

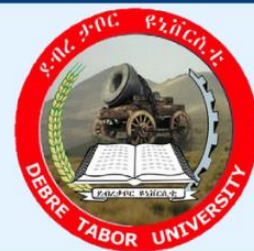
ABSTRACT BOOK

INTERNATIONAL CONFERENCE  
ON MULTIDISCIPLINARY  
RESEARCH & AI FOR  
SUSTAINABILITY



ICMR **A** I S  
2025

ORGANIZED BY



SOCIETY FOR  
PROGRESSIVE LEARNING  
AND RESEARCH (SPLR),  
INDIA

DEBRE TABOR  
UNIVERSITY,  
ETHIOPIA

SEP. 27-28, 2025

*Society for Progressive Learning and Research  
(SPLR)*

*In Collaboration*

*with*

*Debre Tabor University, Ethiopia*

**ORGANISES**

*InnovAltion 2025: International Conference on*

*Multidisciplinary Research & AI for*

*Sustainability*

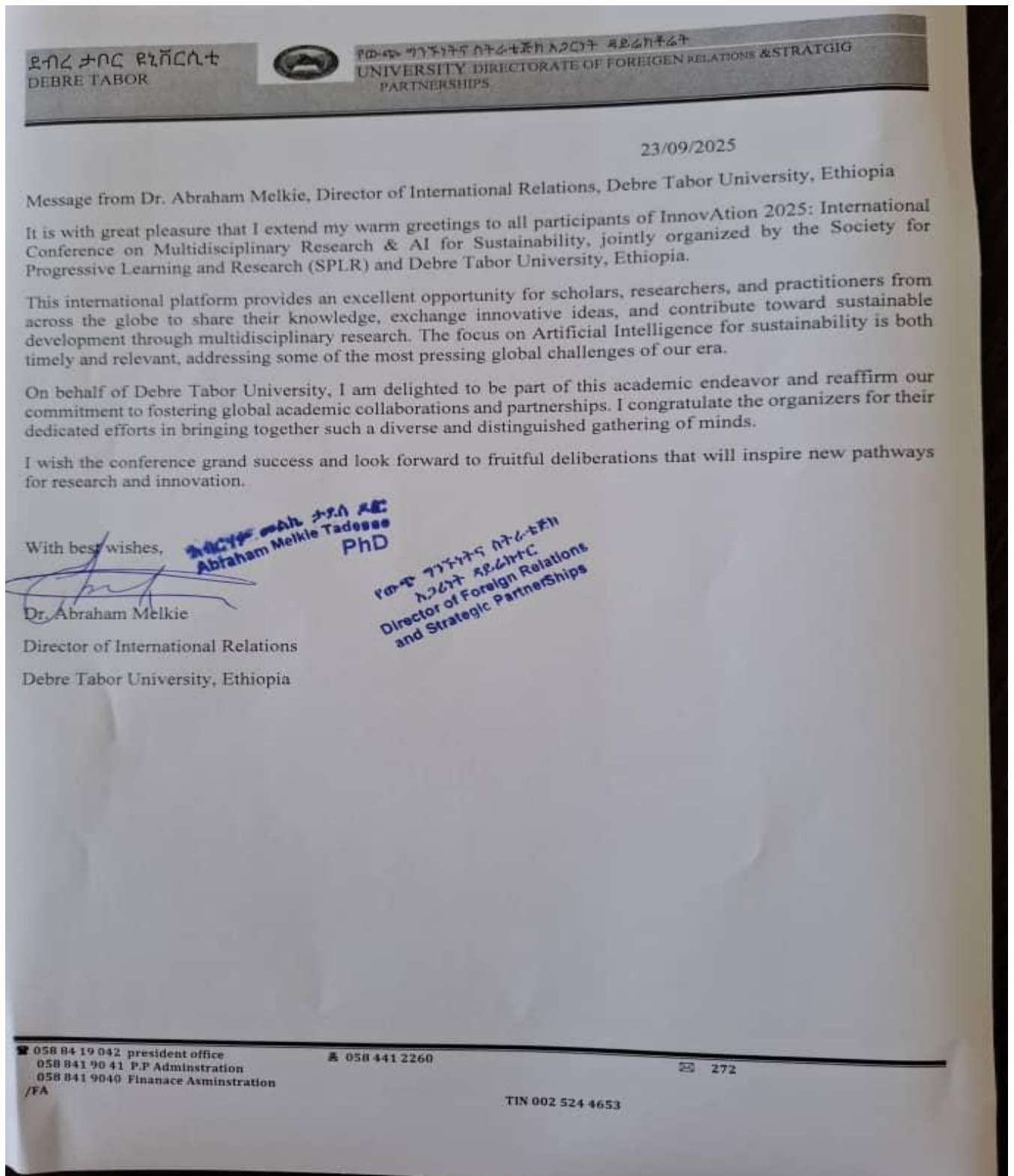
***ABSTRACT BOOK***

***27 – 28 September, 2025***

# ***Messages***

**Dr. Abraham Melkie,**  
**Director of International Relations**  
**Debre Tabor University, Ethiopia**

## Message





**Prof. Santiago Gómez-Ruiz**

Full Professor of the Universidad Rey Juan Carlos (SPAIN)  
Secretary of the ITPS – Research Institute of Sustainable  
Technologies of the Universidad Rey Juan Carlos (SPAIN)



**Welcome Message**

It is with great enthusiasm that I extend my warmest greetings to all participants, speakers, and delegates attending the *International Conference on Multidisciplinary Research & AI for Sustainability – InnovAtion 2025*, taking place on 27–28 September 2025, organized by the Society for Progressive Learning and Research (SPLR) in collaboration with Debre Tabor University, Ethiopia.

This conference represents a dynamic convergence of minds from diverse disciplines, united by a shared commitment to shaping a more sustainable future. In an era where global challenges demand innovative and integrative solutions, the fusion of Artificial Intelligence with multidisciplinary research offers unprecedented opportunities to rethink systems, empower communities, and accelerate progress toward the Sustainable Development Goals (SDGs).

The publication of this Abstract Book is more than a scholarly milestone, it is indeed a celebration of creativity, collaboration, and the transformative power of knowledge. Each contribution reflects not only academic excellence but also a vision for actionable change, rooted in inclusivity, resilience, and long-term impact.

I encourage all attendees to engage deeply, exchange ideas openly, and explore new avenues for partnership. May this conference spark meaningful interactions, foster cross-sectoral collaborations, and inspire initiatives that transcend borders and disciplines. Together, we can co-create pathways toward a more equitable, intelligent, and sustainable world.

Congratulations to the organizers, contributors, and collaborators for bringing this inspiring event to life. I wish everyone a fruitful and enriching experience filled with discovery, dialogue, and shared purpose.

Enjoy the conference and enjoy the research as an important and useful part of your life! I hope I can attend the forthcoming editions, as I am sure it will be a complete success.

Warm wishes,

**Prof. Santiago Gómez-Ruiz**

Professor, Universidad Rey Juan Carlos (SPAIN)



**Manoj K. Pandey, PhD**  
Associate Professor  
Department of Biomedical Sciences



**Message**

September 25, 2025

It is with immense pride and profound joy that I extend my heartfelt greetings to all participants of **InnovAltion 2025: International Conference on Multidisciplinary Research & AI for Sustainability**, organized by the Society for Progressive Learning and Research (SPLR) in collaboration with Debre Tabor University, Ethiopia.

In this era of unprecedented transformation, where technology and knowledge converge at an extraordinary pace, the power of interdisciplinary research and global collaboration has never been more vital. The theme of this conference - Artificial Intelligence and Sustainability - resonates deeply with the grand challenges of our time, from safeguarding our planet's future to shaping a more equitable, intelligent, and resilient society.

This gathering is not merely a meeting of minds, but a celebration of innovation, curiosity, and shared purpose. It serves as a beacon for researchers, academicians, and professionals worldwide to engage in meaningful dialogue, exchange pioneering ideas, and inspire solutions that transcend borders.

I wholeheartedly commend the organizers for their vision and dedication in curating such a prestigious platform, uniting brilliant minds across disciplines and continents. I am confident that the deliberations, collaborations, and outcomes of this conference will leave an indelible mark on advancing human knowledge and fostering sustainable practices for generations to come.

May *InnovAltion 2025* be a catalyst for groundbreaking discoveries, enduring partnerships, and transformative change. I extend my best wishes for the grand success of this remarkable endeavor.

Sincerely,

A handwritten signature in black ink, appearing to read "MK Pandey".

Manoj K Pandey, PhD  
401 S Broadway, Camden,  
NJ 08103, USA  
E-mail: [pandey@rowan.edu](mailto:pandey@rowan.edu)  
Phone (O): 856-956-2751.



**Swadha Singh**, Ph.D.  
Scientist  
Department of Psychiatry

Friedman Brain Institute  
Hess CSM, 9th floor  
1470 Madison Avenue, 9-  
New York, NY 10029

Email: [swadha.singh@mssm.edu](mailto:swadha.singh@mssm.edu)

Sept 25<sup>th</sup>, 2025

**To,**  
The Organizers, Speakers, and Participants  
InnovAltion 2025:  
International Conference on Multidisciplinary Research & AI for Sustainability



**Subject:** Best Wishes for *InnovAltion 2025*.

Dear Organizers, Speakers, and Participants,

It is a privilege to be associated with *InnovAltion 2025: International Conference on Multidisciplinary Research & AI for Sustainability*. This event provides a global platform for sharing innovative ideas and advancing research across disciplines. I am confident that the discussions and collaborations emerging from this conference will contribute significantly to solving real-world challenges and building a sustainable future.

I extend my best wishes to the organizers, speakers, and participants for a successful and impactful conference.

With warm regards,

A handwritten signature in blue ink that reads "Swadha Singh". The signature is stylized with a large, sweeping initial 'S'.

Swadha Singh



## SOCIETY FOR PROGRESSIVE LEARNING AND RESEARCH

+91-9838144680  
sforplar@gmail.com  
<https://splrs.com/>  
Lucknow, India

### *About Society for Progressive Learning and Research (SPLR)*

Society for Progressive Learning and Research (SPLR) stands as a foremost non-profit professional association, operating under the India Trust Act (1882), dedicated to fostering research, development, and the advancement of life sciences, social sciences, engineering and technology. Our organization's primary focus is to promote and facilitate research progress, prioritizing innovation, and nurturing a platform that supports the growth and evolution of these fields.

SPLR has successfully organized impactful events, including the *National Conference on Recent Trends in Biotechnology (Feb 2024)*, a *Workshop on Basics of Bioinformatics and their Application in Protein Mining (June 2024)*, a *One-Week FDP cum Professional Development Program on IPR and Patent Filing in collaboration with CSIR-IMMT (2024)*, *International Conference on Applications and Innovations of Science and Technology in Industry (October 2024)*, *International Conference on Innovation in Science and Technology for Resilient Future (July 2025)* and the recently concluded *International Conference on Multidisciplinary Research & AI for Sustainability (September 2025)*. Through these initiatives, SPLR has built strong connections within the global academic and research community.

As one of the most promising and upcoming societies, we boast a global membership drawn from universities, industries, hospitals, research institutes, and educational institutions, positioning us as a diverse hub for professional expertise and collaborations worldwide. The Society serves as a charitable membership organization catering to researchers passionate about exploring new horizons in the form of collaborations and research.

Feel free to write back to join or to give your valuable suggestions, on [sforplar@gmail.com](mailto:sforplar@gmail.com).

## ***About ICMRAIS 2025***

The Society for Progressive Learning and Research (SPLR), India, in collaboration with **Debre Tabor University, Ethiopia**, is organizing a two-day **International Conference on “Multidisciplinary Research & AI for Sustainability (ICMRAIS 2025)”** on **September 27–28, 2025**. This global academic forum aims to foster interdisciplinary dialogue, highlight innovations, and advance collaborative research in sustainability, artificial intelligence, and allied fields.

ICMRAIS 2025 brings together academicians, researchers, industry professionals, innovators, and thought leaders from diverse disciplines to explore the transformative role of AI and multidisciplinary research in addressing global sustainability challenges. By integrating knowledge from technology, science, social sciences, and industry practices, the conference seeks to chart new pathways for sustainable development.

The conference features over 60 speakers and presenters, including eminent keynote experts, senior academicians, industry leaders, and early-career researchers. With more than 30 keynote and invited lectures from distinguished professionals in India, the USA, Ethiopia, and beyond, ICMRAIS 2025 provides a unique platform for knowledge sharing across disciplines. In addition, the event hosts competitive oral presentations and flash talks, offering young researchers, doctoral scholars, and students the opportunity to showcase their innovative work.

A key highlight of ICMRAIS 2025 is its focus on bridging the gap between academic research and real-world applications. Topics span across artificial intelligence, sustainable technologies, environmental sciences, data-driven healthcare, green infrastructure, and future-ready industries. The conference also celebrates innovation and contributions through award categories recognizing excellence among young scientists, women researchers, and emerging innovators.

This abstract book captures the intellectual wealth and collaborative spirit of ICMRAIS 2025. It stands as a testament to the diversity of perspectives shared during the conference and as a reference point for future research directions in sustainability and AI. We extend our sincere gratitude to all contributors and participants for making this event a vibrant and impactful exchange of ideas.

