgenic lines in response to PM infection as compared to WT plants. Histochemical staining revealed, increased production of superoxide ion, callose deposition and cell death however, decreased production of H_2O_2 in transgenic lines as compared to WT during PM infection. ROS related genes; penetration-resistance genes, JA and SA responsive genes were also downregulated in transgenic lines as compared to WT plants. Transgenic lines also exhibited sensitivity towards salt and osmotic stress conditions. Based on this study, we proposed that *VvlncRNA182459* negatively regulates the abiotic and biotic stress tolerance in *Arabidopsis* by suppressing JA signalling pathway.

SS6 KLOTHO–NLRP3 AXIS: A MISSING LINK IN AUTISM SPECTRUM DISORDER

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ABSTRACT

India is currently experiencing a rapid epidemic of illnesses. Autism spectrum disorder (ASD), is a lifelong neurodevelopmental disorder that typically manifests within first 3 years of life, affecting over 10 million children in India, with prevalence expected to rise in coming years. Globally, ASD affects 1 in 36 children, with males exhibiting a 3.8-fold higher prevalence than females. Research demonstrates that children with ASD experience early delays in sensorimotor development, communication, and social relation which predict subsequent cognitive and behavioural outcomes. Despite extensive research, the etiology of ASD is still unclear with multiple contributing factors including maternal immune imbalance, environmental toxicity, gut dysbiosis, and early-life chemical exposures such as valproic acid, thalidomide, and ethanol playing an important role. The result is disruption in neurodevelopmental processes such as neuronal differentiation, axon myelination, and synaptogenesis.

Neuroinflammation has emerged as a central pathological mechanism in ASD, with NLRP3 inflammasome, an essential component of innate immune system that senses cellular stress signals, playing a critical role in its pathogenesis. Low NLRP3 activity not only helps microglia to detect disturbance in brain homeostasis but also influence synaptic remodelling by regulating cytokine release. Chronic activation in microglia leads to caspase-1-mediated maturation of IL- 1β and IL-18, promoting oxidative stress, mitochondrial dysfunction, and pyroptosis, ultimately causing axonal injury, dendritic swelling, and neuronal loss. Evidence suggests that active NLRP3 inflammasomes are major contributor of neuroinflammation in ASD, linking immune dysfunction with aberrant neuronal signalling.

Klotho (KL), a pleiotropic anti-ageing protein expressed in the brain and circulating in serum and cerebrospinal fluid, is emerging as a key regulator of neurodevelopment and cellular defence. KL promotes neuronal proliferation, differentiation, survival and synaptic formation, while suppressing, inflammatory signalling pathways including NF-κB/NLRP3. Experimental evidences indicate that KL supplementation reduces the NLRP3- mediated proptosis, inhibiting the IL-1β and IL-18 production, and protects against oxidative stress,

suggesting its potential as a neuroprotective agent. However, the correlation among KL dysregulation and NLRP3 activation in ASD is still unexplored.

Thus, our study for the first time hypothesizes that KLOTHO downregulation in ASD may upregulate NLRP3 inflammasome signalling, resulting in neuroinflammation and early developmental deficits. Using the prenatal valproic acid (VPA, 600 mg/kg) rat model of ASD, we evaluated physical and sensorimotor development in offsprings and quantified KL, NLRP3, caspase-1, and IL-1β, levels in serum, hippocampus, and cortex. Our preliminary results demonstrated that VPA-exposed offsprings exhibit delayed physical growth and impaired sensorimotor development accompanied by significant decrease in KL and corresponding increased expression of NLRP3 and associated cytokines.

These finding identify the KLOTHO-NLRP3 axis as a critical mechanistic link between neuroinflammation and ASD. Understanding this signalling cascade not only provides insights into the molecular basis of ASD but also highlights KLOTHO as a potential therapeutic target and diagnostic biomarker. Modulating klotho levels may serve as a novel and one of the kind strategies to attenuate neuroinflammation, improve neurodevelopmental outcomes and guide the developmental of targeted mechanism-based intervention for ASD. This work builds the way for future translational research exploring the KLOTHO-modulating therapies as innovative approach to ASD management.

SS7 A BIO-SENSOR WITH LOVE

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• Mr. Avinash Kumar, Research Scholar, Department of Physics.

ABSTRACT

“As the saying goes, ‘The pen is mightier than the sword.’ I have always believed that words hold the power to change destinies. Since childhood, science has been my world of wonder: how plants create food, how electricity lights our lives, and how acids turn litmus red. Alongside this curiosity, grew my belief in ’Nishkam Seva’ — selfless service for the good of society. One morning, as I read the newspaper, a headline stopped me cold — 20 million new cancer cases and 9.7 million deaths in 2022. Those numbers echoed in my mind. Could I, as a student of science, ever contribute to reducing such human suffering? That question stayed with me. Years later, destiny answered. After securing first position in my class and being selected among the top 20 students of the Department of Physics, Panjab University, I was granted the opportunity to pursue a research project. I chose to work under the esteemed guidance of Prof. S. K. Tripathi, in the field of Material Sciences, to explore the fabrication of a bio-sensor — a step towards early detection of fatal diseases like cancer. Our journey began with the deposition of Coumarin 480 thin films on borosilicate glass substrates using the Thermal Evaporation Technique. The films were prepared at a vacuum pressure of $2 \times 10{-}5$ mbar, a substrate temperature of 30◦C, and a thickness of approximately 100 nm. The process demanded precision — from ultrasonic cleaning of substrates to maintaining deposition parameters for uniformity. Watching the vibrant film form on glass felt like seeing an idea crystallize into reality. The characterization of these films involved UV-Vis and Photoluminescence spectroscopy at our department, FTIR spectroscopy at a college in the union territory, and XRD spectroscopy at our collaborating lab. The obtained results matched theoretical expectations, validating our proof of concept. Our findings suggest that Coumarin 480 thin films possess optical properties conducive for biosensing applications. Such sensors could potentially enable early, affordable, and rapid detection of cancer biomarkers, offering better survival prospects and accessibility for communities worldwide. Beyond the data, this project transformed me. It deepened my understanding of how pure science can translate into societal good. It strengthened my conviction that even a small research contribution, when guided by purpose, can ripple outward to touch lives. As I held the first shining film under the lab light, I felt immense gratitude — that perhaps, in that delicate layer of Coumarin, lay a drop of hope : A bio-sensor with love — for life, for people, and for a better tomorrow.


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56.	Ms. Manya	Panjab University,Chandigarh
57.	Mr. Mayank Yadav	Department Of Biotechnology, Panjab University
58.	Ms. Mehak Jain	Panjab University
59.	Ms. Mehakpreet Kaur	Panjab University
60.	Ms. Muskan	Punjab University
61.	Ms. Namya Singh	Panjab University
62.	Ms. Navjot Kaur	Panjab University Chandigarh
63.	Mrs. Navjot Kaur	Punjab University
64.	Ms. Nidhi Nandani	Panjab University
65.	Ms. Niharika Rana	Panjab University
66.	Ms. Niti Sharma	Centre Of Systems Biology And Bioinfromatics, Panjab University
67.	Ms. Ojal	Panjab University Chandigarh
68.	Ms. Palak Jamwal	Panjab University
69.	Ms. Palvee Pandita	Nchgsr, Panjab University
70.	Ms. Priya Garg	Panjab University Chandigarh
71.	Ms. Priyanka	Panjab University
72.	Ms. Priyanshi	Panjab University
73.	Mr. Punya	Department Of Biotechnology Panjab University
74.	Ms. Raagsimran Sekhon	Department Of Biochemistry, Pu
75.	Ms. Radhika Bisht	Panjabi University
76.	Mr. Rajeev Kumar	Panjab University Chandigarh
77.	Ms. Rashi	Panjab University
78.	Ms. Rashika Katia	Csbb, Pu
79.	Ms. Riyaz Goyal	Panjab University
80.	Mr. Rythem Mahajan	Department Of Human Genomics, Panjab University Main Campus
81.	Ms. Rythem Sharma	Panjab University
82.	Ms. Saanya Bhasker	Panjab University Chandigarh
83.	Mr. Sahil Sharma	Department Of Biophysics Panjab University
84.	Ms. Sakshi	Panjab University
85.	Ms. Sargam Thakur	Panjab University
86.	Ms. Shagun Sharma	Panjab University
87.	Mr. Shantam Bhardwaj	Panjab University
88.	Ms. Sharnpreet Kaur	Panjab University, Chandigarh
89.	Mr. Shivang Kapoor	Panjab University
90.	Mr. Shourya Gupta	Department Of Biotech
91.	Ms. Shreya Chaudhary	Department Of Biotechnology Punjab University
92.	Ms. Shreya Kanwar	Panjab University
93.	Ms. Shruti Singhal	Panjab University
94.	Ms. Shubhdeep Atwal	Panjab University
95.	Mr. Shubhtaj	Panjab University

96.	Ms. Siddaq Kler	Centre For Stem Cell And Tissue Engineering
97.	Ms. Simarpreet Kaur	Biochemistry Department
98.	Ms. Simran Vohra	Panjab University
99.	Ms. Simranpreet Kaur	Panjab University Chandigarh
100.	Ms. Sonali	Centre For Stem Cell Tissue Engineering And Biomedical Excellence
101.	Mr. Sourabh	Panjab University,
102.	Ms. Srishti Thakur	Dr Ssbuicet Panjab University
103.	Ms. Suhani	Panjab University
104.	Ms. Suhani Singh	Punjab University
105.	Ms. Suniti Jangra	Department Of Biotechnology, Panjab University
106.	Mr. Syed Abdullah Hasan	Panjab University
107.	Ms. Tanisha Narula	Department Of Human Genomics, Panjab University
108.	Ms. Tanvi	Department Of Biotechnology, Panjab University
109.	Ms. Tanya Jindal	Panjab University
110.	Ms. Vaishali Agarwal	Panjab University
111.	Ms. Vanisha Sen	Panjab University
112.	Ms. Vanshika	Cenrtre For Stem Cell Tissue Engineering
113.	Ms. Vanshika Thakur	Panjab University
114.	Mr. Vishvjeet Singh	Panjab University Chandigarh
115.	Ms. Yagnika Chauhan	Panjab University
116.	Ms. Yuvika Gupta	Panjab University, Chandigarh
UG/PG Students from Colleges and Other Institutions		
117.	Mr. Esoh Rene Tanwieh	Punjabi University Patiala
118.	Ms. Harmandeep Kaur	Punjab Agricultural Unversity, Ludhiana
119.	Mr. Jashandeep Singh Brar	Postgraduate Institute Of Medical Education And Research (Pgimer), Chandigarh
120.	Ms. Nancy	Pgimer, Chandigarh
121.	Mr. Navdeep	C.G.C University
122.	Mr. Siddhesh Ramekar	Chitkara University Institute Of Engineering & Technology
123.	Ms. Yukta Sharma	GGDSD
Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)		
124.	Mr. Abhishek Sandhu	Department Of Biophysics Panjab University
125.	Ms. Aiana	Panjab University
126.	Ms. Anupreet Kaur Sobti	Government Home Science College, Chandigarh (Affiliated To Panjab University, Chandigarh), India
127.	Dr. Ayan Adhikari	Panjab University
128.	Ms. Ayushi Sandhu	Panjab University
129.	Ms. Himanshi Juneja	Panjab University
130.	Mrs. Jaishree	Department Of Biotechnology
131.	Mr. Jatin	Panjab University
132.	Ms. Jyoti	Panjab University, Chandigarh
133.	Mrs. Manisha Sharma	Panjab University
134.	Mrs. Nandni	Panjab University, Chandigarh
135.	Dr. Neetu Goyal	Panjab University
136.	Ms. Nisha Verma	Department Of Biophysics, Bms 2, Panjab University, South Campus
137.	Ms. Nivedita Sharma	Panjab University