## ***Organizing Committee***

### ***International Conference on Multidisciplinary Research & AI for Sustainability (ICMRAIS 2025)***

#### ***International & National Scientific Advisory Committee***

1. Dr. Abraham Melkie, Director of International Relations, Debre Tabor University, Ethiopia
2. Dr. Mersha Nigus, Professor of Information Technology and Director of eLearning Management, Instructional Designer, Debre Tabor University, Ethiopia
3. Prof. (Dr.) Santiago Gómez-Ruiz, Universidad Rey Juan Carlos, Madrid, Spain
4. Prof. (Dr.) Irena Kostova, Medical University Sofia, Bulgaria
5. Dr. Swadha Singh, Scientist, Friedman Brain Institute, New York
6. Dr. Mohd. Asyraf Kassim, Universiti Sains, Malaysia
7. Dr. Manoj Pandey, Cooper Medical School of Rowan University, Pennsylvania, United States
8. Dr. Alok Chauhan, VIT University, India
9. Dr. Diana Díaz-García, Universidad Rey Juan Carlos, Madrid, Spain
10. Dr. Travers K. Chirova, Harare Institute of Technology, Zimbabwe
11. Dr. Imran Hussain, Integral University, Lucknow, India
12. Dr. G. Gowri, Sri Vijay Vidyalaya College of Arts and Science, Periyar University, TN, India
13. Dr. Ravi K. Deshwal, Shri Ramswaroop Memorial University, Lucknow, India

#### ***Organizing Team***

##### ***Convenor***

Dr. Abraham Melkie, Director of International Relations, Debre Tabor University, Ethiopia

Dr. S. P. Singh, Society for Progressive Learning and Research, India

##### ***Co-Convenor***

Dr. A. S. Chauhan, Society for Progressive Learning and Research, India

Dr. Manish Dwivedi, Society for Progressive Learning and Research, India



## **Inaugural / Plenary Addresses**

**Dr. Abraham Melkie**, Director of International Relations, Debre Tabor University, Ethiopia

**Dr. Mersha Nigus**, Professor of Information Technology and Director of eLearning Management, Instructional Designer, Debre Tabor University, Ethiopia

## **Keynote Speakers of Technical Sessions**

### **Keynote Lecture 1**

**Mr. Kawaljeet Singh Chadha**, University of the Cumberland, Williamsburg, KY, USA

### **Keynote Lecture 2**

**Ms. Swati Karni**, Principal Cloud Engineer at SAIC, USA

### **Keynote Lecture 3**

**Ms. Shilpi Yadav**, Technical Solution Architect, IBM, USA

### **Keynote Lecture 4**

**Ms. Saloni Jitendra Agrawal**, Staff Supplier Industrialization Engineer, Lucidmotors 7500 Gateway Blvd, Newark, USA

### **Keynote Lecture 5**

**Mr. Chandra Bonthu**, Director of IT-MDM, EVERSANA, USA

### **Keynote Lecture 6**

**Mr. Gaurav Malik**, Associate - Information Security Manager, The Goldman Sachs Group, Inc., USA

### **Keynote Lecture 7**

**Mr. Pradeep Rao Vennamaneni**, Staff Software Engineer, Inovalon, USA

### **Keynote Lecture 8**

**Mr. Karan Lulla**, Lead Board Test Engineer, Santa Clara, CA, USA

### **Keynote Lecture 9**

**Mr. Zahir Sayyed**, Software Engineer, Jamesburg, New Jersey, USA

### **Keynote Lecture 10**

**Mr. Vinod Kumar Enugala**, Department of Civil Engineering, University of New Haven, CT, USA

### **Keynote Lecture 11**

**Mr. Harish Kumar Krishnamurthy Sukumar**, Associate Principal - Cloud Engineering at LTIMindtree USA

### **Keynote Lecture 12**

**Mr. Prassanna R Rajgopal**, Cybersecurity Leader, USA

### **Keynote Lecture 13**

**Mr. Sanjay Kumar Das**, Associate Manager Quality Engineering in Accenture, USA

### **Keynote Lecture 14**

**Mr. Yogesh Sabnis**, Program Manager, INTUIT, USA

### **Keynote Lecture 15**

**Mr. Yashasvi Makin**, Software Engineer at Meta, USA

### **Keynote Lecture 16**

**Mr. Ravi Jaiswal**, Computer System Analyst and QAD ERP Consultant, Oremda

**Keynote Lecture 17**

**Mr. Jayanth Kande**, Full Stack Java Developer |  
Cloud & Microservices Enthusiast, USA

**Keynote Lecture 18**

**Ms. Supriya Gandhari**, USA

**Keynote Lecture 19**

**Mr. Naga Murali Krishna Koneru**, Technical  
Architect, Hexaware Technologies Inc, USA

**Keynote Lecture 20**

**Mr. Vinil Apelagunta**, Digital Transformation  
Leader at Johnson & Johnson MedTech, USA

**Keynote Lecture 21**

**Mr. Jeet Kocha**, Program Analyst at the California  
Department of Rehabilitation, USA

**Keynote Lecture 22**

**Mr. Kishore Hebbar**, Senior Software Engineer at  
Intercontinental Exchange (ICE), USA

**Keynote Lecture 23**

**Mr. Pavan Kumar**, Cloud Engineer specializing in  
Azure, CI/CD, and automation, USA

**Keynote Lecture 24**

**Mr. Sandip Patel**, Salesforce Architect, USA

**Keynote Lecture 25**

**Mr. Jaya Krishna Modadugu**, Salesforce  
Architect, USA

**Keynote Lecture 26**

**Mr. Padmanabham Venkiteela**, Senior Enterprise  
Integration Architect | AI/ML Researcher, USA

**Keynote Lecture 27**

**Mr. Rajesh Kumar**, USA

**Keynote Lecture 28**

**Mr. Shaurya Shounik**, Finance from Brandeis  
University, USA

**Keynote Lecture 29**

**Mr. Prajwal Kumar Chinthoju**, Autonomous  
Driving Feature Development Engineer, Carmel,  
Indiana, USA

**Keynote Lecture 30**

**Mr. Suresh Gangula**, Software Engineer, Nike,  
Inc., OR, USA

**Keynote Lecture 31**

**Mr. Sandeep Reddy Gundla**, Lead Software  
Engineer, MACYS Inc, GA, USA

**Keynote Lecture 32**

**Mr. Subramanya Shashank Gollapudi Venkata**,  
Senior Software Engineer, USA

**Keynote Lecture 33**

**Mr. Darshan Prajapati**, Senior Researcher in  
Network Security and Resilience, USA

**Keynote Lecture 34**

**Dr. Srikar Velagapudi**, Senior Civil and  
Environmental Engineer – Stormwater Management  
& Environmental Risk Assessment, USA

**Keynote Lecture 35**

**Mr. Bhumit Dhandhukiya**, Security Operations  
Analyst, Propel Holdings –Toronto, ON

**Keynote Lecture 36**

**Mr. Shreekant Malviya**, Senior Data Engineer –  
Data Platforms & AI Governance, USA

**Keynote Lecture 37**

**Mr. Harsha Vardhan Reddy Kavuluri**

Lead Oracle / Postgres / Cloud Database  
Administrator, Florida, USA

# ICMRAIS 2025

InnovAI<sup>tion</sup>-2025

*International Conference on  
Multidisciplinary Research & AI for Sustainability*

*27 – 28 September 2025*

*Jointly Organized by*

*Society for Progressive Learning and Research (SPLR), India  
and*

*Debre Tabor University, Ethiopia*

## **PROGRAMME SCHEDULE**

**Mode: ZOOM**

**Link: <https://zoom.us/j/97638641369?pwd=KauNcQE4C7uhIw58mvxP9jcwVj0Yhs.1>**

Meeting ID: 976 3864 1369

Passcode: 240658

**\*All the timings are in IST**

**Day 1: September 27<sup>th</sup>, 2025**

09:15 AM – 09:45 AM	<b>Inaugural</b>
09:15 AM – 09:30 AM	Online connecting of Speakers and Delegates
09:30 AM – 09:35 AM	<b>About ICMRAIS 2025 and SPLR, India</b>
09:35 AM – 09:45 AM	<b>Inaugural Address</b> <b>Dr. Abraham Melkie</b> , Director of International Relations, Debre Tabor University, Ethiopia
<b>09:45 AM – 11:45 AM</b>	<b>Technical Session I</b>
<b>Session Chair - Dr. Abraham Melkie</b> , Director of International Relations, Debre Tabor University, Ethiopia	
09:45 AM – 09:55 AM	<b>Keynote Lecture 1</b> <b>Mr. Kawaljeet Singh Chadha</b> , University of the Cumberlands, Williamsburg, KY, USA <b>Topic:</b> “AI for Sustainable Healthcare and Insurance: Turning Complex Data into Actionable Intelligence with Agile Governance”
09:56 AM – 10:06 AM	<b>Keynote Lecture 2</b> <b>Ms. Swati Karni</b> , Principal Cloud Engineer at SAIC, USA. <b>Topic:</b> “The Future of Cloud: From Virtual Machines to Serverless and Beyond”
10:07 AM – 10:18 AM	<b>Keynote Lecture 3</b>

	<p><b>Ms. Shilpi Yadav</b>, Technical Solution Architect, IBM, USA  <b>Topic:</b> “From Automation to Autonomy: How Agentic AI is Redefining Processes”</p>
10:19 AM – 10:26 AM	<p><b>Keynote Lecture 4</b>  <b>Ms. Saloni Jitendra Agrawal</b>, Staff Supplier Industrialization Engineer,  Lucidmotors 7500 Gateway Blvd, Newark, USA  <b>Topic:</b> “Driving Sustainable Mobility: Supplier Development and Advanced  Materials Management in the Electric Vehicle Industry”</p>
10:27 AM – 10:38 AM	<p><b>Keynote Lecture 5</b>  <b>Mr. Chandra Bonthu</b>, Director of IT-MDM, EVERSANA, USA  <b>Topic:</b> “Ever-Increasing Importance for Data Quality in the AI Era”</p>
10:36 AM – 10:47 AM	<p><b>Keynote Lecture 6</b>  <b>Mr. Gaurav Malik</b>, Associate - Information Security Manager, The Goldman Sachs  Group, Inc., USA  <b>Topic:</b> “Evolution of Cybersecurity in The Age of AI and Automation”</p>
10:48 AM – 10:59 AM	<p><b>Keynote Lecture 7</b>  <b>Mr. Pradeep Rao Vennamaneni</b>, Staff Software Engineer, Inovalon, USA  <b>Topic:</b> “Generative AI and Software Architecture: Building Scalable Systems for a  Sustainable Future”</p>
11:00 AM – 11:10 AM	<p><b>Keynote Lecture 8</b>  <b>Mr. Karan Lulla</b>, Lead Board Test Engineer, Santa Clara, CA, USA  <b>Topic:</b> “Python-Based GPU Testing Pipelines: Enabling Zero-Failure Production  Lines.”</p>
11:11 AM – 11:21 AM	<p><b>Keynote Lecture 9</b>  <b>Mr. Zahir Sayyed</b>, Software Engineer, Jamesburg, New Jersey, USA.  <b>Topic:</b> “AI-Driven Optimization of Callback Service Architectures for Sustainable  High-Throughput Applications”</p>
11:22 AM – 11:32AM	<p><b>Keynote Lecture 10</b>  <b>Mr. Vinod Kumar Enugala</b>, Department of Civil Engineering, University of New  Haven, CT, USA  <b>Topic:</b> “Innovative Sustainable Materials and Green Infrastructure Solutions for  Climate-Resilient Urban Development”</p>
11:33AM – 11:43 AM	<p><b>Keynote Lecture 11</b>  <b>Mr. Harish Kumar Krishnamurthy Sukumar</b>, Associate Principal - Cloud  Engineering at LTIMindtree USA.  <b>Topic:</b> “Building Resilient IT Landscapes with Azure Landing Zones”</p>
<b>11:45 AM – 01:00 PM</b>	<b>Technical Session II</b>
<p><b>Session Chair – Dr. Manoj Pandey</b>, Associate Professor, Cooper Medical School of Rowan University,  Hershey, Pennsylvania, United States</p>	
11:45 AM – 11:55 AM	<p><b>Keynote Lecture 12</b>  <b>Mr. Prassanna R Rajgopal</b>, Cybersecurity Leader, USA  <b>Topic:</b> “Human + AI: Redefining Cybersecurity Operations in the Talent Shortage  Era”</p>
11:56 AM – 12:06 AM	<p><b>Keynote Lecture 13</b>  <b>Mr. Sanjay Kumar Das</b></p>

	<b>Topic:</b> “AI-Driven Quality Assurance: Transforming Testing in Regulated Industries”
12:07 AM – 12:17 PM	<b>Keynote Lecture 14</b> <b>Mr. Yogesh Sabnis</b> , Program Manager, INTUIT, USA <b>Topic:</b> “The Last Mile of AI: Why Great Models Fail and How Leaders Make Them Win”
12:18PM – 12:28 PM	<b>Keynote Lecture 15</b> <b>Mr. Yashasvi Makin</b> , Software Engineer at Meta, USA <b>Topic:</b> “Green AI at Scale: Hardware–Software Co-Design for Low-Carbon Training”
12:39 PM – 12:49 PM	<b>Keynote Lecture 16</b> <b>Mr. Ravi Jaiswal</b> , Computer System Analyst and QAD ERP Consultant, Oremda Infotech Inc., Minnesota, USA <b>Topic:</b> “ML-Driven Demand Forecasting in Legacy ERP Environments”
12:50 PM – 01:00 PM	<b>Keynote Lecture 17</b> <b>Mr. Jayanth Kande</b> , Full Stack Java Developer   Cloud & Microservices Enthusiast, USA <b>Topic:</b> “AI as the New Frontline in Fraud Prevention”
<b>01:00 PM – 03:19 PM</b>	<b>Technical Session III</b>
<b>Oral Presentations by Research Scholars (Competitive)</b>	
<b>Session Chair</b> – <b>Dr. Mohd Asyraf Kassim</b> , Professor, School of Industrial Technology, University Sains Malaysia (USM), Pulau Pinang Malaysia <b>Judges</b> – <b>Dr. Alok Chauhan</b> , Prof. School of Computer Science & Engineering, VIT University, Chennai, India <b>Dr. Mimoh Sharma</b> , Department of Biochemistry, Integral Institute of Medical Sciences and Research, Lucknow	
01:00 PM – 01:07 PM	<b>OP01: Effect of Butanol Isomeric Structure on the Density of Choline Chloride–glycerol Based Deep Eutectic Solvents</b> Janvi Patel, Dr Ankit shah Department of Chemistry, Bhagwan Mahavir Universssity, Surat, India
01:07 PM – 01:14 PM	<b>OP02: Omics Approach to investigate the Viral community existing in the river Varuna in the Varanasi region of Uttar Pradesh</b> Arpit Srivastava, *Reena Vishvakarma Department of Bioengineering, Integral University, Lucknow, Uttar Pradesh, 226026
01:14 PM – 01:21 PM	<b>OP03: Green Chemistry Approaches in The Synthesis of Next – Generation Antibiotics</b> Smita Manish Kamble Ph.D. Scholar, Sabarmati University, Ahmedabad
01:21 PM – 01:28 PM	<b>OP04: Improving Liver Disease Detection Accuracy: A Study on Machine Learning Models with Real-World Healthcare Data</b> Mr. Ashish Vishvakarma1, Dr. Sandhya Dwivedi2. 1. Research Scholar, Department of Computer Science and Engineering, Asian International University, Manipur 2. Associate Professor, Department of Computer Science and Engineering, Asian International University, Manipur
01:28 PM – 01:35 PM	<b>OP05: miRNA as a Therapeutic target for cervical cancer</b> Sudipto Roy, Somali Sanyal and Garima Awasthi