138.	Mrs. Preeti Negi	Department Of Microbiology
139.	Mr. Rinku Balhara	Panjab University, Chandigarh
140.	Dr. Rivi Verma	Panjab University
141.	Ms. Sanghvi	Centre For Stem Cell Tissue Engineering And Biomedical Excellence
142.	Mrs. Sanya Gaur	Panjab University
143.	Ms. Shital Rani	Department Of Biophysics
Research Scholars from Colleges and other Institutions (JRF, SRF, Project Fellow and Post Docs)		
144.	Dr. Anamika Thakur	National Institute Of Pharmaceutical Education And Research (Niper)
145.	Ms. Bharti	Manav Rachna International Institute Of Research And Studies
146.	Ms. Chahat Chopra	Chandigarh University
147.	Ms. Diksha Katoch	Niper Mohali
148.	Mr. Jai Kumar Saini	Csir-Institute Of Microbial Technology
149.	Mr. Karthikeyan Krishnan	Csir- Institute Of Microbial Technology
150.	Mr. Mathewos Geneto Abiche	Central University Of Punjab
151.	Ms. Minakshi	Department Of Biotechnology And Food Technology
152.	Ms. Priyanka	Bric-National Agri Food And Biomanufacturing Institute
153.	Mr. Raman Kumar	Punjabi University Patiala
154.	Ms. Surbhi Vashisht	Government Home Science College, Chandigarh
155.	Ms. Tanu Singh	Central University Of Punjab
156.	Ms. Vajinder Kaur	Guru Nanak Dev University, Amritsar
157.	Mr. Yaecob Gebre	Punjabi University, Patiala.
Faculty/Scientists of Panjab University Campus and Regional Centres		
158.	Dr. Aditi Chauhan	DST-CPR, PU, CHD
159.	Professor Amarjit Singh Naura	Panjab University
160.	Dr. Ashutosh Rai	Panjab University
161.	Dr. Deepika Verma	Dst-Centre For Policy Research
162.	Professor Jagtar Singh	Panjab University
163.	Dr. Kavleen Kaur	Panjab University
164.	Ms. Mansi	Guru Nanak Girls College, Model Town, Ludhiana
165.	Dr. Nirmalprabhakar	Panjab University
166.	Dr. Rachna Singh	Dept Of Microbial Biotechnology, Panjab University, Chandigarh
167.	Dr. Ramandeep Kaur	Panjab University Chandigarh
168.	Dr. Ranjana Jaiswara	Department Of Zoology
169.	Professor Ranvir Singh	Panjab University Chandigarh
Faculty/Scientists from Colleges and Other Institutions		
170.	Mrs. Poonam Sharma	Centre For Public Health Punjab University Chandigarh
171.	Dr. Ranjeeta Bhari	Punjabi University, Patiala

CHEMICAL SCIENCES

UG/PG Students of Panjab University Campus and Regional Centres		
1.	Mr. Adarsh Raj	UICET
2.	Ms. Annu	Govt Home Science College Sector 10d
3.	Ms. Gaganpreet Kaur	Panjab University, Chandigarh
4.	Ms. Pragti Arora	UICET
UG/PG Students from Colleges and Other Institutions		
5.	Ms. Avantika Boris	Post Graduate Government College

6.	Ms. Manpreet Kaur	Government Home Science College
7.	Ms. Manveen Kaur Saggu	Punjab Agricultural University
Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)		
8.	Ms. Abhivyakti	Panjab University
9.	Ms. Alka Rani	Panjab University
10.	Mr. Aman Chauhan	Department Of Chemistry Panjab University
11.	Ms. Anjali Dadhwal	Department Of Chemistry
12.	Ms. Antu Yadav	Panjab University, Chandigarh
13.	Ms. Anu Radha	Department Of Chemistry, Panjab University
14.	Ms. Archana Negi	Panjab University
15.	Ms. Archita Sharma	Department Of Chemistry, Panjab University Chandigarh
16.	Ms. Arushi	Department Of Chemistry, Panjab University
17.	Ms. Asha	Panjab University Chandigarh
18.	Ms. Bhavana Rani	Panjab University, Chandigarh
19.	Mr. Deepak	Panjab University, Chandigarh
20.	Mr. Deepak Kumar	Panjab University
21.	Ms. Deepika Sharma	Panjab University
22.	Ms. Devina Sharma	Panjab University
23.	Ms. Divya Tagra	Panjab University Chandigarh
24.	Ms. Gargi Poonia	Panjab University
25.	Ms. Garima	Panjab University
26.	Mr. Gaurav Kumar Verma	Panjab University
27.	Ms. Harshbir Kaur	Panjab University, Chandigarh
28.	Ms. Harshita	Panjab University
29.	Ms. Indu Sharma	Panjab University Chandigarh
30.	Ms. Jyoti Rohilla	Student
31.	Ms. Kamini Sharma	Panjab University
32.	Ms. Kanchan Kumari	Panjab University
33.	Ms. Kanika Thakur	Department Of Chemistry
34.	Ms. Komal	Panjab University
35.	Mrs. Lalita Thakur	Panjab University
36.	Mr. Maanvendra Tiwari	Panjab University, Chandigarh
37.	Ms. Mamta Guleria	Panjab University
38.	Mrs. Manisha	Panjab University
39.	Mr. Manraj Singh	Department Of Chemistry Panjab University Chandigarh
40.	Mrs. Meena	Department Of Chemistry, Panjab University
41.	Ms. Meenakshi Dudi	Panjab University
42.	Ms. Minakshi	Department Of Chemistry, Panjab University, Chandigarh
43.	Mr. Mithun	Panjab University
44.	Ms. Mona	Panjab University,Chandigarh
45.	Ms. Monika	Panjab University, Chandigarh
46.	Mrs. Muskan Garg	UICET
47.	Ms. Neha Garg	Department Of Chemistry, Panjab University, Chandigarh
48.	Ms. Nisha Jain	Panjab University, Chandigarh
49.	Ms. Nishu Singla	Panjab University
50.	Ms. Palak Chaudhary	Panjab University Chandigarh
51.	Mr. Pankaj Sharma	Panjab University
52.	Ms. Parul	Panjab University
53.	Ms. Pawan Deep Kaur Saini	Panjab University Chandigarh
54.	Ms. Pooja Devi	Panjab University
55.	Mrs. Poonam	Panjab University

56.	Ms. Poonam Kumari Sharma	Panjab University
57.	Mr. Prabaljeet Singh	Department Of Applied Sciences
58.	Ms. Preetinder Kaur	Panjab University
59.	Ms. Preety	Panjab University Chandigarh
60.	Ms. Priyanka Shastri	Panjab University
61.	Mrs. Puspa	Punjab University Chandigarh
62.	Ms. Rajni Pathania	Department Of Chemistry
63.	Ms. Ravina	Panjab University Chandigarh
64.	Mr. Rohit Sharma	Panjab University
65.	Mr. Sahil Thakur	Panjab University
66.	Mr. Sanchit Kalra	Panjab University
67.	Ms. Satwinder Kaur	Panjab University
68.	Ms. Simranjeet Kaur	Panjab University, Chandigarh
69.	Ms. Simranjt Kaur	Department Of Chemistry
70.	Ms. Siya	Panjab University Chandigarh
71.	Ms. Sonam	Panjab University, Chandigarh
72.	Ms. Sonam Kumari	Panjab University
73.	Mr. Sourav Hada	Panjab University
74.	Dr. Sumit Sood	Panjab University
75.	Ms. Tsering Diskit	Punjab University Chandigarh
76.	Mr. Vikash	Panjab University Chandigarh
77.	Mr. Vinay Kaushik	Department Of Chemistry
78.	Mr. Vinit Yadav	Panjab University
79.	Mr. Vipan Singh	Panjab University Chandigarh
80.	Mr. Ajay Singh	Niper, Mohali
81.	Ms. Anjali Sharma	Punjab Agricultural University, Ludhiana
82.	Ms. Kajal	CSIR CSIO
83.	Ms. Lipat Kaur	National Institute Of Pharmaceutical Education & Research (Niper)
84.	Ms. Mehak Sood	National Institute Of Pharamaceutical Education And Research (Niper), S.A.S. Nagar (Mohali)
85.	Ms. Neha	CSIR CSIO
86.	Ms. Palvi Andotra	BRIC-National Agri-Food And Biomanufacturing Insitute
87.	Ms. Poonam Verma	Dr. Bhimrao Ambedkar University, Agra
88.	Ms. Supan	BRIC - NABI
Faculty/Scientists of Panjab University Campus and Regional Centres		
89.	Dr. Aman Bhalla	Panjab University
90.	Dr. Amarjit Kaur	Panjab University
91.	Dr. Ankur Ganesh Pandey	Panjab University
92.	Professor Ganga Ram Chaudhary	Panjab University
93.	Professor Gurjaspreet Singh	Panjab University
94.	Dr. Gurpreet Kaur	Panjab University
95.	Dr. Jyoti Agarwal	Panjab University
96.	Dr. Khuswinder Kaur	Panjab University
97.	Professor Navneet Kaur	Panjab University
98.	Professor Navneet Kaur	Panjab University
99.	Dr. Neetu Goel	Panjab University
100.	Dr. Renu Thapar	UIET, PU, CHD
101.	Dr. Rohit Kumar Sharma	Panjab University
102.	Dr. Savita Chaudhary	Panjab University
103.	Dr. Shweta Rana	Panjab University

104.	Dr. Sonal Singhal	Panjab University
105.	Dr. Subash Ch Sahoo	Panjab University Chandigarh
106.	Dr. Vaneet Saini	Department Of Chemistry
107.	Dr. Varinder Kaur	Panjab University Chandigarh
Faculty/Scientists from Colleges and Other Institutions		
108.	Dr. Aarti Sharma	R.D Jindal Group Of Professional Institute
109.	Dr. Prabhjot Singh	Akal University, Talwandi Sabo, Bathinda
110.	Professor Prasad V Bharatam	Niper, Mohali
111.	Dr. Raghubir Singh	Dav College Sector 10 Chandigarh

DENTAL SCIENCES

UG/PG Students of Panjab University Campus and Regional Centres		
1.	Mr. Aarush Joshi	Dr. Harvansh Singh Judge Institute Of Dental Sciences & Hospital
2.	Dr. Aarushi Sharma	Dr.Hsjids
3.	Ms. Aditi Sharma	Panjab University
4.	Ms. Akansha Varshney	Dr Harvansh Singh Judge Institute Of Dental Sciences And Hospital
5.	Dr. Ambika Banga	Dr Harvansh Singh Judge Institute Of Dental Sciences And Hospital
6.	Dr. Amrita Kaur	Dr. Harvansh Singh Judge Institute Of Dental Sciences
7.	Ms. Anu	Dr. Hsj Institute
8.	Ms. Anushka Chandra	Dr. Harvansh Singh Judge Institute Of Dental Sciences And Hospital
9.	Ms. Anushka Tewari	Dr. Harvansh Singh Judge Institute Of Dental Sciences
10.	Mr. Aryan Bali	Dr. Harvansh Singh Judge Institute Of Dental Sciences (Uids)
11.	Mr. Aryan Gupta	Dr. Harvansh Singh Judge Institute Of Dental Sciences & Hospital
12.	Mr. Chandraveer Singh Chhabra	Dr.Harvansh Singh Judge Institute Of Dental Sciences & Hospital
13.	Dr. Charvi Raheja	Dr. Harvansh Singh Judge Institute Of Dental Sciences And Hospital, Chandigarh
14.	Dr. Diksha Aggarwal	Dr. Harvansh Singh Judge Institute Of Dental Sciences
15.	Dr. Divya Sood	Dr. Harvansh Singh Judge Institute Of Dental Sciences And Hospital Chandigarh
16.	Ms. Dorothy	Dr Harvansh Singh Judge Institute Of Dental Science And Hospital
17.	Dr. Garima	Biotechnology Department
18.	Dr. Harleen Arora	Dr. Harvansh Singh Judge Institute Of Dental Sciences And Hospital
19.	Ms. Harleen Kaur	Sec 25 Dr Harvansh Singh Judge Institute Of Dental Science And Hospital
20.	Ms. Hiya Gupta	Dr. Harvansh Singh Judge Institue Of Dental Sciences
21.	Ms. Ishneet	Dr Harvansh Singh Judge Institute Of Dental Sciences
22.	Dr. Jessica	Biotechnology Department
23.	Ms. Kriti Bhardwaj	Dr. Harvansh Singh Judge Institute Of Dental Sciences
24.	Ms. Kriti Verma	Dr Harvansh Singh Judge Institute Of Dental Sciences
25.	Ms. Mandeep Sahu	Dr. Harvansh Singh Judge Institute Of Dental Sciences & Hospital.

26.	Ms. Maneet Kaur	Panjab University
27.	Ms. Mansi Sharma	Dr. Harvansh Singh Judge Institute Of Dental Science And Hospital
28.	Ms. Muskan	Dr Harvansh Singh Judge Institute Of Dental Sciences
29.	Dr. Muskan	Dr. Harvansh Singh Institute Of Dental Sciences And Hospital
30.	Ms. Nandika Bahl	Dr. Harvansh Singh Judge Institute Of Dental Sciences
31.	Dr. Navneet Kaur	Dr. Harvansh Singh Judge Institute Of Dental Sciences, Panjab University, Chandigarh
32.	Mr. Neelinder Singh Rai	Dr. Harvansh Singh Judge Institute Of Dental Sciences And Hospital
33.	Dr. Nidhi Aggarwal	Harvansh Singh Judge Institute Of Dental Science
34.	Ms. Nishtha Jain	Dr. Harvansh Singh Judge Institute Of Dental Sciences & Hospital
35.	Ms. Pallavi	Dr Harvansh Singh Judge Dental College
36.	Ms. Panima Dhand	Dr. Harvansh Singh Judge Institute Of Dental Sciences & Hospital
37.	Ms. Paridhi	Dr. Harvansh Singh Judge Institute Of Dental Sciences And Hospital
38.	Ms. Pramiti Kaur	Punjab University Chandigarh
39.	Dr. Preeti Gupta	Panjab University
40.	Ms. Pulkita Saini	Dr. Harvansh Singh Judge Institute Of Dental Sciences And Hospital
41.	Dr. Radhika Tyagi	Biotechnology Department
42.	Dr. Ritika Thakral	Dr.Harvansh Singh Judge Institute Of Dental Sciences And Hospital
43.	Dr. Riya Arora	Dr Harvansh Singh Judge Institute Of Dental Sciences And Hospital
44.	Ms. Riya Khurana	Dr Harvansh Singh Judge Institute Of Dental Sciences
45.	Mr. Rohan Chandra Mishra	Dr Harvansh Singh Judge Institute Of Denal Sciences And Hospital
46.	Ms. Ruchika	Dr. Harvansh Singh Judge Institute Of Dental Science
47.	Dr. Sakshi Janbade	Dr Harvansh Singh Judge Institute Of Dental Sciences And Hospital
48.	Ms. Samridhi Jaswal	Dr. Harvansh Singh Judge Institute Of Dental Science, Panjab University
49.	Dr. Sangeeta Gupta	Dr Harvansh Singh Judge Institute Of Dental Sciences And Hospital
50.	Ms. Senona	Dr. Harvansh Judge Institute Of Dental Sciences
51.	Dr. Shreya Goel	Dr Harvansh Singh Judge Institute Of Dental Sciences & Hospital
52.	Dr. Shrutika	Dr Harvansh Singh Judge Institute Of Dental Sciences And Hospital
53.	Mr. Shubham Gaur	Dr Harvansh Singh Judge Institute Of Dental Sciences
54.	Ms. Shubhika Tandon	Dr. Harvansh Singh Judge Institute Of Dental Sciences & Hospital
55.	Ms. Simarjeet Kaur	Dr. Harvansh Singh Judge Institute Of Dental Sciences
56.	Dr. Snehal Mandal	Dr Harvansh Singh Judge Institute Of Dental Science And Hospital
57.	Ms. Snigdha Sran	Dr. Harvansh Singh Judge Institute Of Dental Sciences And Hospital, Uids Dept, Pu
58.	Ms. Soloni Gupta	Panjab University
59.	Dr. Somya Jain	Dr Harvansh Singh Judge Institute Of Dental Sciences And

		Hospital
60.	Dr. Soumya Bhasin	Dr. Harvansh Singh Judge Institute Of Dental Sciences And Hospital
61.	Mr. Vaibhav Singh	Panjab University
62.	Dr. Vansh Goyal	Dr. Harvansh Singh Judge Institute Of Dental Sciences And Hospital
63.	Dr. Vibhuti Shukla	Dr. Harvansh Singh Judge Institute Of Dental Sciences
UG/PG Students from Colleges and Other Institutions		
64.	Ms. Shreshtha Bansal	Indian Institute Of Technology, Madras
Faculty/Scientists of Panjab University Campus and Regional Centres		
65.	Dr. Abha Bajaj Nee Sheth	Dr.Hsj Institute Of Dental Sciences And Hospital, Panjab University, Chandigarh
66.	Dr. Amandeep Kaur	Dr Harvansh Singh Judge Institute Of Dental Sciences And Hospital
67.	Dr. Amandeep Singh Uppal	Dr.Harvansh Singh Judge Institute Of Dental Sciences And Hospital
68.	Dr. Amrita Rawla	Dr. Havansh Singh Judge Institute Of Dental Sciences & Hospital, Panjab University Chandigarh
69.	Professor Dr Deepak Kumar Gupta	Dr Harvansh Singh Judge Institute Of Dental Sciences & Hospital
70.	Professor Dr Divya Mahajan	Dr Hsjids, Panjab University
71.	Dr. Dr Jyoti Gupta	Dr Harvansh Singh Judge Institute Of Dental Sciences And Hospital
72.	Professor Dr Kitty Sidhu	Dr Hsjids
73.	Dr. Jyoti Sharma	Dr. Havansh Singh Judge Institute Of Dental Sciences & Hospital, Panjab University Chandigarh
74.	Dr. Kavita Sekhri	Dr Harvansh Singh Judge Institute Of Dental Sciences
75.	Dr. Leena Verma	Dr Hsjids ,P.U Chandigarh
76.	Dr. Maninder Pal Singh Gill	Dr Hsj Institute Of Dental Sciences, Panjab University
77.	Dr. Manjot Kaur	Dr Harvansh Singh Judge Institute Of Dental Sciences And Hospital, Panjab University Chandigarh
78.	Dr. Manjula Mehta	Dr.Harvansh Singh Judge Institute Of Dental Science And Hospital Panjab University Chandigarh
79.	Dr. Namrata C Gill	Dr Hsjids, Panjab University
80.	Dr. Nandini Bhaskar	Dr Harvansh Singh Judge Institute Of Dental Sciences And Hospital, Panjab University, Chandigarh
81.	Dr. Neha Bansal	Dr Harvansh Singh Judge Institute Of Dental Science
82.	Dr. Poonam Sood	Dr Harvansh Singh Judge Institute Of Dental Sciences And Hospital
83.	Dr. Prabhjot Cheema	Dr Hsj Institute Of Dental Sciences, Panjab University
84.	Dr. Rajesh Kumar Joshi	Dr Harvansh Singh Judge Institute Of Dental Sciences And Hospital
85.	Dr. Rakhi Aulakh Batth	Drhsjids
86.	Dr. Ruchi Singla	Dr Harvansh Singh Judge Institute Of Dental Sciences And Hospital
87.	Dr. Ruchika Nandha	Dr Harvansh Singh Judge Institute Of Dental Sciences And Hospital ,Panjab University,Chandigarh
88.	Dr. Shaveta Sood	University Institute Of Dental Sciences
89.	Professor Shefali Singla	Dr Harvansh Singh Judge Institute If Dental Sciences Panjab Univy
90.	Dr. Sidhi Passi	Dr .HSJIDS

91.	Dr. Sonia Bhonchal Bhardwaj	Dr Hsjids, Panjab University
92.	Dr. Sukant K Garg	Dr Hsjids
93.	Dr. Sunint Singh	Dr H S J Institute Of Dental Sciences And Hospital
94.	Dr. Suruchi Aditya	Dr Harvansh Singh Judge Institute Of Dental Sciences
95.	Dr. Swaty Jhamb	Dr. H.S.J.I.D.S., Pu
96.	Dr. Vandana Chhabra	Dr Harvansh Singh Judge Institute Of Dental Sciences And Hospital
97.	Dr. Vinay Kapur	Dr H S Judge Institute Of Dental Sciences & Hospital
98.	Dr. Virender Kumar	Dr. Hsj Institute Of Dental Sciences & Hospital
Faculty/Scientists from Colleges and Other Institutions		
99.	Dr. Gaurav Ahuja	MMCDSR
100.	Dr. Mandeep Kaur Bhullar	MMCDSR