	Amity Institute of Biotechnology, Amity University, Uttar Pradesh, Lucknow campus 226028, Uttar Pradesh, India
01:35 PM – 01:42 PM	<b>OP06: Synthesis and Characterization of SiO<sub>2</sub> Nanoparticles by Green Method and Their Structural and Optical Properties</b> N. D. Barne*, Suresh Gawande, Kiran Khandagale * *Department of Physics, ASP College Devrukh, Dist: Ratnagiri, Maharashtra, India. ICAR- Directorate of Onion and Garlic Research, Pune, Maharashtra, India.
<b>01:42 PM – 01:55 PM</b>	<b>Lunch Break</b>
01:55 PM – 02:02 PM	<b>OP07: Title - AI-Driven Biogenic Synthesis of Nanoparticles: Towards Sustainable Nanotechnology</b> Anil Punetha, Aneeta Kharkwal* S. V. Govt. P. G. College, Lohaghat, Soban Singh Jeena University, Almora
02:02 PM – 02:09 PM	<b>OP08: Forecasting Decline in Clients in The Telecom Industry with Machine Learning Methods</b> Sandeep Rajani <sup>1</sup> and *Dr. Birendra Goswami <sup>2</sup> <sup>1</sup> Research Scholar, Sai Nath University, Ranchi
02:09 PM – 02:16 PM	<b>OP09: Sustainable Mental Health Care Delivery: AI as a Supportive Tool</b> Ms. Pratibha Thakur, PhD Scholar, Noida International University Prof. Dr. Arti, Noida International University
02:23 PM – 02:30 PM	<b>OP10: Serum Vitamin A, Iron, Zinc, and Copper Levels as Predictors of Anemia Severity in Pregnant Women</b> Chandrakesh Mishra <sup>1*</sup> , Shivani Singh <sup>2</sup> , Rupita Kulshrestha <sup>3</sup> , Manish Raj Kulshrestha <sup>2</sup> , Rachna <sup>1</sup> <sup>1</sup> NIMS college of Allied and Health Care Sciences, NIMS University, Jaipur, Rajasthan, 303121, India
02:30 PM – 02:37 PM	<b>OP11: Perception of School Students towards using Mobile Applications in Enhancing English Language</b> Bharti Garg* Research Scholar, Department of Education, Chitkara University Punjab, 140401
02:37 PM – 02:44 PM	<b>OP12: Social And Mental Development Challenges Facing School-Aged Children In Himachal Pradesh”</b> Pooja Devi* <sup>2</sup> , Dr. Raj Kumar <sup>*1</sup> <sup>*2</sup> Research Scholar, Department of Education, Career Point University, Kota (Raj.) India <sup>*1</sup> Assistant Professor, Department of Education, Career Point University, Kota (Raj.), India
02:44 PM – 02:51 PM	<b>OP13: Artificial Intelligence in Agrometeorology: Enhancing Agro-Advisory Services for Farmers</b> 1 Praveen R Patil, 2 Hemareddy Thimmareddy and 3 T. S. Harsha 1. Research Scholar, Department of Studies in Environmental Sciences, KSOU Mysore, 2. Senior Research Fellow, KSNUAS Shivamogga 3. Associate Professor, Department of Studies in Environmental Sciences, KSOU Mysore
02:51 PM – 02:59 PM	<b>OP14: AI-Driven Digital Compensation and Employee Motivation in Healthcare: The Mediating Role of Perceived Fairness</b> Aishwarya Anandavalli MN <sup>1</sup> , Dr. S. Antony Raj <sup>2</sup> <sup>1</sup> Research Scholar, Department of Commerce, Faculty of Science and Humanities, SRMIST, Kattankulathur – 603203

	<sup>2</sup> Assistant Professor, Department of Commerce, Faculty of Science and Humanities, SRMIST, Kattankulathur – 603203
02:59 PM – 03:06 PM	<b>OP15: Invitro Cellulase, Invertase, Xylanase and <math>\beta</math>-glucosidase activity of Termite Mound Soil</b> Uzma Naaz Shaikh*, Dr. Manojkumar Z. Chopda *Junior Research Fellow, Department of Zoology, KCES's Moolji Jaitha College Autonomous Jalgaon, (M.S.) India. Associate professor, Department of Zoology, KCES's Moolji Jaitha College Autonomous Jalgaon, (M.S.) India.
03:06 PM – 03:13 PM	<b>OP16: Advanced Cybersecurity through Machine Learning: Cyber Risk Identification, Mitigation and Management</b> Sangeeta Singh Madhav University Pindwara Rajasthan
03:13 PM – 03:19 PM	<b>OP17: A Review paper on Particle swarm optimization</b> Paramjeet Kaur Research Scholar in Computer Science Guru Kashi University Talwandi Sabo
<b>Faculty Invited Lectures</b>	
03:19 PM – 03:29 PM	<b>Invited Lecture 01: Multidisciplinary Research and Artificial Intelligence for Sustainability: Pathways, Challenges, and Future Directions</b> Dr. Kavita Manghnani Department of Law Jai Narayan Vyas University, Jodhpur Raj
03:29 PM – 3:39 PM	<b>Invited Lecture 02: Role of Self-Help Groups For Sustainable Development Of Rural Women</b> Mr. Uddip Khanikar Assistant Professor, Department of Sociology, Kamarbandga College: P.O. K.B-Ali. Pin-785625 Golaghat (Assam)
03:39 PM – 03:49 PM	<b>Invited Lecture 03: Identification of differentially expressed genes related to immune pathways in oral squamous cell carcinoma</b> Sayali Mukherjee* Amity Institute of Biotechnology, Amity University Uttar Pradesh, Lucknow Campus
03:49 PM – 03:59 PM	<b>Invited Lecture 04: A Study on Conservation of Bonnet Macaque (Macaca Radiata), Thoppur, Dharmapuri, Tamilnadu, India.</b> Dr. G. Gowri Head of the Department, PG and Research Department of Zoology, Sri Vijay Vidyalaya College of Arts and Science, Nallampalli, Dharmapuri, Tamil Nadu, India
04:00 PM – 04:10 PM	<b>Invited Lecture 05: Essential Metals, Toxic Thresholds, and Human Health</b> Irena Kostova <sup>1</sup> and Aditi Singh <sup>2</sup> * <sup>1</sup> Department of Chemistry, Faculty of Pharmacy, Medical University - Sofia, (BULGARIA) <sup>2</sup> Amity Institute of Biotechnology, Amity University Uttar Pradesh, Lucknow - 226028 (INDIA)
04:10 PM – 04:20 PM	<b>Invited Lecture 06: Sodium-Proton Transporter Proteins as Novel Therapeutic Targets in human health and diseases</b> Dr. Manish Dwivedi, PhD Amity Institute of Biotechnology, Amity University Uttar Pradesh, Lucknow Campus, Lucknow-226028, India

04:20 PM – 04:30 PM	<p><b>Invited Lecture 07: Life Cycle Assessment of Lipase Enzyme Production: Evaluating Environmental Hotspots and Pathways for Sustainable Manufacturing</b></p> <p>Dr. S.P. Singh Amity Institute of Biotechnology, Amity University Uttar Pradesh, Lucknow Campus, Lucknow-226028, India</p>
*****END OF DAY 1*****	

## Day 2: September 28<sup>th</sup>, 2025

**Mode: ZOOM**

**Link: <https://zoom.us/j/97638641369?pwd=KauNcQE4C7uhIw58mvxP9jcwVj0Yhs.1>**

Meeting ID: 976 3864 1369

Passcode: 240658

09:00 AM – 09:15 AM	Online connecting of Speakers and Delegates
09:15 AM – 09:30 AM	<p><b>Keynote Address</b></p> <p><b>Dr. Mersha Nigus</b>, Professor of Information Technology and Director of eLearning Management, Instructional Designer, Debre Tabor University, Ethiopia.</p>
<b>09:30 AM – 11:00 AM</b>	<b>Technical Session I</b>
<p><b>Session Chair – Dr. Alok Chauhan</b>, Professor, School of Computer Science Engineering, VIT University, India</p>	
09:30 AM – 09:40 AM	<p><b>Keynote Lecture 1</b></p> <p><b>Ms. Supriya Gandhari</b>, USA <b>Topic:</b> “Data Foundations for Green AI: Building Sustainable AI Systems in the CPG Industry”</p>
09:41 AM – 09:51 AM	<p><b>Keynote Lecture 2</b></p> <p><b>Mr. Naga Murali Krishna Koneru</b>, Technical Architect, Hexaware Technologies Inc, USA <b>Topic:</b> “AWS-Powered Machine Learning: Streamlined CI/CD Approaches”</p>
09:52 AM – 10:02 AM	<p><b>Keynote Lecture 3</b></p> <p><b>Mr. Vinil Apelagunta</b>, Digital Transformation Leader at Johnson &amp; Johnson MedTech, USA <b>Topic:</b> “Ethics of AI-Based Supply Chain Optimization: A Better Balance Between Efficiency and Fairness”</p>
10:03 AM – 10:13 AM	<p><b>Keynote Lecture 4</b></p> <p><b>Mr. Jeet Kocha</b>, Program Analyst at the California Department of Rehabilitation, specializes in AI-driven workforce development and compliance solutions, USA <b>Topic:</b> “AI for Sustainable Workforce Systems: Predictive, Compliant, and Scalable Innovations”</p>
10:14 AM – 10:24 AM	<p><b>Keynote Lecture 5</b></p> <p><b>Mr. Kishore Hebbar</b>, Senior Software Engineer at Intercontinental Exchange (ICE), USA</p>

	<b>Topic:</b> “Smarter, Safer, Sustainable: How AI Is Transforming Financial Systems in Real Time”
10:25 AM – 10:35 AM	<b>Keynote Lecture 6</b> <b>Mr. Pavan Kumar</b> , Cloud Engineer specializing in Azure, CI/CD, and automation, dedicated to building intelligent, self-healing systems and driving operational excellence, USA <b>Topic:</b> “The DevOps for Earth: Applying Automation and AI to Planet-Scale Systems”
10:36 AM – 10:46 AM	<b>Keynote Lecture 7</b> <b>Mr. Sandip Patel</b> , Salesforce Architect with 13+ years’ experience, specializes in AI-driven workflow automation, intelligent agent design, and sustainable enterprise solutions, USA <b>Topic:</b> “Sustainable AI in the Enterprise: How Salesforce and Agent force are Redefining Business Transformation”
10:47 AM – 10:57 AM	<b>Keynote Lecture 8</b> <b>Mr. Jaya Krishna Modadugu</b> , Salesforce Architect with 13+ years’ experience, specializes in AI-driven workflow automation, intelligent agent design, and sustainable enterprise solutions, USA <b>Topic:</b> “MFD-MCAGCNN: Microservices-Based AI for Anomalous Payment Detection”
10:58 AM – 11:08 AM	<b>Keynote Lecture 9</b> <b>Mr. Padmanabham Venkitekela</b> , Senior Enterprise Integration Architect   AI/ML Researcher, USA <b>Topic:</b> “Leading API Management Platforms for API Modernization”
11:09 AM-11:19 AM	<b>Keynote Lecture 10</b> <b>Mr. Rajesh Kumar</b> , <b>Topic:</b> “Cloud Transaction Orchestration for Hybrid TIBCO/java Micro-services”
<b>11:20 AM – 01:09 PM</b>	<b>Technical Session II</b>
<b>Session Chair – Dr. Mersha Nigus</b> , Professor of Information Technology and Director of eLearning Management, Instructional Designer, Debre Tabor University, Ethiopia	
11:20 AM- 11:30 AM	<b>Keynote Lecture 11</b> <b>Mr. Shaurya Shounik</b> , Finance from Brandeis University, USA <b>Topic:</b> “Identifying Operational Red Flags to prevent Financial Distress within organisations”
11:31 AM-11:41 AM	<b>Keynote Lecture 12</b> <b>Mr. Prajwal Kumar Chinthoju</b> , Autonomous Driving Feature Development Engineer, Carmel, Indiana, USA <b>Topic:</b> “Driving Tomorrow: A Global Study of Well-to-Wheel Performance in Electric Vehicles”
11:42 AM-11:52 AM	<b>Keynote Lecture 13</b> <b>Mr. Suresh Gangula</b> , Software Engineer, Nike, Inc., OR, USA <b>Topic:</b> “Ensuring Security and Compliance in Retail Cloud Environments: A Wide-ranging Review”
11:53 AM-12:03 PM	<b>Keynote Lecture 14</b> <b>Mr. Sandeep Reddy Gundla</b> , Lead Software Engineer, MACYS Inc, GA, USA

	<b>Topic:</b> “Serverless Java: Cold Start Mitigation in Cloud Run/Spring Boot”
12:04 PM-12:14 PM	<b>Keynote Lecture 15</b> <b>Mr. Subramanya Shashank Gollapudi Venkata</b> , Senior Software Engineer, USA <b>Topic:</b> “Engineering Trust through Cryptographic Architectures - Safeguarding Information Integrity and Trust”
12:15 PM-12:25 PM	<b>Keynote Lecture 16</b> <b>Mr. Darshan Prajapati</b> , Senior Researcher in Network Security and Resilience, USA <b>Topic:</b> “Cyber-Physical Risks in ISP Infrastructure: Planning for National-Level Disruptions”
12:26 PM-12:36 PM	<b>Keynote Lecture 17</b> <b>Dr. Srikar Velagapudi</b> , Senior Civil and Environmental Engineer – Stormwater Management & Environmental Risk Assessment, USA <b>Topic:</b> “Bridging Research and Practice: Advancing Urban Water Protection Through Interdisciplinary Engineering Innovation”
12:37 PM-12:47 PM	<b>Keynote Lecture 18</b> <b>Mr. Bhumit Dhandhukiya</b> , Security Operations Analyst, Propel Holdings –Toronto, ON <b>Topic:</b> “SecOps Playbook: Agents, AI IR & LLM Guardrails”
12:48 PM-12:58 PM	<b>Keynote Lecture 19</b> <b>Mr. Shreekant Malviya</b> , Senior Data Engineer – Data Platforms & AI Governance, USA <b>Topic:</b> “AI for Sustainable Data Ecosystems: From Fragmentation to Trust”
12:59 PM-01:09 PM	<b>Keynote Lecture 20</b> <b>Mr. Harsha Vardhan Reddy Kavuluri</b> , Lead Oracle/Postgres/Cloud Database Administrator, Florida, USA <b>Topic:</b> “Disaster Recovery in Large-Scale Databases: Designing Effective Failover and Backup Strategies.”
<b>01:09 PM – 01:20 PM</b>	<b>Lunch Break</b>
<b>01:20 PM – 03:48 PM</b>	<b>Technical Session III</b>
<b>Session Chair – Dr. Swadha Singh</b> , Scientist, Friedman Brain Institute, New York	
<b>Oral Session Judge – Dr. Amrit Pal</b> , Associate Professor, School of Computer Science Engineering, VIT Chennai <b>Dr. Garima Awasthi</b> , Amity University, Lucknow (INDIA)	
01:20 PM – 01:24 PM	<b>OP01: Homeostasis Meets Artificial Cognition: Architecting the Future of Precision Endocrinology</b> <u>Sucharita Dey *</u> , Soumik Chatterjee <u>*Consultant, Technology &amp; Transformation, Deloitte Touche Tohmatsu ILLP, Kolkata</u> Consultant Endocrinologist, Suraksha Clinic & Diagnostics, Kolkata
01:24 PM – 01:28 PM	<b>OP02: Multi Neural / Non-Neural Style Transfer: A Deep Learning Approach For Multi-Style Image Blending</b> <u>Kuhu Chandna</u> , Alok Chauhan* Vellore Institute of Technology, Chennai, Tamil Nadu, India
01:28 PM – 01:32 PM	<b>OP03: Predictive Modeling of Fracture Behavior in Plastic Deformation</b> Mr. Mohit Singh, Mr. Surinder Kumar, Dr. M. Kannan, Dr. Shobhit Srivastava Department of Mechanical Engineering