EARTH AND ENVIRONMENTAL SCIENCES

UG/PG Students of Panjab University Campus and Regional Centres		
1.	Ms. Ambika Kumari	Panjab University
2.	Ms. Arshdeep Kaur Sahi	Panjab University
3.	Ms. Harshnoor Kaur	Dr. SSBUICET, Chandigarh
4.	Ms. Kapila Negi	Panjab University
5.	Ms. Khushi Arya Singh	Department Of Geology, Panjab University
UG/PG Students from Colleges and Other Institutions		
6.	Ms. Sandhya	Jawaharlal Nehru University
Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)		
7.	Ms. Anshula Chauhan	Panjab University, Chandigarh
8.	Ms. Dhriti Bragta	Panjab University
9.	Mr. Pankaj	Panjab University
10.	Ms. Raashi Gupta	Department Of Environment Studies
11.	Mr. Raj Kiran Dhiman	Panjab University
12.	Mr. Rajat Kumar	Panjab University
13.	Ms. Shreya Gupta	Panjab University, Chandigarh
14.	Ms. Tundup Dolma	Environment Studies
Research Scholars from Colleges and other Institutions (JRF, SRF, Project Fellow and Post Docs)		
15.	Mr. Akshay Raj Manocha	University Of Silesia, Katowice, Poland
16.	Mr. Jasvir Singh	Rayat Bahra University
17.	Ms. Vedika	Csir-Imtech
Faculty/Scientists of Panjab University Campus and Regional Centres		
18.	Professor Gaurav Kalotra	Panjab University
19.	Professor Harminder Pal Singh	Panjab University
20.	Dr. Mahesh Thakur	Department Of Geology
21.	Professor Navneet Kaur	Panjab University
22.	Dr. Rajeev Kumar	Panjab University
23.	Dr. Rupali Jandrotia	Dst-Centre For Policy Research
24.	Dr. Sukhdeep Kaur	Panjab University
25.	Dr. Surbhi Goel	Department Of English And Cultural Studies
26.	Dr. Vishwa Bandhu Singh	Department Of Geography, Panjab University

ENGINEERING SCIENCES

UG/PG Students of Panjab University Campus and Regional Centres		
1.	Mrs. Aarushi Sharma	Sb Bhatnagar Institute Of Chemical Engineering And Technology
2.	Ms. Aashima Sood	Dr. S.S. Bhatnagar University Institute Of Chemical Engineering And Technology
3.	Mr. Abhay Thakur	University Institute Of Engneering And Technology, Pu,Chandigarh
4.	Mr. Abhi Chahar	Uiet Panjab University Chandigarh
5.	Mr. Abhishek	University Institute Of Engineering And Technology
6.	Mr. Abhishek Chauhan	University Institute Of Engineering And Technology
7.	Ms. Aditi	University Institute Of Engineering And Technology,Punjab University
8.	Mr. Aditya Kumar	University Institute Of Engineering And Technology
9.	Mr. Aditya Poddar	University Institute Of Engineering And Technology
10.	Mr. Akash Biswas	University Institute Of Engineering And Technology
11.	Ms. Akriti Sinha	University Institute Of Engineering And Technology Chandigarh
12.	Ms. Akshita Bisht	Dr Ssb Uicet
13.	Ms. Akshita Sharma	University Institute Of Engineering And Technology
14.	Er. Aman Dabral	Panjab University
15.	Ms. Amanpreet Kaur	Uiet,Chandigarh
16.	Mr. Amit Singh	University Institute Of Engineering And Technology
17.	Mr. Amol Chaudhary	University Institute Of Engineering And Technology
18.	Ms. Anjanjot Kaur	Uiet(Pu),Chandigarh
19.	Mr. Ankit Bhardwaj	University Institute Of Engineering And Technology
20.	Mr. Anshul Bhardwaj	University Institute Of Engineering And Technology
21.	Mr. Anubhav Gautam	Uiet Dept. Panjab University
22.	Ms. Arpan Sharma	University Institute Of Engineering And Technology, Panjab University
23.	Er. Arshpreet Kaur	University Institution Of Engineering And Technology
24.	Ms. Arshpreet Kaur Ghotra	Uiet, Panjab University Chandigarh
25.	Mr. Aryan Kamboj	Dr. Ssbuicet, Panjab University
26.	Ms. Avantika Pandey	University Institute Of Engineering And Technology
27.	Ms. Avneet Kaur	Panjab University
28.	Ms. Chahat	Uiet, Panjab University, Chandigarh
29.	Er. Chailsi Thakur	University Institute Of Engineering And Technology
30.	Ms. Chanpreet Kaur	University Institute Of Engineering And Technology, Pu
31.	Mr. Chealson Seleibam	University Institute Of Engineering And Technology
32.	Mr. Dev Pratap Singh	University Institute Of Engineering And Technology
33.	Mr. Dev Vrat	Uiet Chandigarh
34.	Ms. Dhriti Kakkar	Uiet Pu Chd
35.	Mr. Dikshant	Panjab University
36.	Ms. Gagandeep Kaur	Uiet ,Chandigarh
37.	Ms. Gayatri Mehta	Uiet Chandigarh, Pu
38.	Mr. Gourav Chahal	U.I.E.T Panjab Univeristy
39.	Mr. Gourav Kashiv	Uiet, Pu
40.	Er. Gurashish Singh	University Institute Of Engineering And Technology
41.	Er. Gursajan Thapa	Uiet Panjab University
42.	Ms. Harkit Kaur Khalsa	Uiet, Panjab University

43.	Ms. Harleen Kaur	Chandigarh University
44.	Ms. Harleen Kaur	Uiet, Panjab University, Chandigarh
45.	Mr. Harpreet Singh	Uiet,Panjab University
46.	Mr. Harshdeep Singh	University Institute Of Engineering And Technology,Panjab University
47.	Mr. Harshit Kumar	University Institute Of Engineering And Technology
48.	Ms. Ira Bhatia	University Institute Of Engineering And Technology, Panjab Univeristy
49.	Ms. Jagriti	University Institute Of Engineering And Technology
50.	Mr. Jashanpreet Singh	Uiet, Pu
51.	Er. Jasjit Singh Dhanoa	Panjab University
52.	Ms. Kanvi	University Institute Of Engineering And Technology
53.	Er. Kashvi Sharma	Uiet Chandigarh , Pu
54.	Ms. Komal	Uiet Punjab University
55.	Er. Kshitiz Sharma	Panjab University
56.	Mr. Lakshya Sharma	University Institute Of Chemical Engngineering And Technology
57.	Ms. Maanya	University Institute Of Engineering And Technology, Panjab University, Chandigarh
58.	Mr. Maaz Danish Khan	University Institute Of Engineering Technology
59.	Ms. Maitri	Uiet,Pu Chd
60.	Mr. Manak Saggu	Uiet, Panjab University, Chandigarh
61.	Ms. Mansi Sharma	Panjab University
62.	Ms. Manureet Kaur	University Institute Of Engineering & Technology
63.	Ms. Manya Singla	Uiet Chandigarh
64.	Ms. Megha Saini	Dr Ssb Uicet, Panjab University
65.	Ms. Mehak Randhawa	University Institute Of Engineering And Technology (Uiet) ,Panjab University, Chandigarh.
66.	Ms. Nandini Sharma	University Institute Of Engineering Technology
67.	Mr. Navjot Singh	University Institute Of Engineering And Technology
68.	Ms. Navpreet Kaur	Dr.Ssbuicet
69.	Ms. Navreet Kaur	University Institute Of Engineering And Technology, Panjab University, Chandigarh
70.	Ms. Nidhi	Uiet, Panjab University
71.	Ms. Niharika	University Institute Of Engineering And Technology
72.	Ms. Niharika Singh	Panjab University
73.	Ms. Nimrat Kaur	Panjab University
74.	Mr. Nitin Pandey	University Institute Of Engineering And Technology
75.	Ms. Nivedita	Dr Ssb Uicet , Panjab University
76.	Ms. Onkriti	University Institute Of Engineering And Technology
77.	Er. Payal Dogra	Panjab University
78.	Ms. Popinder Kour	Uiet, Punjab University
79.	Mr. Pratimaan Tripathi	University Institute Of Engineering & Technology , Panjab University Chandigarh
80.	Mr. Prithul Joshi	University Institute Of Engineering And Technology
81.	Ms. Priya Kaloni	Dr.Ssbuicet
82.	Ms. Priyankle	Uiet, Pu
83.	Ms. Richa Singh	Dr. Ssbuicet, Panjab University
84.	Mr. Ritik Bhardwaj	University Institute Of Engineering And Technology
85.	Ms. Ritika	University Institute Of Engineering And Technology,

		Panjab University, Chandigarh
86.	Mr. Rohit Kumar	University Institute Of Engineering Technology
87.	Ms. Roshleen Singla	University Institute Of Engineering And Technology, Panjab University, Chandigarh
88.	Ms. Rupali	University Institute Of Engineering And Technlogy
89.	Ms. Samriti	University Institute Of Engineering And Technology, Panjab University, Chandigarh
90.	Ms. Sargun	Chandigarh College Of Engineering And Technology
91.	Ms. Shambhavi	Panjab University
92.	Ms. Shrishti Jha	Dr Ssbuicet
93.	Ms. Simar Atwal	Chandigarh College Of Engineering And Technology (Ccet)
94.	Ms. Simarpreet Kaur	Uicet
95.	Ms. Simran Kaushik	Uicet
96.	Mr. Snehasish Kundu	University Institute Of Engineering Technology
97.	Ms. Sonali Kumari	Uiet, Chandigarh
98.	Mr. Sudhanshu Angiras	University Institute Of Engineering And Technology, Panjab University
99.	Ms. Tanya Gandhi	University Institute Of Engineering
100.	Mr. Taranjeet Singh	Uiet/ Panjab University
101.	Mr. Taranjot Singh	University Institute Of Engineering And Technology
102.	Mr. Tathagat Satyam	Uiet Pu
103.	Ms. Urvi Chauhan	Uiet, Panjab University
104.	Ms. Vandna Thakur	Uiet, Panjab University
105.	Er. Vanshika Sharma	University Institute Of Engineering Technology
106.	Mr. Vinay Sharma	University Institute Of Engineering And Technology
107.	Mr. Vishal Kumar Kasav	Panjab University
108.	Ms. Yukti Mahajan	Panjab University
UG/PG Students from Colleges and Other Institutions		
109.	Ms. Anvi Aggarwal	Thapar Institute Of Engineering And Technology
110.	Er. Harsh Bassal	Punjab Engineering College
111.	Mr. Ishan Garg	Thapar Institute Of Engineering And Technology
112.	Mr. Krishnan Abhishek	Thapar Institute Of Engineering And Technology
113.	Mr. Mridul Dobhal	Thapar Institute Of Engineering And Technology
114.	Ms. Nabya Kamboj	I K Gujral Punjab Technical University Mohali Campus 1
115.	Ms. Palak Goyal	Punjab Engineering College
Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)		
116.	Dr. Abhinav Pratap Singh	Uiet, Panjab University
117.	Ms. Amanpreet Kaur	Uiet Panjab University
118.	Mr. Anil Kumar	Uiet Chd
119.	Ms. Archita	Panjab University
120.	Ms. Divya Verma	Panjab University
121.	Mr. Gurbinder Singh Dhanoa	Uiet Panjab Univesity
122.	Ms. Gurneet Kaur	University Institute Of Engineering And Technology, Panjab University
123.	Ms. Harleen Kaur	University Institute Of Engineering And Technology
124.	Mr. Himanshu	Uiet, Panjab University
125.	Ms. Kanak Sharma	Dr. Ssb Uicet Pu Chandigarh
126.	Mr. Karan Kapoor	Panjab University
127.	Mr. Karun Madan	Panjab University, Chandigarh