	School of Technology, Quantum University, Roorkee
01:32 PM – 01:36 PM	<b>OP04: Computer-Aided Biopharmaceutical Characterization</b> Rutuja.P. Limaye *, Dr. Himanshu.K. Solanki Dept. of Pharmaceutics, SSR College of Pharmacy (Permanently Affiliated to Savitribai Phule Pune University), Sayli Road -Silvassa - 396230, U.T of Dadra and Nagar Haveli and Daman and Diu, India
01:36 PM – 01:40 PM	<b>OP05: AI in Multi-Model Medical imaging: Towards Personalized Healthcare</b> Akshy Laxman Mane, Miss. Rutuja R. Shah* Dept. of Pharmaceutics, Anandi Pharmacy College (Permanently Affiliated to Shivaji University), Kolhapur - 416204, India
01:44 PM – 01:48 PM	<b>OP06: Travelling Salesman Problem using 2-RNN with CUDA</b> <u>Mahak Khetan*</u> and Dr. Alok Chauhan *BTech – Computer Science with Data Science, School of Computer Science and Engineering, VIT Chennai, Tamil Nadu, India
01:48 PM – 01:52 PM	<b>OP07: Wireless Charging of Electric Vehicles: A Hybrid-Compensated Photovoltaic Approach to Sustainable Transportation</b> Shaik Mahaldar Rahim <sup>1*</sup> , K.Meenendranath Reddy <sup>2</sup> <sup>1</sup> PG Student, Department of EEE, SVR Engineering College, Nandyal <sup>2</sup> Assistant Professor, Department of EEE, SVR Engineering College, Nandyal
01:52 PM – 01:56 PM	<b>OP08: CRISPR-Integrated Biosensors and AI for Environmental Surveillance of Antimicrobial Resistance</b> Manya Khanna Department of Science Vardhaman College Bijnor (U.P.)
01:56 PM – 02:00 PM	<b>OP09: Widespread Challenges in Rabies Control in India</b> Prem Kumar Patel* PFA Institute of Research Uttar Pradesh, Prayagraj
02:00 PM – 02:04 PM	<b>OP10: Cloning, Recombinant Expression, and Preliminary Characterization of a Thermostable Glyceraldehyde-3-Phosphate Phosphatase from <i>Pyrococcus furiosus</i></b> Sanavi Sandeep Tambe* VIT University Bhopal
02:04 PM – 02:08 PM	<b>OP11: Sustainable Bioremediation of Pharmaceutical Residues by <i>Chlorella</i> Species.</b> <u>Garima Sahay*</u> and Aditi Singh Amity Institute of Biotechnology, Amity University Uttar Pradesh, Lucknow Campus, Gomti Nagar Extension, Lucknow - 226028 (India)
02:08 PM – 02:12 PM	<b>OP12: Integrative Multi-Omics and Bioinformatics for Personalized Cosmetic Interventions in Skin and Hair Health</b> Tanaz Safique, Nisha Singh, Gujarat Biotechnology University, Gandhinagar, Gujarat, India
02:12 PM – 02:16 PM	<b>OP13: Advancing Patient Care through Precision Medicine: Integrating Genomics, Data Analytics, and Personalized Therapeutics</b> Apoorv Pathak, Amity University, Lucknow.
02:16 PM – 02:20 PM	<b>OP14: Exploring the potential of membrane proteins in the regulatory mechanism of Human sperm metabolism: Prospective drug targets</b> Kruthi <sup>1</sup> , Manish Dwivedi <sup>2</sup> . * Amity University, Noida, Amity University, Lucknow

02:20 PM – 02:26 PM	<b>OP15: Artificial Intelligence in Drug Discovery: Transforming the Future of Therapeutic</b> Shubham Raj, Dr. Snigdha Das Mandal Parul Institute of Pharmacy and Research, Vadodara, Gujrat
02:26 PM – 02:32 PM	<b>OP16: Unraveling the Microbial diversity of Human Health: Shaping Physiology and Disease</b> Vaanya Srivastava, Manish Dwivedi Amity University, Lucknow
02:32 PM – 02:38 PM	<b>OP17: Latent Infections at the Intersection of Pathogen Survival and Chronic Disease</b> Kanishka Singh and Aditi Singh Amity University, Lucknow
02:38 PM – 02:44 PM	<b>OP18: Socio-legal appraisal of matrimonial disputes and judicial redressal frameworks in the State of Haryana</b> Manoj Kumar Govt. Girls Model Sanskriti Primary School, Gurugram,
02:44 PM – 02:50 PM	<b>OP19: Membrane Proteins-Based Therapeutics in Immune and Metabolic Crosstalk</b> Kaatyayni Rohilla, Manish Dwivedi Amity University, Lucknow
<b>Faculty Invited Lectures</b>	
03:08 PM – 03:18 PM	<b>Invited Lecture 01: A Prototype of A Portable Gas Analyzer for Exhaled Acetone Detection</b> Nivetha K, Vijaya Kumar Kambila* Department of Physics, Dayananda Sagar University, Devarakaggalahalli, Harohalli, Karnataka – 562112
03:18 PM – 03:28 PM	<b>Invited Lecture 02: Identification of Hub Genes and Regulatory miRNAs in Gallbladder Cancer</b> Sonia Chadha* Amity Institute of Biotechnology, Amity University Uttar Pradesh, Lucknow Campus
03:28 PM – 03:38 PM	<b>Invited Lecture 03: Bridging Disciplines with AI : Pathways toward Environmental and Social Sustainability</b> Dr. Suneel Kumar Assistant Professor Chemistry, Government Lohia College Churu Rajasthan
03:38 PM – 03:48 PM	<b>Invited Lecture 04: Comparative Analysis of Circulating and Muscle-Derived miRNAs in Juvenile Dermatomyositis</b> Somali Sanyal* Amity Institute of Biotechnology, Amity University Uttar Pradesh, Lucknow Campus, Lucknow-226028, India
03:49 PM – 03:59 PM	<b>Invited Lecture 05: From Single-Use Plastics to Circular Bioeconomy: The Role of Biotechnology and GEMs in Zero-Waste Packaging</b> Garima Awasthi* Amity Institute of Biotechnology, Amity University, Uttar Pradesh, Lucknow campus- 226028, Uttar Pradesh, India
04:00 PM – 04:10 PM	<b>Invited Lecture 06: Artificial Intelligence-Driven Strategies for Microbial Bioremediation of Heavy Metals</b> Aditi Singh

	Amity Institute of Biotechnology, Amity University Uttar Pradesh, Lucknow Campus, Gomti Nagar Extension, Lucknow - 226028 (INDIA)
04:10 PM – 04:20 PM	<b>Invited Lecture 07: Interaction of Mosquito Repellent Exposure and FcεR1β Genotype Aggravates Asthma via Th2 Immune Skewing in Children</b> Shivani Singh <sup>1*</sup> , Vandana Tiwari <sup>1</sup> , Manish Raj Kulshrestha <sup>1</sup> , Shetanshu Srivastva <sup>2</sup> <sup>1</sup> Department of Biochemistry, <sup>2</sup> Department of Pediatrics, Dr. Ram Manohar Lohia Institute of Medical Sciences, Lucknow, India
04:25 PM – 05:10 PM	Valedictory Session and Award Announcement
04:25 PM – 04:30 PM	Unveiling of E-Abstract Book of ICMRAIS 2025
04:30 PM – 04:40 PM	ICMRAIS 2025 Awards Announcement
04:40 PM – 04:50 PM	Experience sharing by participants
04:50 PM – 05:00 PM	Results Announcement of Oral Presentation
05:00 PM – 05:10 PM	Vote of Thanks and End of Program
***** <b>END OF DAY 2</b> *****	

*Abstracts*

*Plenary and Keynote Lectures*

## **Plenary Lecture – I**

### **Harnessing Artificial Intelligence for Sustainable Development: Bridging Research, Innovation, and Societal Impact**

**Dr. Abraham Melkie**

Director of International Relations,

Debre Tebor University, Ethiopia

Email: [melkieabraham@gmail.com](mailto:melkieabraham@gmail.com)

#### ***Abstract***

This inaugural lecture, jointly convened by Debre Tabor University and the Society for Progressive Learning and Research, celebrates the transformative promise of artificial intelligence in shaping a sustainable future. It explores how AI, when grounded in rigorous research and ethical innovation, can address pressing challenges in agriculture, health, education, energy, and climate action, fostering efficiency, equity, and resilience. Emphasizing the pivotal role of universities and knowledge networks, the lecture envisions a world where technology and human creativity converge to advance inclusive development and lasting sustainability.

## Plenary Lecture - II

### The Role of AI in Education

**Dr. Mersha Nigus,**

Professor of Information Technology and Director of eLearning Management,  
Instructional Designer, Debre Tabor University, Ethiopia

#### *Abstract*

##### 1. Personalized Learning

AI adapts to the needs of individual students by analyzing learning patterns and adjusting lessons in real time. This ensures that every learner whether fast-paced or needing more support can progress at their own speed.

##### 2. Supporting Teachers

AI reduces teachers' workload by assisting with grading, lesson planning, and administrative tasks. This frees up more time for meaningful teacher-student interactions, ensuring that technology enhances rather than replaces human connection.

##### 3. Improving Access and Inclusion

AI promotes inclusivity by offering tools such as real-time captions, text-to-speech, and language translation. These innovations help students with diverse needs fully participate in learning, regardless of background or challenges.

##### 4. Preparing for the Future

AI equips students with skills for a rapidly evolving workforce. By introducing learners to digital literacy, critical thinking, and creativity, schools prepare them for industries increasingly shaped by AI and automation.

##### 5. Challenges to Address

While powerful, AI raises concerns around data privacy, bias, and unequal access to technology. Responsible use is essential. AI must remain a supportive tool—not a replacement for teachers who provide the empathy and guidance no machine can replicate.

#### Conclusion

AI holds enormous promise to make education more **personal, efficient, and inclusive**. With thoughtful policies and the leadership of skilled teachers, AI can help create a future where every student has the chance to succeed.

# *Keynote Lectures*

**Keynote Lecture: 01**

**AI for Sustainable Healthcare and Insurance: Turning Complex Data into Actionable Intelligence with Agile Governance**

**Kawaljeet Singh Chadha**

Business Intelligence Analyst, USA

Email address - [kawaljeetsinghchadha99@gmail.com](mailto:kawaljeetsinghchadha99@gmail.com)

**Abstract**

The healthcare and insurance industries need to make sustainable change to address rising costs, inefficiencies, and inequities. AI provides advanced capabilities to manage and operationalize complexity and multi-dimensional data— (clinical records, claims and claims processing data, and behavioral data)—and can be used to convert that complexity into actionable intelligence—predictive care, fraud reduction, and personalized services. It is important to note that impact passes beyond the technology; impact depends on agile governance—governance that ensures data quality, governance that ensures compliance, governance that provides transparency, and governance that focuses on ethical and responsible AI.

**Keynote Lecture: 2**

**The Future of Cloud: From Virtual Machines to Serverless and Beyond**

**Swati Karni**

Principal Cloud Engineer, SAIC, USA

Email: [karniswati@gmail.com](mailto:karniswati@gmail.com)

**Abstract**

Cloud computing has gone through several important phases, changing how organizations build, deploy, and manage applications. The initial use of virtual machines (VMs) was a shift away from physical hardware, offering more flexibility, better resource use, and improved scalability. However, VMs had drawbacks like slower startup times and complicated management. The introduction of containers and microservices helped address these issues by providing lightweight, portable, and faster deployment options, with tools like Docker and Kubernetes simplifying orchestration. The next major advancement was serverless computing, or Functions-as-a-Service (FaaS). This completely removed infrastructure management, allowing developers to focus solely on application logic. Serverless provided benefits like automatic scaling and pay-per-use pricing, changing the game for cost efficiency, deployment speed, and real-time responsiveness. Challenges like cold starts, vendor lock-in, and monitoring difficulties still exist, creating opportunities for more innovation. Looking ahead, the future of cloud computing will be increasingly influenced by edge computing, artificial intelligence, and new concepts like quantum-cloud integration. Edge computing processes data closer to users to reduce latency, while AI-driven cloud operations (AIOps) offer intelligent automation, predictive scaling, and self-healing infrastructure. This keynote provides an in-depth look at this journey from virtual machines to serverless and beyond, examining the technical, architectural, and business impacts of each phase. By highlighting opportunities and challenges, it offers insights on how organizations can use cloud innovations to stay agile, scalable, and prepared for the future.

**Keynote Lecture: 3**

**From Automation to Autonomy: How Agentic AI is Redefining Processes**

**Shilpi Yadav**

Technical Solution Architect, IBM, USA

Email: [shilpi.yadav16@gmail.com](mailto:shilpi.yadav16@gmail.com)

**Abstract**

In today's fast-changing digital world, businesses are no longer asking if they should adopt AI but how far they should take it. While automation changed how we work, Agentic AI will reshape what is possible. Unlike traditional automation, agentic AI does not just execute; it also decides, adapts, and collaborates. This keynote will explore the journey from automation to true autonomy and showcase how autonomous AI agents are redefining processes across various industries, reshaping efficiency, resilience, and human-AI collaboration. Attendees will learn how to responsibly harness this shift and prepare their organizations for a future where AI does not just automate but transforms.

**Keynote Lecture: 4**

**Driving Sustainable Mobility: Supplier Development and Advanced Materials  
Management in the Electric Vehicle Industry**

**Saloni Jitendra Agrawal**

Staff Supplier Industrialization Engineer, Lucidmotors

7500 Gateway Blvd, Newark, USA

Email: [SaloniAgrawal@lucidmotors.com](mailto:SaloniAgrawal@lucidmotors.com)

**Abstract**

The accelerating move to electric mobility has created new complexities in supply chain and operations management. The production of electric vehicles (EVs), especially high-voltage battery and powertrain systems, requires precise coordination of global suppliers, advanced material sourcing, and strict quality frameworks. How these factors are managed determines not only product reliability but also the speed at which sustainable mobility can be achieved. This speaker note examines management strategies for supplier development and manufacturing excellence for polymer-intensive EV components like battery enclosures, thermal management structures, and sealing systems. These critical applications require materials with high thermal stability, durability, and lightweight properties, and also require suppliers to meet strict quality and delivery standards. By implementing structured approaches such as risk-based supplier evaluation, root cause analysis, and tiered supplier development, organizations can reduce defects, stabilize production, and improve long-term supplier performance. In addition, sustainability is becoming a core management criterion in supplier selection and operational decision-making. Integrating recyclability, emissions reduction, and circular economy principles into supplier scorecards ensures that environmental impact is considered along with cost, quality, and lead-time trade-offs. This shift highlights the growing role of supply chain management in advancing both organizational competitiveness and broader environmental goals. The findings show that strategic supplier management, combined with robust quality systems, is essential for scaling EV production while achieving sustainability targets. By aligning material innovation, supplier development, and operational excellence, management can drive defect-free, cost-effective, and environmentally responsible outcomes in the automotive sector.

**Keynote Lecture: 5**

**Ever-Increasing Importance for Data Quality in the AI Era**

**Chandra Bonthu**

Director of IT-MDM, EVERSANA, USA

Email address: [chandrabonthu78@gmail.com](mailto:chandrabonthu78@gmail.com)

**Abstract**

In the current AI-driven world, high-quality data is fundamental to success. As AI becomes more integrated into business operations, decision-making, and customer interactions, the integrity of the data that powers these systems is crucial. High-quality data helps ensure that AI models are accurate, reliable, and fair. In contrast, poor data quality can result in biased outcomes, flawed predictions, and major reputational and regulatory risks. The AI era requires a shift from static data management to dynamic, real-time data stewardship, where validation, governance, and enrichment are continuous and automated. Organizations should adopt strong data governance frameworks that include: clear ownership and accountability through data stewardship; automated monitoring and anomaly detection to maintain standards; and ethical and regulatory compliance to ensure responsible AI deployment. The rise of AI has also increased the need for tools and platforms that not only process data but actively improve it by flagging inconsistencies, enriching context, and building trust in downstream analytics. The success of AI initiatives ultimately depends on the quality of the data they use. As we advance further into the AI era, data quality must be treated as a strategic priority that drives innovation, builds trust, and secures a competitive advantage.

**Keynote Lecture: 6**

**Evolution of Cybersecurity in The Age of AI and Automation**

**Gaurav Malik**

Associate - Information Security Manager

The Goldman Sachs Group, Inc., USA

Email address: [Gauravv.mmallik2m@gmail.com](mailto:Gauravv.mmallik2m@gmail.com)

**Abstract**

As cyber threats grow in scale and sophistication, traditional defense approaches are no longer sufficient. This presentation explores how Artificial Intelligence (AI) and automation are transforming cybersecurity by enhancing threat detection, prediction, and response. We examine their role in reducing alert fatigue, accelerating incident response, and improving resilience against phishing, ransomware, and insider threats. The session also highlights challenges such as AI bias, over-reliance on automation, and ethical considerations. Finally, it looks ahead to future trends—generative AI, autonomous defense, and quantum risks—positioning AI-driven automation as a cornerstone of modern cyber defense.

**Keynote Lecture: 7**

## **Generative AI and Software Architecture: Building Scalable Systems for a Sustainable Future**

**Pradeep Rao Vennamaneni**

Staff Software Engineer, Inovalon, USA

Email address: [praovennamaneni@gmail.com](mailto:praovennamaneni@gmail.com)

### **Abstract**

Generative AI is changing the future of intelligent systems, but its full potential relies on the strength of the software architectures that support it. This keynote will explore how modern engineering practices, such as cloud-native design, microservices, and real-time data pipelines, allow AI to scale securely and sustainably across different industries. Drawing on real-world experience in finance and healthcare, the talk will highlight strategies for embedding AI into enterprise systems while balancing innovation with compliance, security, and efficiency. Attendees will gain insights on how to build scalable, resilient, and sustainable AI-driven ecosystems that have a lasting impact.

**Keynote Lecture: 8**

**Python-Based GPU Testing Pipelines: Enabling Zero-Failure Production Lines**

**Karan Lulla**

Lead Board Test Engineer, Santa Clara, CA, USA

Email address: [karanvijaylulla08@gmail.com](mailto:karanvijaylulla08@gmail.com)

**Abstract**

With the rising demand for high-performance and reliable GPUs for AI, scientific computing, and autonomous systems, hardware developers must produce zero-failure outcomes. This article discusses how Python-based GPU test workflows are changing the traditional QA approach into intelligent, automated, and scalable methods. It provides a full walkthrough of current GPU validation, from the unit level to system-level stress tests. The article shows how Python libraries such as PyCUDA, CuPy, TensorFlow, and pynvml can provide deep hardware introspection and realistic simulation scenarios. The design of these pipelines is closely integrated with CI/CD tools, real-time dashboards, and factory systems, which provides fast feedback and traceability. A case study of a mid-size GPU OEM reveals a measurable result: a 99.997% increase in pass rates and a 20% reduction in returns by using Python-powered test automation. The article also covers stress-testing strategies, telemetry logging, error detection, and predictive maintenance workflows. Finally, it presents future trends like AI assistant diagnostics, edge testing, and blockchain audit trails. The results offer engineers and manufacturers a guide for creating resilient, data-based, and future-proof testing systems with reduced cost, high efficiency, and high product reliability.

**Keynote Lecture: 9**

**AI-Driven Optimization of Callback Service Architectures for Sustainable  
High-Throughput Applications**

**Zahir Sayyed**

Software Engineer, Jamesburg, New Jersey, USA

Email address: [sayyedzahir@gmail.com](mailto:sayyedzahir@gmail.com)

**Abstract**

This research evaluates callback service frameworks that support both high-throughput and cloud-native applications. The scalability and responsiveness of microservices in banking, insurance, and virtualization can become an issue when event-driven mechanisms lack proper design. Callback architectures have become vital because they offer reduced latency, enhanced fault tolerance, and lower resource usage compared to polling methods. The research evaluates three main callback patterns: webhooks, message queue subscribers (Kafka, RabbitMQ, AWS SQS), and gRPC streams to highlight their benefits in distributed systems. The research proposes an AI-powered callback orchestration scheduler to handle changing workloads. The scheduler uses predictive models to forecast workload peaks, which enables dynamic resource allocation and intelligent callback event routing. The system reduces retry attempts and failure rates while optimizing the use of cloud infrastructure resources. Real-time transaction alerts, insurance claim updates, and high-frequency trading notifications all benefit from AI-powered callback scheduling. The paper also explains resilience techniques that combine circuit breakers and stateless scaling with centralized retry orchestration and OpenTelemetry-based observability. A case study shows that migrating from monolithic synchronous systems to serverless architectures (AWS Lambda and SNS) leads to significant latency reductions, enhanced fault tolerance, cost savings, and sustainability benefits.

**Keynote Lecture: 10**

## **Innovative Sustainable Materials and Green Infrastructure Solutions for Climate-Resilient Urban Development"**

**Vinod Kumar Enugala**

Sustainable Civil Engineering for Climate Resilience Affiliation: Department of Civil  
Engineering, University of New Haven, CT, USA

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### **Abstract**

This presentation examines cutting-edge sustainable practices in civil engineering that address climate change challenges. It explores innovative eco-friendly materials, including recycled concrete aggregates, bio-based composites, and self-healing concrete technologies. The research highlights green infrastructure solutions like permeable pavements, green roofs, and constructed wetlands for urban stormwater management. Case studies show the successful implementation of carbon-neutral construction techniques and circular economy principles in infrastructure projects. The presentation emphasizes multidisciplinary approaches that combine environmental science, materials engineering, and urban planning to create resilient infrastructure systems. These sustainable methods significantly reduce environmental impact while improving infrastructure performance and longevity in changing climate conditions.

**Keynote Lecture: 11**

**Building Resilient IT Landscapes with Azure Landing Zones**

**Harish Kumar Krishnamurthy Sukumar**

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**Abstract**

These days, enterprises are facing pressures from cyberattacks, strict compliance rules, and operational disruptions. Resilience has become a key element for successful digital transformation. Cloud adoption can offer agility and scalability, but without the right underlying setup, it can increase risk and complexity. This keynote looks at how Azure Landing Zones provide a solid blueprint for creating cloud environments that are secure, scalable, and ready for future challenges. They build in governance, identity, networking, monitoring, and automation from the start, giving organizations the necessary guardrails to stay agile without losing control. Based on real-world experience, the session shows how Landing Zones assist with security and governance using policy-driven controls. They support high availability through multi-region setups and disaster recovery. Operational efficiency comes from monitoring and automation that work seamlessly. For business resilience, they enable fast innovation and adaptation when needed. Attendees will leave with practical insights on how to turn cloud adoption into a strategic advantage, with IT foundations that not only survive disruptions but help organizations thrive.

**Keynote Lecture: 12**

**Human + AI: Redefining Cybersecurity Operations in the Talent Shortage Era**

**Prassanna R Rajgopal**

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**Abstract**

Security Operations Centers (SOCs) are facing a surge in attack volume, rising complexity, and a workforce gap of 3.4 million people. Analysts are overwhelmed by repetitive alerts, leading to fatigue and burnout, which results in slower detection and response and increases breach and compliance risk. AI copilots powered by advanced language models offer a solution. Unlike rigid, rule-based automation, they adapt and interact by parsing telemetry, prioritizing alerts, enriching indicators, correlating signals, guiding investigations, and drafting incident summaries in seconds. When deployed across Tier-1 to Tier-3, they act as a force multiplier that cuts false positives and shrinks MTTD/MTTR while improving consistency and auditability. Operationally, copilots integrate with SIEM/SOAR/XDR stacks, explain their reasoning, and keep humans in the loop for approvals and nuanced judgment. With guardrails like role-based access, logging, and policy-aligned prompts, they boost productivity without sacrificing oversight. In short, AI copilots are becoming trusted SOC teammates, enabling overstretched teams to operate at machine speed while preserving human expertise and strengthening organizational resilience.

**Keynote Lecture: 13**

**AI-Driven Quality Assurance: Transforming Testing in Regulated Industries**

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**Abstract**

The rapid adoption of artificial intelligence (AI) is transforming Quality Assurance (QA) practices in regulated industries like finance, retirement services, and healthcare, where compliance, accuracy, and security are critical. This presentation explores how AI-driven QA frameworks enhance test automation, streamline regulatory validations, and ensure operational resilience in complex legacy systems such as Omni recordkeeping platforms and mainframe applications. By integrating machine learning models with traditional testing methods, organizations can detect anomalies, predict defects, and improve test coverage while adhering to strict industry regulations. Through real-world use cases, including retirement industry workflows and financial transaction validations, the session will highlight strategies for reducing manual effort, improving time-to-market, and mitigating compliance risks. Attendees will gain insights into emerging trends, implementation challenges, and best practices for embedding AI into QA processes, ultimately enabling smarter, faster, and more reliable software delivery in high-stakes, compliance-driven environments.

**Keynote Lecture: 14**

**The Last Mile of AI: Why Great Models Fail and How Leaders Make Them Win**

**Yogesh Sabnis**

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**Abstract**

AI pilots often look impressive in demos but fail in the real world. The reason is not the algorithm but "the last mile": choosing the right problem, preparing people, wiring processes, enforcing guardrails, and proving value. This keynote, drawing on enterprise programs in financial technology, global manufacturing, and retail, shares a practical "Last-Mile Playbook" that leaders can use immediately. The playbook covers Problem (value thesis and decision to change), People (role clarity, reskilling, decision rights), Process (product–data–operations cadence with experimentation), Protections (privacy, security, and bias reviews), and Payoff (a scorecard that balances ROI, customer outcomes, and ethics). Through short, anonymized cases, such as churn prediction moving from "accurate" to adopted and campaign systems enabling real-time decisions, attendees will leave with three take-home tools: a readiness checklist, a lightweight governance template, and a payoff scorecard (evidence standards) that leaders can fund. The goal is simple: to turn AI from hype into a habit, scaling responsibly and sustainably so people, trust, and measurable results can carry great models across the last mile.

**Keynote Lecture: 15**

## **Green AI at Scale: Hardware–Software Co-Design for Low-Carbon Training**

**Yashasvi Makin**

Software Engineer, Meta

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### **Abstract**

How do we make frontier AI both faster and greener? This talk shares production-tested techniques—kernel fusion, mixed precision, sharded optimizers, memory- and data-pipeline tuning, and carbon-aware orchestration across NVIDIA/AMD/other hardwares—that increase throughput per watt. Drawing on real deployments, it offers a playbook for reducing energy use and cost while enabling cross-disciplinary research.

**Keynote Lecture: 16**

**ML-Driven Demand Forecasting in Legacy ERP Environments**

**Ravi Jaiswal**

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**Abstract**

Classic ERP systems, like QAD, use forecasting methods that often struggle with modern supply chain changes. This research investigates whether demand forecasts can be improved using ML models such as XGBoost (eXtreme Gradient Boosting) and LSTM (Long Short-Term Memory), which were tested on the M5 Forecasting dataset. Data preparation and feature development allowed the ML models to outperform moving averages and ARIMA (Auto Regressive Integrated Moving Average) in capturing the details of demand response. The findings show that ML increases forecasting accuracy in the QAD ERP system, which helps with strategy and planning inventory choices without needing to upgrade the core ERP. This demonstrates how to improve legacy ERP systems by using data insights at any scale.