128.	Mr. Mankirat Singh Mann	Uiet Panjab University
129.	Ms. Mehak Singla	University Institute Of Engineering And Technology
130.	Ms. Neha Singla	Information Technology/Uiet
131.	Mrs. Nisha Sharma	U.I.E.T (E.C.E)
132.	Ms. Pranjal Rohilla	Panjab University
133.	Mr. Prashant Prakash	University Institute Of Engineering And Technology
134.	Mr. Preet Singh	Panjab University
135.	Ms. Priyanka	University Institute Of Engineering And Technology
136.	Mr. Puneet Kapoor	University Institute Of Engineering & Technology
137.	Er. Rajneesh	Uiet Punjab University
138.	Ms. Rashika Saproo	Uiet, Panjab University
139.	Er. Sakshi Gupta	Dr S.S.B. Uicet, Panjab University
140.	Ms. Saumya Bharti	Uiet, Panjab University
141.	Ms. Shewangi	Uiet/ Panjab University
142.	Ms. Sumindar Kaur Saini	University Institute Of Engineering And Technology
143.	Mr. Sunil Kumar	Uiet, Panjab University Chandigarh
144.	Ms. Versha Thakur	Uiet,Panjab University
145.	Mr. Vipul Swami	University Institute Of Engineering And Technology
146.	Mr. Yadevendra Kamal	Uiet, Panjab University
Research Scholars From Colleges And Other Institutions (Jrf, Srf, Project Fellow And Post Docs)		
147.	Mr. Arshpreet Singh	Csir Csio
148.	Ms. Himanshi	Csir Csio
149.	Ms. Ishani Sharma	Shoolini University
150.	Ms. Maya Thapa	Shoolini University
151.	Ms. Saveri Singh	Csir- Central Scientific Instruments Organisation
Faculty/Scientists of Panjab University Campus and Regional Centres		
152.	Dr. Aditi Gupta	Uiet, Panjab University
153.	Professor Amandeep Verma	Uiet,Pu
154.	Professor Amrinder Pal Singh	University Institute Of Engineering & Technology
155.	Professor Anupreet Kaur	Uiet Pu
156.	Professor Charu Madhu	Panjab University
157.	Professor Deepak Kumar	Uiet, Panjab University Chandigarh
158.	Professor Inderdeep Kaur Aulakh	University Institute Of Engineering And Technology
159.	Professor Jaget Singh	Uiet, Panjab University Chandigarh
160.	Dr. Madhu Khatri	Uiet, Panjab University
161.	Professor Mamta Juneja	Uiet, Panjab University
162.	Professor Mandeep Kaur	Uiet,Panjab University
163.	Professor Naresh Kumar	Uiet, Panjab University Chandigarh
164.	Professor Naveen Aggarwal	Uiet, Panjab University
165.	Dr. Neelam Goel	Panjab University, Chandigarh
166.	Professor Nidhi Garg	University Institute Of Engineering And Technology (Uiet)
167.	Dr. Nishima	Panjab University
168.	Dr. Parul Gaur	Uiet, Pu
169.	Professor Prashant Jindal	Panjab University
170.	Dr. Preeti Gupta	Uiet, Panjab University, Chnadigarh
171.	Professor Preeti Singh	Uiet, Panjab University, Chandigarh
172.	Dr. Puneet Kaur	Uiet,Panjab University,Chandigarh

173.	Dr. Raj Kumari	Uiet Panjab University Chandigarh
174.	Professor Roopali Garg	Panjab University
175.	Professor Sakshi Kaushal	Uiet Pu Chandigarh
176.	Professor Sanjeev Puri	Uiet, Panjab University, Chandigarh
177.	Professor Seema Kapoor	Panjab University
178.	Professor Shailendra Kumar Arya	Panjab University, Chandigarh
179.	Dr. Sukhvir Singh	Uiet, Panjab University
180.	Dr. Sumit Budhiraja	Uiet, Panjab University
181.	Dr. Twinkle Bedi	Dr. Ssbuicet
182.	Er. Vishal Sharma	Uiet Panjab University
183.	Dr. Vivek Pahwa	Uiet, Panjab University
184.	Professor Yajvender Pal Verma	Panjab University Chandigarh
Faculty/Scientists From Colleges And Other Institutions		
185.	Dr. Suresh Kumar	Panjab University

MANAGEMENT SCIENCES

UG/PG Students of Panjab University Campus and Regional Centres		
1.	Ms. Arshdeep Kaur	University Institute Of Fashion Technology & Vocational Department (Uift)
2.	Ms. Diksha	University Institute Of Fashion And Lifestyle Technology &V.D.
3.	Mr. Rohan Sharma	Dr.S.S. Bhatnagar University Institute Of Chemical Engineering & Technology
4.	Ms. Seerat	Panjab University, Chandigarh
Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)		
5.	Ms. Akanksha Garg	University Institute Of Fashion And Lifestyle Technology
6.	Ms. Anu Kaushal	Uiams
7.	Mr. Ashwini Kumar	Uihtm
8.	Ms. Deepa	Uift&Vd, Panjab University
9.	Ms. Kanksha Malhotra	University Business School
10.	Ms. Kirti	University Institute Of Fashion And Lifestyle Techology&V.D.
11.	Ms. Meenal Jain	University Business School
12.	Mr. Naveen	Dst Cpr Panjab University Chandigarh
13.	Mrs. Ravinder Kaur	University Institute Of Applied Management Sciences
Faculty/Scientists of Panjab University Campus and Regional Centres		
14.	Dr. Aman Khera	University Institute Of Applied Management Sciences (Uiams)
15.	Dr. Anu H Gupta	Panjab University, Chandigarh
16.	Dr. Harjit Kaur	Ssbuicet

LIFE SCIENCES

UG/PG Students of Panjab University Campus and Regional Centres		
1.	Mr. Abhinav Dhiman	Panjab University
2.	Mr. Abhinav Dhiman	Panjab University
3.	Mr. Abhinav Sharma	Department Of Anthropology
4.	Mr. Ajay Kumar	Panjab University
5.	Mr. Akshit Sharma	Panjab University

6.	Mr. Amit Sharma	Department Of Anthropology
7.	Ms. Anjali Thakur	Panjab University Chandigarh
8.	Ms. Ankita	Center Of System Biology Panjab University Chandigarh
9.	Mr. Anshuman Sharma	Department Of Botany Panjab University
10.	Ms. Anushka Joshi	Panjab University
11.	Ms. Arshita	Department Of Microbiology, Panjab University
12.	Mr. Aryan Bhan	Panjab University
13.	Mr. Aryan Chauhan	Department Of Botany, Panjab University
14.	Ms. Ayushi Raturi	Panjab University Chandigarh
15.	Ms. Bavneet Kaur	Panjab University (Main Campus)
16.	Ms. Bhumika	Panjab University Chandigarh
17.	Ms. Chandrika	Panjab University
18.	Ms. Charu	Punjab University
19.	Ms. Deepti Rani Sehrawat	Panjab University
20.	Ms. Divi Sharma	Panjab University
21.	Ms. Drishti Sharma	Ggdsd College
22.	Ms. Garima Kakkar	Panjab University
23.	Ms. Gauri Sharma	Panjab University
24.	Ms. Gauri Singh	Nchgsr
25.	Ms. Harnoor Kaur	Department Of Biotechnology, Panjab University
26.	Ms. Hasrat Brar	Panjab University
27.	Ms. Ishita Goyal	Panjab University
28.	Ms. Ishita Sehgal	Panjab University
29.	Dr. Ishnoor Kaur	Department Of Human Genomics
30.	Ms. Kanika Sharma	Panjab University Chandigarh
31.	Ms. Kashish Thakur	Department Of Biotechnology, Panjab University
32.	Ms. Mehak Chaudhary	Department Of Microbial Biotechnology, Panjab University
33.	Ms. Navnoor Kaur	Panjab University
34.	Ms. Nilanjana Sharma	Uiet, Panjab University
35.	Ms. Nishka Sarda	Department Of Anthropology
36.	Ms. Nishu Saini	Panjab University Chandigarh
37.	Ms. Palak Sharma	Panjab University
38.	Ms. Pallak Bahl	Panjab University
39.	Ms. Prabhjot Kaur	Panjab University Chandigarh
40.	Ms. Pritpal Kaur Rose	Panjab University
41.	Mr. Pulkit Sharma	Department Of Anthropology, Panjab University Chandigarh.
42.	Ms. Sakshi Palial	Panjab University Chandigarh
43.	Ms. Samiksha Awasthi	Panjab University
44.	Ms. Sanchita Gandhi	Panjab University
45.	Ms. Sharmishtha	Panjab University
46.	Ms. Shiwanti Jarial	Panjab University
47.	Ms. Sonal Jain	Panjab University Chandigarh
48.	Mr. Sudhanshu Maurya	Panjab University
49.	Mr. Tanveersinghsaini	Department Of Biotechnology
50.	Ms. Tanvi	Panjab University Chandigarh
51.	Ms. Tanya Arora	Panjab University
52.	Ms. Trisha Chander	Panjab University
53.	Ms. Vani Sharma	Panjab University
54.	Ms. Vertika	Panjab University
UG/PG Students from Colleges and Other Institutions		

55.	Ms. Aarti	Punjabi University, Patiala
56.	Ms. Aarushi	Mody University Of Science And Technology
57.	Ms. Agrima Sood	Csir-Csio
58.	Ms. Aikjot Sood	Post Graduate Government College Sector 11 Chandigarh
59.	Ms. Anchal Bhogal	Chandigarh University
60.	Mrs. Chahat	Punjabi University
61.	Mr. Dimple Kumar	Chandigarh University
62.	Ms. Kiranjot Kaur	Punjabi University
63.	Mr. Maninder Singh Jassal	Pggc-11 Coed Sector -11
64.	Dr. Moneesh Thakur	Gadvasu Ludhiana
65.	Dr. Nandini Sharma	Anovus Institute Of Clinical Research,Chandigarh
66.	Mr. Samarth Sharma	Punjab Agricultural University
67.	Mr. Sumit Kumar	Anovus Institute Of Clinical Research
68.	Ms. Tisha	Punjabi University
Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)		
69.	Ms. Aarti	Panjab University
70.	Ms. Aastha Sharda	Panjab University
71.	Ms. Aditi Rana	Panjab University, Chandigarh
72.	Ms. Akansha Rana	Panjab University
73.	Dr. Anamika Kumari	Panjab University Chandigarh
74.	Ms. Ankita Guleria	Panjab University Chandigarh
75.	Ms. Ashita	Panjab University, Chandigarh
76.	Ms. Ayushi Srivastava	Institute Of Forensic Science And Criminology
77.	Ms. Bhawna Kumari	Panjab University Chandigarh
78.	Mr. Bhupender Singh	Department Of Botany, Panjab University
79.	Mrs. Deepika	Panjab University Chandigarh
80.	Ms. Deepshikha	Panjab University
81.	Mrs. Diksha Bhanot	Panjab University
82.	Ms. Ekta Rani	Panjab University, Chandigarh
83.	Mr. Gaurav Spehia	Panjab University
84.	Mr. Jaspreet Singh	Botany Department, Panjab University Chandigarh
85.	Ms. Kajal Preet	Uift & Vd
86.	Mr. Karan Sharma	Panjab University
87.	Ms. Kriti Sharma	Panjab University, Chandigarh
88.	Ms. Manila	Institute Of Forensic Science And Criminology, Panjab University
89.	Ms. Mitali Jain	Uift&Vd, Pu
90.	Ms. Navreet Kaur	Institute Of Forensic Science And Criminology
91.	Ms. Neha Bhatt	Panjab University
92.	Ms. Neha Thakur	Panjab University
93.	Ms. Niharika	Panjab University
94.	Ms. Nishu	Department Of Biochemistry, Panjab University, Chandigarh
95.	Ms. Pooja Rani	Panjab University
96.	Ms. Priya Thakur	Department Of Zoology, Panjab University
97.	Mrs. Priyanka Puri	University Institute Of Pharmaceutical Sciences
98.	Mr. Rajesh Kumar	Panjab University
99.	Ms. Romika Chopra	Institute Of Forensic Science And Criminology
100.	Ms. Shalini Ojha	Department of Botany, Panjab University, Chandigarh
101.	Ms. Sharda	Panjab University Chandigarh
102.	Ms. Shivani Rawat	Department Of Botany

103.	Ms. Swati	Panjab University
Research Scholars from Colleges and other Institutions (JRF, SRF, Project Fellow and Post Docs)		
104.	Ms. Anshu	Department Of Zoology And Environmental Sciences
105.	Mr. Chetan Dubey	Chandigarh University
106.	Dr. Daljit Singh	Ikgptu Jalndhar
107.	Ms. Deepika	Guru Nanak Dev University
108.	Mrs. Jyoti	Chandigarh University, Gharuan Punjab
109.	Ms. Kiran Vashist	Chandigarh University
110.	Mr. Madan Lal	Guru Nanak Dev University
111.	Mr. Mohammad Asif Gawhari	Punjabi University, Patiala
112.	Mr. Musbahu Abdullahi Bagwai	Punjabi University, Patiala
113.	Mr. Naveenraj R	Csir Imtech
114.	Ms. Pallvi	Guru Nanak Dev University Amritsar
115.	Ms. Pari Panwar	Chandigarh University
116.	Ms. Payal Grover	Chitkara University
117.	Ms. Rimzim Pawar	Chandigarh University
118.	Ms. Samriti	Department Of Zoology, Guru Nanak Dev University
119.	Ms. Smile Sharma	Chandigarh University
120.	Ms. Vinamrta Sharma	Chandigarh University
Faculty/Scientists of Panjab University Campus and Regional Centres		
121.	Professor Anand Narain Singh	Deptt. Of Botany, Panjab University, Chandigarh
122.	Dr. Anju Rao	Deptt. Of Botany, Panjab University, Chandigarh
123.	Dr. Archana Chauhan	Panjab University, Chandigarh
124.	Professor Daizy Rani	Deptt. Of Botany, Panjab University, Chandigarh
125.	Dr. Deepa Dhatwalia	Panjab University
126.	Dr. Geetanjali Manchanda	Panjab University
127.	Dr. Indu Sharma	Panjab University, Chandigarh
128.	Dr. Jagdish Rai	Panjab University
129.	Dr. Jaspreet Kaur	Panjab University
130.	Dr. Js Sehrawat	Panjab University, Chandigarh, India
131.	Professor Kamaljit Singh	Panjab University, Chandigarh
132.	Dr. Kawalpreet Kaur	Sri Guru Gobind Singh College
133.	Professor Malkiat Chand Sidhu	Panjab University
134.	Dr. Neha Lakhanpal	Panjab University
135.	Dr. Papiya Mukherjee	Deptt. Of Botany, Panjab University, Chandigarh
136.	Professor Promila Pathak	Panjab University Chandigarh
137.	Dr. Ravinder Kumar	Panjab University Chandigarh
138.	Dr. Ravneet Kaur	Panjab University
139.	Professor Richa Puri	Deptt. Of Botany, Panjab University, Chandigarh
140.	Dr. Santosh Kumar Upadhyay	Panjab University
141.	Dr. Shalinder Kaur	Panjab University
142.	Professor Shweta Sharma	Panjab University
143.	Dr. Tej Kaur	Institute Of Forensic Science And Criminology
144.	Dr. Vijay Kumar	Department Of Zoology, Panjab University, Chandigarh
145.	Professor Yogesh Kumar Rawal	Panjab University, Chandigarh
Faculty/Scientists from Colleges and Other Institutions		
146.	Dr. Gurkanwal Kaur	Punjab Agricultural University
147.	Dr. Harmanjit Kaur	University Of Allahabad
148.	Dr. Nidhi Srivastava	Maharaja Agrasen University
149.	Mrs. Shivani Seraik	Govt. College Solan District Solan Himachal Pradesh
Person from Industry		
150.	Mr. Arun Kumar	Jkg Bioscience Pvt Ltd

MATHEMATICAL SCIENCES

UG/PG Students of Panjab University Campus and Regional Centres		
1.	Mrs. Akriti Thakur	Dcsa, Punjab University
2.	Ms. Akshita	Department Of Statistics
3.	Mr. Ankaj Kumar	Department Of Statistics, Panjab University Chandigarh
4.	Ms. Arpita Jain	Panjab University
5.	Ms. Chandrima Seal	Panjab University, Chandigarh
6.	Mr. Deepanshu	Panjab University
7.	Ms. Gurleen Kaur	Panjab University
8.	Mr. Hardik	Department Of Statistics, Panjab University, Chandigarh
9.	Ms. Harmanjot Kaur	Panjab University, Chandigarh
10.	Ms. Himani Sharma	Panjab University
11.	Ms. Kashish Malhotra	Panjab University
12.	Ms. Kashish Taank	Panjab University, Chandigarh
13.	Mr. Manveer Singh	Department Of Statistics
14.	Ms. Niharika	Department Of Statistics, Panjab University
15.	Ms. Palak	Mehr Chand Mahajan Dav College For Women
16.	Ms. Pratibha Behl	Panjab University
17.	Ms. Radhika Aggarwal	Punjab University, Chandigarh
18.	Mr. Sachin Kumar	Dcsa, Panjab University
19.	Ms. Samriddhi Jain	Panjab University
20.	Ms. Shivani	Panjab University
21.	Mr. Shivnandan	Panjab University, Chandigarh
22.	Ms. Tanya Ghai	Department Of Mathematics , Panjab University Chandigarh
23.	Mr. Yash Kumar	Panjab University
UG/PG Students from Colleges and Other Institutions		
24.	Ms. Gurnoor Kaur	Mehr Chand Mahajan Dav College For Women
25.	Ms. Amanpreet Kaur	Panjab University
26.	Mr. Amit Kumar Maurya	Department Of Statistics
27.	Mrs. Anjali Duggal	Dav College Hoshiarpur
28.	Mr. Ashish Kumar	Dcsa Department, Panjab University
29.	Mrs. Bhagya Shree	Panjab University
30.	Mr. Bohar Singh	Panjab University Chandigarh
31.	Mr. Chahat Monga	Guru Nanak College
32.	Ms. Dimple	Panjab University
33.	Ms. Fiza	Panjab University
34.	Mr. Harmanjeet	Department Of Mathematics
35.	Mr. Harmeet Singh	Panjab University Regional Center, Sri Muktsar Sahib
36.	Mr. Jatender Kumar	Department Of Computer Science And Applications
37.	Ms. Jyoti	Panjab University
38.	Ms. Kanika Sharma	Panjab University
39.	Mr. Karan Kaushal	Punjab University Regional Center Hoshiarpur
40.	Mr. Karan Pathania	Panjab University
41.	Ms. Krittika	Dcsa, Panjab University
42.	Mr. Manit Malhotra	Dcsa,Pu
43.	Mr. Manit Malhotra	Department Of Computer Science And Applications
44.	Ms. Manpreet Kaur Dhaliwal	Dcsa,Pu, Chd
45.	Ms. Mehak	Panjab University
46.	Mr. Narender Kumar	Dcsa, Panjab University
47.	Ms. Navdeep Kaur	Panjab University