**Keynote Lecture: 17**

**Artificial Intelligence in Financial Fraud Detection: Innovations,  
Applications, and Future Challenges**

**Jayanth Kande**

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**Abstract**

Financial fraud has become one of the most significant threats to the global economy, with projected losses in the tens of billions annually. Traditional defenses, which are built around static rules and manual reviews, can no longer keep pace with fast-evolving fraud tactics and the sheer volume of digital transactions. Artificial intelligence (AI) provides a powerful alternative by learning from large datasets, adapting to new patterns, and identifying anomalies in real time. This paper explores how AI is transforming fraud detection through a mix of supervised learning, anomaly detection, graph analysis, and federated learning. Four case studies illustrate the wide range of applications: Visa's partnership with Eika Banken in Norway, which used adaptive AI to cut phishing losses by 90%; PayPal's use of real-time scam alerts that analyze billions of transactions and intervene before funds are lost; Shift Technology's use of AI to detect fraudulent insurance claims by analyzing billions of unstructured data points; and Chainalysis's integration of AI engines to track both on-chain and off-chain transactions to help law enforcement dismantle crypto scams. While AI systems are delivering measurable gains—reduced fraud losses, fewer false positives, and faster investigations—they also raise new challenges, including explainability, privacy, adversarial attacks, and model drift. The findings suggest that the future of fraud prevention will depend on continuous innovation, collaboration across industries, and the integration of human oversight with machine intelligence. Together, these elements can help financial institutions stay ahead in the ongoing arms race between fraudsters and defenders.

**Keynote Lecture: 18**

## **Data Foundations for Green AI: Building Sustainable AI Systems in the CPG Industry**

**Supriya Gandhari**

Data Engineer

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### **Abstract**

As companies in the Consumer Packaged Goods (CPG) sector expand their AI projects for things like demand forecasting and supply chain optimization, they often overlook a critical factor: the environmental consequences of the data infrastructure that supports these systems. This keynote presentation will delve into the often-overlooked carbon footprint associated with AI pipelines in the CPG industry and present actionable strategies for data engineers to build more energy-efficient, scalable, and sustainable infrastructures. The discussion will emphasize how careful data engineering can minimize waste, lower energy costs, and align AI advancements with broader environmental, social, and governance (ESG) objectives by improving data ingestion and storage, using deduplication techniques, and pursuing energy-aware model deployment. Participants will gain insights into AI-responsive data architectures that are not only efficient and reliable but also environmentally responsible.

**Keynote Lecture: 19**

**AWS-Powered Machine Learning: Streamlined CI/CD Approaches**

**Naga Murali Krishna Koneru**

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**Abstract**

As organizations increasingly use machine learning (ML) to drive innovation, the need for scalable, repeatable, and automated deployment practices has become critical. Traditional software delivery pipelines are insufficient for ML workloads, which have unique challenges such as data versioning, model retraining, experiment tracking, and continuous monitoring. This talk will explore streamlined CI/CD approaches for machine learning that are powered by AWS services. It will discuss how to design pipelines that integrate data preparation, model training, validation, and deployment while using tools like Amazon SageMaker, AWS CodePipeline, and AWS Step Functions. Attendees will gain practical insights into implementing automation, ensuring reproducibility, and maintaining compliance across ML workflows. By the end of the talk, participants will understand how AWS-native CI/CD strategies can speed up ML delivery, reduce operational overhead, and enable a faster time-to-value for machine learning initiatives.

**Keynote Lecture: 20**

## **Ethics of AI-Based Supply Chain Optimization: A Better Balance Between Efficiency and Fairness**

**Vinil Apelagunta**

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### **Abstract**

This paper discusses the ethical dimensions of AI-based supply chain optimization. It addresses algorithmic biases, the effect of automation on employment, and the importance of transparency and accountability. The paper uses existing literature and case studies to explain how ethical frameworks can be integrated into AI-based systems to create resilient and equitable supply chains. It concludes with practical suggestions for reducing risk and achieving equitable AI-based supply chain management. The paper's contribution is to emphasize the value of AI for efficiency and optimization while also indicating that a proactive and ethical approach is needed to use its potential to create a fairer and more sustainable world.

**Keynote Lecture: 21**

## **AI for Sustainable Workforce Systems: Predictive, Compliant, and Scalable Innovations**

**Jeet Kocha**

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### **Abstract**

Artificial Intelligence is transforming workforce and public service systems by improving compliance, efficiency, and sustainability. This talk will highlight practical advances from my research, such as real-time compliance engines, blockchain-based vendor payment systems, and predictive analytics that reduce service gaps by up to 30 days. I will also examine AI-driven caseload distribution models that help with staffing shortages without compromising service, as well as federated data platforms that integrate rehabilitation, Medicaid, and workforce initiatives. The event will provide pragmatic methods, governance insights, and scalable frameworks for organizations that want to balance technical progress with responsibility and social impact.

**Keynote Lecture: 22**

**Smarter, Safer, Sustainable: How AI Is Transforming Financial Systems in Real Time**

**Kishore Hebbar**

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**Abstract**

In this keynote, I will share how to apply AI and modern cloud-native technologies to build financial systems that are not just faster, but also smarter, safer, and more sustainable for the future. Having worked extensively in the FinTech domain, I have seen how legacy infrastructure often struggles with the demands of real-time data, fraud detection, compliance, and user scalability. At Intercontinental Exchange (ICE), I have led efforts to modernize these systems using intelligent microservices, Kafka Streams, and machine learning to power responsive, secure platforms. I will walk through real examples of how AI is enabling financial systems to detect fraud in real time, reduce operational risks, and support compliance across global markets, while also minimizing infrastructure waste and technical debt. These innovations are not just technical upgrades; they are foundational steps toward long-term digital sustainability. This talk connects finance, AI, engineering, and cloud infrastructure to show how a multidisciplinary approach can deliver impactful, responsible solutions. Whether you are in academia, tech, research, or finance, you will gain practical insights into how to design and deploy AI systems that are resilient, explainable, and built to last.

**Keynote Lecture: 23**

**The DevOps for Earth: Applying Automation and AI to Planet-Scale Systems**

**Pavan Kumar**

Cloud Engineer specializing in Azure, CI/CD, and automation, dedicated to building intelligent, self-healing systems and driving operational excellence, USA

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**Abstract**

In the world of cloud engineering, our expertise is in building and managing complex, data-driven systems. But what if our skills could be used to solve the biggest operations challenge of all: the health of our planet? This talk, led by Azure Cloud Engineer Pavan Kumar Asu, argues that a DevOps mindset is key to creating a sustainable future. We will explore how a technical feedback loop—from ingesting telemetry to triggering automated remediation—can be applied to everything from smart cities to resource management. By reframing AI not just as an algorithm but as a powerful automation agent, this presentation offers a fresh, technical perspective on the role of engineers in sustainability. Attendees will leave with a new appreciation for how their daily work on the Azure cloud is directly transferable to building a better world.

**Keynote Lecture: 24**

## **Sustainable AI in the Enterprise: How Salesforce and Agent force are Redefining Business Transformation**

**Sandip Patel**

Salesforce Architect with 13+ years' experience, specializes in AI-driven workflow automation, intelligent agent design, and sustainable enterprise solutions, USA

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### **Abstract**

Artificial Intelligence (AI) is quickly becoming the cornerstone of digital transformation, but its true impact lies in how responsibly it is applied. Salesforce, through innovations like Agent force and its trusted AI ecosystem, gives organizations the tools to use AI for not only business efficiency but also for sustainable growth and social impact. This keynote will explore how Salesforce's AI-first architecture and Agent force allow enterprises to go beyond traditional customer relationship management (CRM) into a world of intelligent agents, ethical AI decision-making, and workflow automation that reduces waste and improves efficiency. By examining real-world use cases in healthcare, nonprofits, and sustainability, we will highlight how AI can support the UN's Sustainable Development Goals (SDGs). Participants will gain actionable insights into designing AI-powered, responsible, and scalable Salesforce ecosystems that drive innovation while ensuring transparency, trust, and sustainability. The session will also discuss the future of Agent force in empowering developers, architects, and businesses to create AI agents that are not only smart but also sustainable.

**Keynote Lecture: 25**

## **MFD-MCAGCNN: Microservices-Based AI for Anomalous Payment Detection**

**Jaya Krishna Modadugu**

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### **Abstract**

Microservices are an architectural model where an application is broken down into loosely coupled, independently deployable services aligned with specific business functions, which allows for greater scalability, flexibility, and ease of maintenance. To address a specific problem, the proposed Multi-Component Attention Graph Convolutional Neural Network (MFD-MCAGCNN) is applied to financial data processing. The input data is initially collected from the Greedy Cloud Selection Deployment on Microservices dataset and then normalized using the Robust Maximum Correntropy Kalman Filter (RMCKF) in the pre-processing segment. The pre-processed data is then fed into the detection segment using the Multi-Component Attention Graph Convolutional Neural Network (MCAGCNN) to predict anomalous payment behavior. The proposed MFD-MCAGCNN method was developed on the Python platform, and its performance was evaluated using metrics such as accuracy, precision, and sensitivity. The proposed method achieves an accuracy of 98.9%, which surpasses existing methods such as CAM-MAFSD (75.4%), CFFD-FSAI-MS (78.7%), and READ-IMCCS-VPN (85.2%). The performance of the proposed technique was compared with various existing methods.

**Keynote Lecture: 26**

**Leading API Management Platforms for API Modernization**

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**Abstract**

API Management platforms are central to digital transformation, enabling enterprises to innovate faster, integrate seamlessly, and deliver secure, scalable services. As organizations modernize their legacy middleware systems, choosing the right API management solution is a critical decision that affects both technical agility and business outcomes. This keynote will provide a comparative look at leading API Management platforms, focusing on SAP BTP Integration Suite, Google Apigee X, MuleSoft, Boomi, and Oracle. The session will evaluate these platforms based on dimensions such as API lifecycle management, governance, developer productivity, cost optimization, multi-cloud flexibility, and security. The talk will highlight emerging trends like AI-driven API ecosystems, intelligent automation, and sustainable architectures that support enterprise growth and resilience. By examining real-world case studies and industry best practices, this keynote will give participants a structured framework to make informed decisions on API modernization, avoid common pitfalls, and unlock long-term digital value.

**Keynote Lecture: 27**

## **Multi-Cloud Transaction Orchestration for Hybrid TIBCO/java Micro-services**

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### **Abstract**

A major cause is likely the rapid dynamism of development of enterprise applications which bring with them the compelling urge for enterprises to design and implement multi-cloud strategies that exploit the different clouds to have the advantages of resilience and scalability as well as cost control. In a well-structured multi-cloud services spectrum, one can gamble that plans to enable transactions ' distribution,

especially about minimal-functionality and failover resilience, will be insufficient. The project addresses the design and implementation of a Transaction Orchestration Layer for Multi-Clouds that leverages full TIBCO and Java-based microservices, with the following goals:

Supporting the event-driven orchestration, smart routing, and workload sharing of a hybrid environment, alongside supporting multiple cloud vendors under the same ACID and BASE transactional model. The technique draws on the ability of the TIBCO Engine to mix colors using Java based micro-system and such a combination facilitates transaction coordination services together with the discovery and monitoring of services in hybrid cloud environments. The testing has demonstrated that the approach decreases the queue of transactions, reduces latency and improves resistance to faults. Consequently, it has the potential of use in multi-cloud enterprise systems.

**Keynote Lecture: 28**

## **Identifying Operational Red Flags to prevent Financial Distress within Organizations**

**Shaurya Shounik**

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### **Abstract**

Following the COVID-19 pandemic, global corporations faced unprecedented financial and operational challenges. This research examines the early warning signals of financial distress for firms from 2020 to 2025 and their strategic responses. We used a mixed-method approach, analyzing company success indicators and including qualitative insights from academic literature and industry sources. Key findings show that in the post-COVID economy, certain operational red flags—such as declining revenues, insufficient liquidity, rising debt burdens, and operational inefficiencies—often led to significant financial difficulties for enterprises. The research evaluates the effectiveness of strategic measures used by firms, including significant cost reductions, restructuring, adaptive pivots, and stakeholder support initiatives. In conclusion, the research indicates that a company's resilience in the post-pandemic years (2020–2025) depended on the early identification of warning signs and timely strategic actions. Scholars, professionals, and politicians can use this information to improve preparedness for future economic disruptions and establish early warning systems.

**Keynote Lecture: 29**

## **Driving Tomorrow: A Global Study of Well-to-Wheel Performance in Electric Vehicles**

**Prajwal Kumar Chinthoju**

Autonomous Driving Feature Development Engineer, Carmel, Indiana, USA

Email:

### **Abstract**

In recent decades, the rising threat of global warming has received heightened attention. Scientific evidence shows that restricting the increase in global temperature to below 1.5°C is essential to prevent irreversible environmental consequences. The transportation sector faces particular difficulty in this regard, as it has traditionally depended on fossil fuel combustion for mobility. To address this challenge, automotive manufacturers are adopting advanced technologies such as hybrid vehicles, plug-in hybrids, battery electric vehicles, and fuel cell vehicles. A unifying aspect of these innovations is the shift from direct fossil fuel use to electricity as the primary energy source for propulsion. While this transition reduces tailpipe emissions, it also increases demand on the power grid, which may rely on either renewable or non-renewable energy sources. Hence, assessing the true environmental impact requires evaluating efficiency, energy use, and CO<sub>2</sub> emissions across the entire energy chain, from production to final vehicle motion.

This study investigates the well-to-wheel efficiency of electric vehicles at a global scale. The well-to-wheel framework accounts for every stage of energy flow within the vehicle lifecycle. Beyond calculating overall efficiency, this research examines regional differences, recognizing that variations in electricity generation mixes result in substantial disparities in performance across countries. Identifying these differences is critical for understanding where improvements can be made. By mapping energy losses at each stage, the analysis highlights opportunities to maximize efficiency and guide the evolution of sustainable transportation worldwide.