48.	Ms. Pallvi Sharma	Dcsa, Panjab University
49.	Mr. Pankit	Department Of Mathematics
50.	Mr. Parteek	Panjab University Regional Campus Hoshiarpur
51.	Mrs. Rajni Garg	Panjab University, Chandigarh
52.	Mr. Ranveer	Panjab Universiy
53.	Mrs. Rashmi	Panjab University
54.	Mr. Rishab Batra	Panjab University
55.	Ms. S Ratna	Department Of Computer Science And Applications, Panjab University, Chandigarh
56.	Ms. Seema Chaudhary	Panjab University
57.	Ms. Shaveta	Dcsa, Panjab University, Chandigarh
58.	Ms. Shruti Saroha	Panjab University
59.	Ms. Smriti Bansal	Panjab University
60.	Mr. Sourabh Jangra	Dcsa, Panjab University
61.	Mr. Sumit Kumar	Department Of Statistics
62.	Ms. Swaranjeet Kaur	Panjab University
63.	Mr. Ujjwal Thakur	Panjab University
64.	Ms. Veerpal Kaur	Panjab University
65.	Ms. Vikramjeet Kaur	Panjab University
66.	Mrs. Vinto	Panjab University
Research Scholars from Colleges and other Institutions (JRF, SRF, Project Fellow and Post Docs)		
67.	Mrs. Punam	Mehr Chand Mahajan Dav College For Women
Faculty/Scientists of Panjab University Campus and Regional Centres		
68.	Dr. Aarti Khurana	Panjab University
69.	Dr. Anju Goyal	Department Of Statistics, Panjab University, Chandigarh
70.	Professor Anu Gupta	Dcsa, Panjab University
71.	Dr. Anuj Kumar	Panjab University
72.	Dr. Anuj Sharma	Panjab University
73.	Dr. Balwinder Kaur	Panjab University
74.	Dr. Dilbag Singh	Panjab University
75.	Professor Dinesh Khurana	Department Of Mathematics, Pu
76.	Dr. Gagandeep Singh	Panjab University, Chandigarh
77.	Mr. Harminder Singh Deosi	Panjab University
78.	Dr. Jasleen Kaur Bains	Panjab University
79.	Dr. Kathiravan T	Panjab University
80.	Dr. Kulbhushan Agnihotri	Panjab University, Chandigarh
81.	Dr. Mohinder Kumar	Panjab
82.	Professor Narinder Kumar	Department Of Statistics, Panjab University
83.	Dr. Neeru Mago	Panjab University
84.	Dr. Rajinder Singh	P.U. Chandigarh
85.	Professor Renu	Department Of Mathematics
86.	Dr. Rohini Sharma	Panjab Universitypan
87.	Professor Savita Bhatnagar	Panjab University
88.	Dr. Supreet Thapar	Department Of Computer Science And Applications
89.	Dr. Surinder Pal Singh Kainth	P. U. Chandigarh
Faculty/Scientists from Colleges and Other Institutions		
90.	Dr. Amrit Pal Singh	Smhs Government College Sas Nagar Punjab
91.	Dr. Manish Goyal	Iihs, Kurukshetra University, Kurukshetra
92.	Dr. Savkirat Kaur	Dev Samaj College For Women, Chandigarh
93.	Dr. Sukhdeep Singh	D.M.College

PHARMACEUTICALS SCIENCES

UG/PG Students of Panjab University Campus and Regional Centres		
1.	Ms. Aaina	Panjab University
2.	Ms. Aakanksha Kumari	University Insitute Of Pharmaceutical Sciences
3.	Mr. Aayush Goyal	University Institute Of Pharmaceutical Sciences
4.	Mr. Abhay Likhar	University Institute Of Pharmaceutical Sciences, Panjab University
5.	Mr. Abhinav	University Institute Of Pharmacutical Science Panjab University Chandigarh
6.	Mr. Abhishek Mishra	University Institute Of Pharmaceutical Sciences
7.	Mr. Adarsh Kumar	University Institute Of Pharmaceutical Sciences
8.	Ms. Aditi Kapoor	University Institute Of Pharmaceutical Sciences, Panjab University
9.	Mr. Ajay Kumar	University Institute Of Pharmaceuical Sciences
10.	Mr. Ajaydeep Singh	University Institute Of Pharmaceutical Sciences
11.	Ms. Akanksha Kumari	University Institute Of Pharmaceutical Sciences, Panjab University
12.	Ms. Alisha	University Institute Of Pharmaceutical Sciences
13.	Ms. Anagha Kaundal	Uips Panjab University
14.	Ms. Ananya Saikia	University Institute Of Pharmaceutical Sciences, Punjab University
15.	Ms. Anchal	University Institute Of Pharmaceutical Sciences
16.	Ms. Angelina	University Institute Of Pharmaceutical Sciences
17.	Ms. Anika Arora	University Of Pharmaceutical Sciences
18.	Mr. Anirudra Verma	Panjab University Chandigarh
19.	Ms. Anjali	University Institute Of Pharmaceutical Sciences
20.	Ms. Anjali Saini	Punjab University
21.	Ms. Ankita Sharma	University Institute Of Pharmaceutical Sciences, Panjab University Chandigarh
22.	Ms. Anshika Sharma	University Institute Of Pharmaceutical Sciences
23.	Ms. Anu Chaudhary	University Institute Of Pharmaceutical Sciences , Panjab University
24.	Ms. Anushka Sharma	Panjab University Chandigarh
25.	Mr. Archit Sood	University Institute Of Pharmaceutical Sciences Panjab University
26.	Mr. Arjun Singh	Uips , PU
27.	Ms. Arpita Dubey	Panjab University
28.	Ms. Arshdeep Kaur	University Institute Of Pharmaceutical Sciences
29.	Ms. Arya Singla	Panjab University Chandigarh
30.	Mr. Ashmit Jodha	University Institute Of Pharmaceutical Sciences
31.	Mr. Ayush Gupta	University Institute Of Pharmaceutical Sciences
32.	Ms. Bhumika Bhatt	University Institute Of Pharmaceutical Sciences
33.	Ms. Chandanpreet Dhupar	University Institute Of Pharmaceutical Sciences, Panjab University, Chandigarh
34.	Ms. Devyanshi Bhatt	Punjab University
35.	Ms. Dhriti	University Institute Of Pharmaceutical Sceinces (Uips)
36.	Mr. Divansh	U.I.P.S. Panjab University, Chandigarh
37.	Mr. Fanesh Goyal	University Institute Of Pharmaceutical Sciences
38.	Mr. Gaurav	University Institue Of Pharmaceutical Sciences
39.	Ms. Gurleen Kaur	Uips, Panjab University
40.	Mr. Gurmail Singh	University Institute Of Pharmaceutical Sciences, Panjab University

41.	Ms. Isha	University Institute Of Pharmaceutical Sciences
42.	Ms. Isha Sandhu	University Institute Of Pharmaceutical Sciences
43.	Ms. Ishita Nagpal	University Institute Of Pharmaceutical Sciences
44.	Mr. Jatin Sachdeva	Uips Panjab University
45.	Mr. Kailashdeep Singh	University Institute Of Pharmaceutical Sciences
46.	Ms. Kalpana	University Institute Of Pharmaceutical Sciences
47.	Ms. Kamaljit Kaur	Uips Panjab University
48.	Ms. Kanika Sharma	University Institute Of Pharmaceutical Sciences, Panjab University, Chandigarh
49.	Ms. Kanishka Vij	University Institute Of Pharmaceutical Sciences, Panjab University
50.	Ms. Kaushiki Roy	University Institute Of Pharmaceutical Sciences
51.	Ms. Kavya Jha	University Institute Of Pharmaceutical Sciences
52.	Ms. Khushvi	University Institute Of Pharmaceutical Sciences
53.	Ms. Kritika Khanna	Uips, Panjab University
54.	Ms. Kritika Longia	University Institute Of Pharmaceutical Sciences
55.	Mr. Madhav Vashisht	University Institute Of Pharmaceutical Sciences
56.	Mr. Manas Prabhu	University Institute Of Pharmaceutical Sciences
57.	Mr. Meet Yashraj Singh	University Institute Of Pharmaceutical Sciences
58.	Ms. Muskan Kanwar	Panjab University
59.	Ms. Nikita Paswan	Uips, Panjab University
60.	Ms. Nishtha Garg	University Institute Of Pharmaceutical Sciences
61.	Ms. Noor Vadera	Uips Panjab University
62.	Ms. Ojaswi	Panjab University
63.	Mr. Onkar Singh	Uips Puchd
64.	Ms. Pallavi Biala	University Institute Of Pharmaceutical Sciences, Panjab University
65.	Mr. Panshul Sharma	University Institute Of Pharmaceutical Sciences
66.	Mr. Paras	Panjab University
67.	Mr. Piyush Bhagi	U.I.P.S. Panjab University
68.	Ms. Pooja Rani	Uips Panjab University Chandigarh
69.	Mr. Prabal	University Institute Of Pharmaceutical Sciences Chandigarh
70.	Ms. Prakarti	University Institute Of Pharmaceutical Science (Uips)
71.	Ms. Priya Gupta	University Institute Of Pharmaceutical Sciences
72.	Ms. Purva Dhingra	Uips, Pu
73.	Ms. Radhika Sharma	University Institute Of Pharmaceutical Sciences Chandigarh
74.	Mr. Raghav Bhardwaj	University Institute Of Pharmaceutical Sciences Panjab University
75.	Mr. Rahul Gour	University Institute Of Pharmaceutical Sciences, Panjab University
76.	Mr. Raj Arihant Singhai	Panjab University Chandigarh
77.	Ms. Raj Sakshi Rana	Uips, Panjab University, Chandigarh
78.	Ms. Richa Sharma	University Institute Of Pharmaceutical Sciences
79.	Ms. Rishika Bhatt	Panjab University, Chandigarh
80.	Ms. Rishika Verma	Panjab University Chandigarh
81.	Ms. Rita Bhandari	University Institute Of Pharmaceutical Sciences
82.	Mr. Ritik Saproo	University Institute Of Pharmaceutical Sciences
83.	Ms. Ritika Sharma	University Institute Of Pharmaceutical Sciences ,Panjab University Chandigarh
84.	Ms. Riya Kamboj	University Institute Of Pharmaceutical Sciences