**Keywords:** Electric Vehicles (EVs); Hybrid Electric Vehicles (HEVs); Well-to-Wheel Efficiency (WTW); energy consumption; CO<sub>2</sub> emissions; sustainable mobility; transportation efficiency

**Keynote Lecture: 30**

## **Ensuring Security and Compliance in Retail Cloud Environments: A Wide-ranging Review**

**Suresh Gangula**

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### **Abstract**

Integrating DevOps principles in retail cloud environments has revolutionized software development, deployment, and operations. However, this shift introduces complex security and compliance challenges, particularly as retailers handle sensitive customer data, financial transactions, and business intelligence. This review examines the role of DevOps in enhancing security, discusses the limitations of traditional security models, and explores cloud-native security solutions tailored for retail enterprises. Additionally, the paper highlights regulatory compliance mandates that retailers must adhere to in cloud-based DevOps frameworks. This review analyzes best practices and provides actionable insights for retail businesses to achieve secure, compliant, and resilient cloud infrastructures while maintaining agile DevOps workflows.

**Keynote Lecture: 31**

**Serverless Java: Cold Start Mitigation in Cloud Run/Spring Boot**

**Sandeep Reddy Gundla**

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**Abstract**

**Keynote Lecture: 32**

## **Engineering Trust through Cryptographic Architectures - Safeguarding Information Integrity and Trust**

**Subramanya Shashank Gollapudi Venkata**

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### **Abstract**

In today's digital era, everything that we do generates data and data is considered the most important asset and safeguarding it is no longer optional - it's a necessity. During this keynote address, the essential importance of encryption and hashing in guarding confidential information, maintaining privacy, and establishing trust within digital systems will be discussed. Attendees will discover that encryption transforms information into unreadable, secure content accessible to authorized parties alone, while hashing provides unique digital fingerprints that verify data integrity and signal tampering. Through real-world examples and recent trends, this session will demonstrate real-world applications, implications, and best practices in employing these cryptographic techniques.

**Keynote Lecture: 33**

## **Cyber-Physical Risks in ISP Infrastructure: Planning for National-Level Disruptions**

**Darshan Prajapati**

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### **Abstract**

The digital and physical worlds are no longer separate domains. This convergence has created a new frontier of risk for Internet Service Provider (ISP) infrastructure, where a cyber attack can manifest as tangible, widespread physical disruption. This keynote moves beyond traditional discussions of data breaches to explore the existential threat of attacks targeting the core physical components of our connectivity: undersea cables, central offices, fiber optic trunks, and power systems.

We will analyze real-world vectors, from the sabotage of critical cable landing stations to the manipulation of industrial control systems within network operations centers. The consequences of a coordinated attack are not merely digital; they are a potential national-level emergency, crippling finance, logistics, emergency services, and public communication.

This session is a call to action. We will outline a strategic framework for resilience, advocating for a paradigm shift from pure cybersecurity to integrated cyber-physical defense. We will discuss the imperative of public-private partnerships, robust redundancy protocols, and advanced threat intelligence sharing. The goal is not just to secure data, but to fortify the very backbone of our modern society against disruptions that threaten national stability.

**Keynote Lecture: 34**

**Bridging Research and Practice: Advancing Urban Water Protection  
Through Interdisciplinary Engineering Innovation**

**Dr. Srikar Velagapudi**

Senior Civil and Environmental Engineer – Stormwater Management  
& Environmental Risk Assessment, USA

**Abstract**

As cities face growing challenges in stormwater management and air pollution, the integration of artificial intelligence (AI) in urban infrastructure design presents a transformative opportunity for sustainable urban development. This research synthesizes recent advances in AI-augmented stormwater modeling, Best Management Practice (BMP) optimization, and predictive maintenance of urban assets, drawing on validated models and frameworks from peer-reviewed literature. AI-driven approaches leverage data analytics, remote sensing, and Internet-of-Things (IoT) sensors to enhance flood prediction, scenario testing, and risk assessment. In parallel, air quality monitoring and pollution prevention research harness machine learning algorithms to track trends in pollutants, identify sources, and evaluate the effectiveness of emission controls. The evidence demonstrates significant improvements in system performance, regulatory compliance, and public health outcomes when AI and interdisciplinary research are embedded in planning and operational workflows. The study concludes that the convergence of data-centric engineering, AI, and transdisciplinary collaboration offers a scalable path to urban water resilience and pollution prevention, supporting robust, adaptable cities against environmental uncertainty.

**Keynote Lecture: 35**

## **SecOps Playbook: Agents, AI IR & LLM Guardrails**

**Bhumit Dhandhukiya,**

Security Operations Analyst, Propel Holdings –Toronto, ON

### **Abstract**

AI agents can now act, not just chat—which raises the stakes. I'll share three practical SecOps moves: agent guardrails that truly enforce policy, a crisp AI incident response flow that contains unsafe actions fast, and LLM safeguards that keep data and permissions tight by default. Expect simple diagrams, a lightweight rollout plan, and clear metrics (unauthorized tool calls, MTTR, attestation coverage) your team can publish to prove improvement.

**Keynote Lecture: 36**

**AI for Sustainable Data Ecosystems: From Fragmentation to Trust**

**Shreekant Malviya**

Data Engineer – Data Platforms & AI Governance, USA

**Abstract**

The global datasphere is expanding rapidly, yet most enterprise data remains fragmented, unused, or unreliable, leading to inefficiencies and unsustainable practices. This keynote, "AI for Sustainable Data Ecosystems: From Fragmentation to Trust," explores how AI-augmented governance can transform data silos into trusted ecosystems that drive sustainability. Using a five-layer framework and case studies from insurance, education, and cultural heritage, the talk highlights how AI can reduce waste, improve transparency, and embed ethics. The core message: sustainability in AI begins with trust in data.

**Keynote Lecture: 37**

## **Disaster Recovery in Large-Scale Databases: Designing Effective Failover and Backup Strategies**

**Harsha Vardhan Reddy Kavuluri**

Lead Oracle/Postgres/Cloud Database Administrator, Florida, USA

### **Abstract**

Disaster recovery is a critical component of modern large-scale database environments, where enterprises and government organizations face rising challenges from massive data growth, complex architectures, cyber threats, and regulatory requirements. Traditional approaches, such as cold standby models, often fail to meet the stringent demands for high availability, data consistency, and cost efficiency. Emerging strategies including multi-region replication, software-defined resilience, predictive failure detection, and adaptive backup optimization are transforming disaster recovery into a proactive, intelligent process.

Key considerations include balancing Recovery Time Objective (RTO) and Recovery Point Objective (RPO), ensuring consistent transaction integrity across distributed systems, and integrating disaster recovery into cloud-native and hybrid infrastructures. Techniques such as real-time replication, automated failover orchestration, and tiered storage backups enable faster recovery with minimal business disruption. Moreover, predictive analytics and machine learning models enhance resilience by anticipating failures before they occur, while cost-aware architectures optimize storage and recovery expenses.

This presentation highlights the strategic importance of designing disaster recovery solutions that not only ensure continuity during outages but also improve operational efficiency, compliance alignment, and scalability for future growth.

**Keywords:** Disaster Recovery, Large-Scale Databases, High Availability, Multi-Region Replication, Predictive Failover, Cloud-Native Recovery, Backup Strategy Optimization

# *Invited Lectures*

**Invited Lecture 01**

**Multidisciplinary Research and Artificial Intelligence for Sustainability:  
Pathways, Challenges, and Future Directions**

**Dr. Kavita Manghnani**

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**Abstract**

The pursuit of sustainability has emerged as a defining challenge of the twenty-first century, requiring holistic approaches that transcend disciplinary boundaries. Traditional siloed research methods often fall short in addressing the interconnected nature of environmental, social, and economic issues. In this context, multidisciplinary research offers an integrated framework by bringing together insights from natural sciences, engineering, economics, policy studies, and social sciences. Simultaneously, Artificial Intelligence (AI) has proven to be a transformative tool capable of processing vast datasets, uncovering complex patterns, and generating predictive models that can inform evidence-based decision-making.

This study examines the intersection of multidisciplinary research and AI for advancing sustainability. It highlights the ways in which AI applications, such as machine learning, computer vision, and natural language processing, can support diverse domains including climate change mitigation, renewable energy optimization, sustainable agriculture, disaster resilience, green finance, and public health. The analysis reveals that when grounded in multidisciplinary collaboration, AI-driven approaches enhance efficiency, foster innovation, and promote systems-level solutions to sustainability challenges.

However, the research also identifies critical barriers such as algorithmic bias, data privacy concerns, digital inequality, and the ecological footprint of high-powered AI models. These limitations underscore the need for ethical frameworks, transparent governance mechanisms, and inclusive access to AI technologies. The paper argues that the future of sustainability depends not only on technological advancement but also on the creation of collaborative ecosystems that integrate AI tools with multidisciplinary knowledge.

By synthesizing insights from academic literature, case studies, and global policy frameworks such as the United Nations Sustainable Development Goals (SDGs), the paper demonstrates that AI, when responsibly applied within a multidisciplinary paradigm, can accelerate progress toward sustainable development. The findings emphasize the importance of bridging disciplinary divides, investing in green AI, and fostering global partnerships to ensure that technological innovation contributes meaningfully to ecological balance, social equity, and economic resilience.

**Keywords:** Multidisciplinary research, Artificial Intelligence, Sustainability, UN SDGs, Green AI, Ethical frameworks, Climate resilience

**Invited Lecture 02**

**Role of Self-Help Groups For Sustainable Development of Rural Women**

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**Abstract**

Self-Help Groups (HSGs) have played a significant role for sustainable development of rural women. The Ministry of Rural Development is implementing various programmes to embark as 'Women's Component' to ensure flow of adequate resources for the purpose. The commencement of the empowerment of rural women is multi-dimensional social process through self-help groups based on micro-finance programme cover a large number of rural women. So, the Self-help groups are small voluntary association of women to form a group which is home grown model for poverty alleviation and simultaneously works to empower and improve the lives of rural women. The formation of the self-help groups has benefited its members in a significant way. It improves the economic and employment opportunities for rural women. The self-help groups also help to enhance the quality of status of women in the democratic economic and social process of organization. It improves the economic and employment opportunities for women.

Self-Groups started in India around 1976-1983 with a focus on savings and loans to provide financial support for rural women. India is a multifaceted society where no generation could apply to all of the nations' various regional, religious, social, and economic groups. Nevertheless, certain broad circumstances in which Indian women live affect the ways they participate in the economy. In Indian culture, as in many countries, women are expected to devote virtually all of their time, energy, and earnings to their family. Research has shown that women contribute a higher share of their earnings to the family and are less likely to spend it on themselves. Hence, it is to be observable matter that the role of SHGs can be marked for the sustainable development of rural women as well as self employability at present era.

**Invited Lecture 03**

**Identification of Differentially Expressed Genes Related to Immune Pathways in Oral Squamous Cell Carcinoma**

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Oral squamous cell carcinoma (OSCC) originates from squamous epithelium and is a common malignancy worldwide. OSCC occurs in the oral cavity, including the tongue, gingiva, oral floor, palate, and buccal mucosa. Despite novel advances in its diagnosis and therapy, the 5-year survival rate of OSCC patient is 50% due to distant metastases, locoregional relapse and second primary tumour. Immune system and inflammation play a very important role in oral cancer pathogenesis. The study was initiated by searching for the OSCC datasets (GSE30784) in the Gene Expression Omnibus database and comparing gene expression between them and normal tissues. 2054 differentially expressed genes (DEGs) were identified using GEO2R out of which 1253 were upregulated and 1254 were downregulated. To find statistically significant genes, the adjusted *P*-values (adj. *P*) and Benjamini and Hochberg false discovery rate were used [Log FC (fold change) > 1 and adj. *P*-value < 0.05]. Functional annotation analysis revealed that the upregulated genes were involved in immunity (104 genes), innate immune response (71 genes), cytokine-cytokine receptor interaction (54 genes), inflammatory response (41 genes), TNF signalling pathways (25 genes), Toll like receptor signalling pathways (23 genes), TGF $\beta$  signalling pathway (19 genes), complement and coagulation cascade (18) and natural killer cell mediated cytotoxicity (18 genes). The pathways may be explored further to find out the interaction of these genes related to immune responses in cancer pathogenesis.

**Keywords:** Oral cancer, DEGs, functional annotations, immune response

**Invited Lecture 04**

**A Study on Conservation of Bonnet Macaque (*Macaca Radiata*), Thoppur,  
Dharmapuri, Tamilnadu, India.**

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**Abstract**

The IUCN has classified the Bonnet Macaque as a "Vulnerable" species. It is not found all over India. Tamil Nadu, Karnataka, Andhra Pradesh, Kerala, Gujarat, and Andhra Pradesh are among the existing states. Its vulnerable status stems from habitat loss, food scarcity, urbanization, and ongoing conflicts between humans and macaques. This conservation initiative uses a multifaceted approach to protect monkey populations and habitats. Community engagement, habitat restoration, and conflict resolution are some of the key strategies. The initiative aims to ensure monkey population survival and biodiversity preservation by engaging local communities and promoting sustainable land-use practices.

**Key words:** Monkey, Protect, Population, Conflict

**Invited Lecture 05**

**Essential Metals, Toxic Thresholds, and Human Health**

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**Abstract**

Chemical elements play vital roles in biological systems, where homeostasis regulates their levels to maintain health. Essential metals such as Fe, Cu, Zn, and Mn support key functions like enzyme activity, metabolism, and protein synthesis, but excess intake can disrupt physiology, leading to liver damage, infertility, neurological disorders, and cancers. The effects of metals depend on concentration and chemical form; for example, Cr(III) is beneficial in metabolism, while Cr(VI) is highly carcinogenic. Toxic metals such as Pb, Hg, and Cd are hazardous even at trace levels due to bioaccumulation, with children being especially vulnerable. Lead exposure impairs neurodevelopment, mercury compounds cause neurological disease, and cadmium contributes to osteoporosis and pediatric cancers. Additionally, redox-active metals promote oxidative stress, chronic inflammation, and premature aging. While certain radioactive isotopes are valuable in diagnostics and therapy, their mutagenicity poses risks. Understanding metal toxicity and homeostasis is crucial for preventing exposure-related diseases and safeguarding health.