85.	Mr. Rohan Manjera	Punjab University
86.	Mr. Rohit Kumar	University Institute Of Pharmaceutical Sciences
87.	Mr. Rohit Sharma	Uips Panjab University
88.	Ms. Roli Gupta	University Institute Of Pharmaceutical Sciences
89.	Mr. Roshan Nagar	University Institute Of Pharmaceutical Sciences, Panjab University
90.	Ms. Sadhana Devi	University Institute Of Pharmaeutical Sciences,Panjab University
91.	Ms. Sadhiya	Panjab University Chandigarh
92.	Ms. Sakshi	Panjab University
93.	Ms. Sampriti De	University Institute Of Pharmaceutical Sciences Panjab University Chandigarh
94.	Ms. Sanjana	Panjab University Chandigarh
95.	Ms. Santosh Choudhary	University Institute Of Pharmaceutical Sciences
96.	Ms. Sarika Kumari	University Institute Of Pharmaceutical Sciences, Panjab University
97.	Ms. Sarveshi Sharma	Panjab University
98.	Mr. Sayandeep Giri	Uips, Panjab University
99.	Ms. Sezal	University Institute Of Pharmaceutical Sciences
100.	Mr. Shashi Bhushan Kumar	University Institute Of Pharmaceutical Sciences, Panjab University Chandigarh
101.	Mr. Shivam	U.I.P.S. Panjab University
102.	Mr. Shivam Singh	University Institute Of Pharmaceutical Sciences, Panjab University
103.	Mr. Shiven Gupta	University Institute Of Pharmaceutical Sciences, Panjab University
104.	Mr. Shivendra Ughade	University Institute Of Pharmaceutical Sciences , Panjab University Chandigarh
105.	Ms. Shristy Dhiman	Uips Panjab University
106.	Ms. Shriya	University Institute Of Pharmaceutical Sciences, Panjab University
107.	Ms. Shruti Goyal	University Institute Of Pharmaceutical Sciences
108.	Ms. Shruti Kumari	University Institute Of Pharmaceutical Sciences
109.	Mr. Shubham Dogra	University Institute Of Pharmaceutical Sciences, Panjab University Chandigarh
110.	Ms. Shyna Madaan	Uips, Panjab University
111.	Ms. Simran	University Institute Of Pharmaceutical Sciences
112.	Ms. Siya Uppal	Uips , Panjab University
113.	Mr. Smarth	Uips , Panjab University
114.	Ms. Soniya Bhojwani	University Institute Of Pharmaceutical Sciences
115.	Mr. Sunny Chugh	Panjab University Chandigarh
116.	Ms. Supreet Kaur	University Institute Of Pharmaceutical Sciences Panjab University
117.	Ms. Swani	University Institute Of Pharmaceutical Sciences
118.	Mr. Takbeer Alam	University Institute Of Pharmaceutical Sciences, (Uips), Panjab University Chandigarh
119.	Mr. Tanmay Pandey	University Institute Of Pharmaceutical Sciences
120.	Ms. Tanvi Kohli	University Institute Of Pharmaceutical Sciences
121.	Ms. Vaanshi	University Institute Of Pharmaceutical Science
122.	Mr. Vansh Kamboj	Panjab University

123.	Ms. Vanshika	Panjab University
124.	Ms. Vanshika Chayal	University Institue Of Pharmaceutical Sciences, Panjab University
125.	Ms. Vanshika Sharma	University Department Of Pharmaceutical Sciences
126.	Ms. Veenu	Panjab University
UG/PG Students from Colleges and Other Institutions		
127.	Ms. Avneet Kaur Grewal	Thapar Institute Of Engineering And Technology
128.	Mr. Chinnari Sai Sumanth	Shoolini University
129.	Mr. Kartikeya Bhardwaj	Dr. Harisingh Gour University
130.	Ms. Komal	Chaudhary Bansi Lal University, Bhiwani
131.	Ms. Neha	Isf College Of Pharmacy Moga Punjab
132.	Mr. Nidhaan Singh Davtaal	Amar Shadeed Baba Ajit Singh Jujhar Singh Memorial College Of Pharmacy
133.	Mr. Nikhil Choudhary	Amar Shaheed Baba Ajit Singh Jujhar Singh Memorial College Of Pharmacy,Bela,Ropar
134.	Ms. Ojashwini	Shoolini University
135.	Mr. Parwinder Singh	Asbasjsm College Of Pharmacy, Bela (Ropar)
136.	Mr. Pranav Gupta	Dr. Harisingh Gour University Sagar
137.	Mr. Rajat	Gautam Collage Of Pharmacy ,Hamirpur
138.	Mr. Ranjeet Singh	Isf College Of Pharmacy
139.	Mr. Rizul Singh	Shooolini University
140.	Mr. Sandeep Thakur	Gautam College Of Pharmacy Hamirpur
141.	Mr. Shivansh Katoch	Asbasjsm College Of Pharmacy
142.	Ms. Shreya	Isf College Of Pharmacy
143.	Ms. Simranjeet Kaur	Amar Shaheed Baba Ajit Singh Jujhar Singh Memorial College Of Pharmacy, Bela (Ropar)
144.	Mr. Sourav Chauhan	Shoolini University ,Solan, Hiachal Pradesh
145.	Mr. Akshay Kumar	University Institute Of Pharmaceutical Sciences
146.	Ms. Anisha Sharma	University Institute Of Pharmaceutical Sciences, Panjab University
147.	Ms. Chetna Pal	University Of Pharmaceutical Sciences
148.	Ms. Divya	Uips, Panjab University
149.	Ms. Mansi Prashar	University Institute Of Pharmaceutical Sciences, Panjab University, Chandigarh
150.	Mrs. Mini	Uips, Panjab University
151.	Ms. Namarta Thakur	Uips, Panjab University
152.	Ms. Pemal Preet Kaur	Uips, Panjab University
153.	Mrs. Pratibha Sharma	Uips, Panjab University Chandigarh
154.	Mr. Roshan Lal	University Institute Of Pharmaceutical Sciences
155.	Ms. Saloni Rahi	University Institute Of Pharmaceutical Sciences
156.	Ms. Tanvi Sharma	University Institute Of Pharmaceutical Sciences
157.	Ms. Ditsaah Kak	Shoolini University
158.	Mr. Hardik Kumar	Ik Gujral Punjab Technical University
159.	Ms. Kanika	Shoolini University
160.	Mr. Kshitij Rawat	Bric- National Agri-Food And Biomanufacturing Institute (Bric-Nabi)
161.	Dr. Seema Kirar	Bric Nabi Mohali
162.	Ms. Shilpa Debnath	Ik Gujral Punjab Technical University
163.	Professor Alka Bali	Panjab University Chandigarh
164.	Dr. Amita Sarwal	Uips, Panjab University
165.	Dr. Ashok Kumar Yadav	Panjab Universitty

166.	Dr. Ashwani Kumar	Panjab University
167.	Ms. Beenta Kumari	Uips, Panjab University, Chandigarh
168.	Dr. Divya Dhawal Bhandari	Panjab University
169.	Professor Indu Pal Kaur	Panjab University
170.	Mrs. Ishita Atwal	Panjab University
171.	Dr. Jai Malik	University Institute Of Pharmaceutical Sciences
172.	Dr. Jatinder Dhaliwal	Panjab University
173.	Dr. Monika	Panjab University
174.	Dr. Neelima Dhingra	University Institute Of Pharmaceutical Sciences, Panjab University Chanidgarh
175.	Professor Poonam Piplani	Uips Pu
176.	Dr. Prerna Kaushik	Uips, Panjab University
177.	Dr. Prerna Sarup	Uips, Pu, Chandigarh
178.	Dr. Sandip V Pawar	University Institute Of Pharmaceutical Sciences, Panjab University, Chandigarh
179.	Dr. Sangeeta Pilkhwal Sah	Panjab University, Chandigarh
180.	Dr. Vandita Kakkar	University Institute Of Pharmaceutical Sciences
181.	Professor Vivek Ranjan Sinha	Panjab University

PHYSICAL SCIENCES

UG/PG Students of Panjab University Campus and Regional Centres		
1.	Ms. Aarushi Thakur	Department Of Microbial Biotechnology, Panjab University
2.	Mr. Aman Sharma	Panjab University
3.	Ms. Ananya Nautiyal	Panjab University
4.	Ms. Anisha Yadav	Department Of Physics, Panjab University
5.	Ms. Aru Mittal	Panjab University
6.	Er. Desh Deepak Diwakar	Panjab University, Chandigarh
7.	Mr. Eakamkaar Singh	Department Of Physics, Panjab University, Chandigarh
8.	Ms. Garima	Department Of Physics, Panjab University
9.	Ms. Gurnaman Kaur	Panjab University
10.	Ms. Havisha	Panjab University, Physics Department
11.	Mr. Jagbir Singh	Department Of Physics , Panjab University Chandigarh
12.	Ms. Jasleen Kaur Nagpal	Department Of Physics, Panjab University
13.	Ms. Jasmine Masown	Department Of Physics, Panjab University
14.	Ms. Khushpreet Kaur	Department Of Physics, Panjab University
15.	Mr. Lakhwinder Singh	Centre Of Nano Science And Nano Technology
16.	Ms. Mansi	Ggdsd College
17.	Mr. Meraj Ahmad	Department Of Physics, Panjab University
18.	Ms. Nandini Chaudhary	Department Of Physics
19.	Mr. Rishav Thakur	Department Of Physics, Panjab University
20.	Ms. Sahaj	Panjab University
21.	Ms. Supriya Grover	Panjab University
22.	Ms. Upasana Sharma	Department Of Physics, Panjab University
23.	Mr. Vinayak Bhatnagar	Department Of Physics, Panjab University.
24.	Mrs. Yashika Sood	Panjab University Chandigarh
UG/PG Students from Colleges and Other Institutions		
25.	Mr. Aman Chakradhari	PGGC-11
26.	Mr. Siddhant Singh Sehgal	PGGC 11

Research Scholars of Panjab University Campus and Regional Centres (JRF, SRF, Project Fellow and Post Docs)		
27.	Dr. Amandeep Kaur	Department Of Physics Panjab University
28.	Mr. Amit	Panjab University, Chandigarh
29.	Ms. Ankita Nain	Physics Department, Panjab University
30.	Mr. Basant Sura	Panjab University Chandigarh
31.	Mr. Chirag Garg	Department Of Physics Panjab University Chandigarh
32.	Mr. Dikshit Gupta	Panjab University
33.	Ms. Kiran	Department Of Physics, Panjab University
34.	Ms. Komal	Department Of Physics, Panjab University
35.	Dr. Rajneet Kaur	Panjab University, Chandigarh
36.	Ms. Renu Joshi	Panjab University
37.	Dr. Ritu	Panjab University Chandigarh 160014
38.	Ms. Shakshi	Panjab University Chandigarh
39.	Ms. Versha Rani	Department Of Physics, Pu Chandigarh
Research Scholars from Colleges and other Institutions (JRF, SRF, Project Fellow and Post Docs)		
40.	Ms. Neelam	Guru Jambheshwar University Of Science $ Technology, Hisar, Haryana
41.	Ms. Sushila Devi	Guru Jambheshwar University Of Science & Technology
Faculty/Scientists of Panjab University Campus and Regional Centres		
42.	Professor Ashok Kumar	P.U. Chandigarh
43.	Professor Bivash Ranjan Behera	Department Of Physics, Panjab University
44.	Professor D Mehta	Panjab University
45.	Dr. Geetu	Panjab University
46.	Dr. Gss Saini	Panjab University
47.	Dr. Gulsheen Ahuja	Panjab University
48.	Professor Lokesh Kumar	Panjab University
49.	Dr. Manish Dev Sharma	Panjab University Chandigarh
50.	Professor Navdeep Goyal	Panjab University
51.	Dr. Neeru Chaudhary	Panjab University
52.	Professor Ranjan Kumar	Panjab University Chandigarh
53.	Dr. Sakshi Gautam	Department Of Physics Panjab University
54.	Professor Samarjit Sihotra	Panjab University
55.	Professor Sunil Kumar Arora	Centre For Nano Science And Nano Technology
56.	Professor Surya Kant Tripathi	Panjab University
57.	Dr. Sushil Singh Chauhan	Panjab University
58.	Professor Vipin Bhatnagar	Panjab University

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