**Keywords:** Homeostasis, Metal elements, Biological systems, Heavy metals, Bioaccumulation

**Invited Lecture 06**

**Sodium–Proton Transporter Proteins as Novel Therapeutic Targets in  
human health and diseases**

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**Abstract**

Na<sup>+</sup>/H<sup>+</sup> antiporter proteins are ubiquitously present across all domains of life, from the simplest bacterial cells to complex multicellular organisms, including humans. Throughout the course of evolution, the ancient cation-proton antiporter (CPA) family has developed into a highly efficient and functionally diverse group of transporters. Among the CPA family members, sodium-proton transporters have emerged as key regulators of sodium ion absorption and excretion, crucial for maintaining ion homeostasis and cellular volume. Recent advances in structural biology, particularly the elucidation of the three-dimensional structure of the *Escherichia coli* NhaA (Ec-NhaA) antiporter, have positioned it as a model system for studying other CPA family members found in archaea, yeast, and humans. In lower organisms, such as bacteria, these transporters enhance salt tolerance by exchanging intracellular sodium for external protons. In contrast, sodium-proton antiporters and exchangers in humans play vital roles in various physiological functions. Their dysfunction has been linked to a range of pathological conditions, including disruptions in cell proliferation, differentiation, and cardiovascular health. This report aims to provide a comparative overview of the roles and mechanisms of CPA family transporters in both lower organisms and humans. Such insights can contribute to the development of novel mechanistic models and therapeutic strategies targeting CPA-related human diseases.

**Keywords:** antiporters, human disease, CPAs, NHEs, physiology, *Ec-NhaA*.

**Invited Lecture 07**

**Life Cycle Assessment of Lipase Enzyme Production: Evaluating  
Environmental Hotspots and Pathways for Sustainable Manufacturing**

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**Abstract**

**Objective:** Lipase enzymes play a pivotal role in various industries including food, detergent, pharmaceuticals, and biofuels. However, large-scale production of lipases involves energy-intensive processes and substantial raw material use, raising sustainability concerns. This study aims to apply Life Cycle Assessment (LCA) to evaluate the environmental impacts of industrial lipase production and to identify strategies for reducing its ecological footprint.

**Methodology:** The LCA was conducted following ISO 14040/44 guidelines, covering the cradle-to-gate system boundary. Data were analyzed for microbial lipase production through submerged fermentation (SmF) and solid-state fermentation (SSF), including upstream operations (substrate preparation, inoculum development, sterilization) and downstream processing (extraction, purification, drying). Impact categories considered were global warming potential (GWP), cumulative energy demand, eutrophication potential, and water footprint. Comparative evaluation between SmF and SSF was carried out, with scenario analyses incorporating renewable energy inputs and utilization of agro-industrial residues as substrates.

**Results:** The LCA results revealed that upstream processes, particularly sterilization and substrate preparation, contributed most significantly to environmental burdens, accounting for nearly 40–50% of the total GWP. Downstream processes were energy-intensive due to purification and drying, contributing substantially to cumulative energy demand. Comparative analysis showed that SSF, when integrated with agro-residue substrates, reduced GWP by 25–30% compared to conventional SmF. The incorporation of renewable energy further decreased overall environmental impacts, highlighting the potential of sustainable process integration.

**Conclusion:** Industrial lipase production has notable environmental hotspots, primarily in energy use and raw material consumption. SSF-based production using waste substrates and renewable energy integration offers a more sustainable alternative to conventional SmF. LCA thus serves as a critical decision-support tool to guide eco-design, process optimization, and policy development for sustainable enzyme biotechnology.

**Keywords:** Life cycle assessment, industrial enzymes, lipase production, environmental impact, submerged fermentation, solid-state fermentation, sustainability, bioprocess optimization

**Invited Lecture 08**

**A Prototype of A Portable Gas Analyzer for Exhaled Acetone Detection**

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**Abstract**

A portable gas analyzer prototype has been developed for the non-invasive detection of acetone in exhaled breath. Acetone serves as a key volatile organic compound (VOC) and a recognized biomarker for monitoring metabolic health, particularly in individuals with diabetes. Addressing the limitations of current invasive monitoring methods, our proposed solution offers a painless and convenient alternative. The device's design employs an application-suited, multi-sensor array, with the mechanical housing fabricated using 3D printing technology to ensure an ergonomic, handheld form. The prototype integrates energy-efficient processing hardware to provide sufficient computing power for stand-alone operation, enabling long battery life. The functionality of the device is validated through a detailed calibration and measurement process, confirming the relationship between exhaled acetone concentrations and glucose in blood as supported by existing literature. This work demonstrates the feasibility of a cost-effective, portable solution with the potential to significantly improve non-invasive diabetes management and patient quality of life.

**Keywords:** Gas sensors, Exhaled acetone detection, Diabetes, Portable breath analyzer, Non-invasive diagnostics

**Invited Lecture 09**

**Identification of Hub Genes and Regulatory miRNAs in Gallbladder  
Cancer**

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**Abstract**

Gallbladder cancer (GBC) is a rare but highly aggressive malignancy of the biliary tract, frequently diagnosed at advanced stages due to nonspecific clinical presentation. Despite advances in genomics, the molecular mechanisms driving its progression remain poorly defined. In this study, transcriptomic profiling of 10 paired gallbladder tumor and adjacent normal tissues (GSE139682) was analyzed for differentially expressed genes (DEGs) using GEO2R. The identified DEGs were used for construction of the PPI network which was analyzed using Cytoscape. The Cytohubba plugin was used to find the hub genes. Protein–protein interaction (PPI) network construction revealed MCM3, CCNB1, and MCM2 as central hub genes involved in DNA replication, mitotic spindle assembly, and cell-cycle progression. Functional enrichment through Gene Ontology and KEGG revealed their involvement in DNA replication, the p53 signaling cascade, and checkpoints of the G1/S and G2/M transitions. miRNA-gene regulatory network analysis using miRTarBase and TargetScan revealed miR-34a-5p, miR-16-5p, and miR-193b-3p as potential post-transcriptional regulators of these hubs, implicating dysregulated miRNA activity. The identification of hub genes and their regulatory miRNAs provides new insights into GBC pathogenesis and reveals promising candidates for biomarker development and targeted therapy.

**Keywords:** GBC, Hub genes, miRNA

## **Invited Lecture 10**

# **Bridging Disciplines with AI: Pathways toward Environmental and Social Sustainability**

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### **Abstract**

The pursuit of sustainability requires solutions that transcend disciplinary boundaries, integrating knowledge from environmental science, engineering, social sciences, economics, and policy. Artificial Intelligence (AI) has emerged as a transformative tool capable of bridging these diverse domains by offering data-driven insights, predictive modeling, and decision-support systems. This paper explores how AI can act as a unifying force in multidisciplinary research, creating new pathways toward environmental and social sustainability. By processing complex datasets on climate change, resource management, and biodiversity, AI enables more accurate forecasting of ecological risks and supports the design of adaptive strategies. At the same time, social sustainability benefits from AI-driven approaches in areas such as urban planning, public health, and equitable resource distribution, where machine learning models reveal patterns that guide inclusive decision-making. The integration of AI into multidisciplinary frameworks fosters collaboration among researchers, policymakers, and communities, promoting holistic perspectives on global sustainability challenges. However, the adoption of AI also raises concerns regarding ethics, transparency, and equitable access, which must be addressed to ensure that technological progress aligns with social justice and ecological well-being. This study emphasizes the need for an inclusive research ecosystem where AI is not only a technological tool but also a catalyst for cross-disciplinary dialogue and action. Ultimately, bridging disciplines with AI opens novel opportunities to co-create sustainable solutions that are scientifically robust, socially responsible, and environmentally resilient.

**Keywords:** Artificial Intelligence, Multidisciplinary research, Sustainability, Environmental systems, Social equity, Data-driven decision making, Climate resilience, Policy integration, Ethics in AI, Sustainable development goals

**Invited Lecture 11**

**Comparative Analysis of Circulating and Muscle-Derived miRNAs in  
Juvenile Dermatomyositis**

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**Abstract**

Juvenile dermatomyositis (JDM) is a rare, immune-mediated inflammatory myopathy characterized by systemic involvement and chronic muscle weakness, with interferon signaling playing a central role in disease pathology. In this study, we utilized transcriptomic datasets to explore microRNA (miRNA) dysregulation and their putative target genes in JDM, aiming to uncover potential regulatory mechanisms underlying disease progression. Two publicly available datasets were analyzed: GSE221091, comprising whole blood transcriptomes from JDM patients and healthy controls, and GSE243339, consisting of muscle-derived donor myobundle samples. For this analysis, a subset of samples was selected, including 10 JDM patients and 10 controls from GSE221091, and all 8 JDM patients with 12 randomly chosen controls from GSE243339. Differentially expressed miRNAs were identified, and their predicted targets were retrieved using the miRDB database, with a stringent cutoff score of  $\geq 80$  to ensure robust predictions. In GSE221091, downregulated miRNAs such as hsa-miR-1267 (80 targets) and hsa-miR-762 (177 targets) were identified, along with upregulated miRNAs including hsa-miR-8075 (103 targets) and hsa-miR-5588-3p (48 targets). In contrast, GSE243339 revealed a single downregulated miRNA, hsa-miR-3652, with 160 predicted targets, while no upregulated miRNAs were observed. These findings highlight distinct patterns of miRNA dysregulation between systemic and localized tissue environments in JDM, underscoring their potential as regulatory biomarkers and therapeutic targets. Overall, this study emphasizes the importance of integrating transcriptomic and miRNA analyses to better understand immune-mediated mechanisms in JDM, potentially guiding future precision-based therapeutic strategies.

**Keywords:** Juvenile Dermatomyositis, miRNA dysregulation, Transcriptomic analysis

**Invited Lecture 12**

**From Single-Use Plastics to Circular Bioeconomy: The Role of  
Biotechnology and GEMs in Zero-Waste Packaging**

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**Abstract**

Plastic pollution from single-use plastics (SUPs) and excessive packaging has become a critical environmental threat, demanding biotechnology-driven solutions. Zero-waste retail models such as package-free stores, refill systems, and bulk purchasing are increasingly complemented by innovations in biopolymers, microbial degradation, and bio-based packaging. This study synthesizes current evidence, policy frameworks, and case studies while emphasizing the role of biotechnology in reducing plastic dependency. In India, a nationwide 19 SUP categories were ban effective from 1 July 2022, alongside Extended Producer Responsibility (EPR), with over 20,800 producers, importers, and brand owners registering in 2022–23 and obligations exceeding 3.71 million tonnes of plastic waste. These regulations are accelerating demand for biotechnological alternatives, including polyhydroxyalkanoates (PHAs), polylactic acid (PLA), and edible films derived from agricultural by-products. Recent advances in microbial biotechnology offer novel solutions. The *Ideonella sakaiensis*, strains secretes PETase and MHETase enzymes, which can biodegrade polyethylene terephthalate (PET). Moreover, genetically engineered microorganisms (GEMs), including engineered *E. coli* and *Pseudomonas* species, are being optimized for higher yields of PHAs and enhanced plastic-degrading enzyme activity. Synthetic biology approaches are further enabling the design of microbial consortia capable of converting plastic waste into bio-based chemicals and fuels, linking waste management with circular bioeconomy principles. Globally, the sustainable packaging market is expanding rapidly: India's zero-waste packaging sector alone was valued at USD 17.34 billion in 2024 and is projected to reach USD 43.69 billion by 2033, with a 10.9% CAGR. This review concludes that integrating zero-waste retail with biotechnology-based materials and GEM-enabled plastic biodegradation represents a promising pathway toward circular economies. Adoption at scale, supported by policy incentives, corporate responsibility, and consumer engagement, can substantially mitigate plastic pollution and foster long-term environmental resilience.

**Keywords:** Single-use plastics, PET, MHETase, PETase enzymes, GEMs, pollution,

**Invited Lecture 13**

**Artificial Intelligence-Driven Strategies for Microbial Bioremediation of Heavy Metals**

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**Abstract**

Heavy metal contamination has emerged as a major environmental and public health concern, with metals such as arsenic, mercury, cadmium, lead, chromium, and others exerting toxic effects on biological systems by displacing essential biogenic elements. Traditional detoxification strategies like chelation therapy, while effective, are often associated with adverse effects and fail to address contamination in soil and water systems. Microbial bioremediation has shown significant promise for the degradation and detoxification of heavy metals and other pollutants under laboratory conditions; however, its large-scale application is frequently limited by slow processing, high costs, and reduced efficiency. To overcome these challenges, advanced approaches such as systems biology, metabolic engineering, and synthetic biology are being harnessed to optimize microbial pathways for enhanced bioremediation. Moreover, high-throughput omics technologies—genomics, proteomics, metabolomics, and transcriptomics—offer powerful insights into the molecular mechanisms of metal tolerance and detoxification. Integration of these biological strategies with artificial intelligence (AI) and machine learning (ML) further enhances predictive modeling, process optimization, and the development of engineered microbial consortia with superior remediation capabilities. AI-driven biosensors and microbial bioreporter cells provide innovative avenues for real-time monitoring of environmental toxicity, exemplified by engineered bacteria for arsenic detection in groundwater. Collectively, the convergence of biotechnology, omics, and AI-based tools is paving the way for efficient, sustainable, and scalable heavy metal bioremediation strategies, with far-reaching implications for ecological restoration and public health protection.

**Keywords:** Bioremediation strategies High-throughput omics technologies, Genomics, Proteomics, Metabolomics, Transcriptomic

**Invited Lecture 14**

**Interaction of Mosquito Repellent Exposure and FcεR1β Genotype  
Aggravates Asthma via Th2 Immune Skewing in Children**

**Shivani Singh<sup>1\*</sup>, Vandana Tiwari<sup>1</sup>, Manish Raj Kulshrestha<sup>1</sup>, Shetanshu  
Srivastva<sup>2</sup>**

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Medical Sciences, Lucknow, India

**Abstract**

**Introduction:** Mosquito repellents containing chemicals such as metofluthrin, allethrin, transfluthrin, and imiprothrin (MATI) are commonly used in India to prevent vector-borne diseases. However, these chemicals may exacerbate asthma by inducing airway hyper-reactivity and promoting a Th2 immune response, influencing IgE and eosinophil/basophil activity, especially in children with FcεR1β variant genotypes.

**Aim:** This study aimed to measure MATI levels and investigate their association with FcεR1β (C/T) genetic variations and Th2-driven cytokine dysregulation to elucidate their contribution to immune dysregulation and asthma severity.

**Methods:** A case-control study was conducted with 253 children (130 asthmatic and 123 controls, aged 5–12 years). Leukocyte subsets were analyzed using a 5-part hematology analyzer. IgE and hs-CRP levels were measured by immunoturbidity. MATI levels were quantified by gas chromatography-mass spectrometry (GC-MS), and FcεR1β genotypes were assessed by PCR-RFLP. Cytokine levels (IL-4, IL-5, IL-13) were measured using ELISA. Asthma severity was quantified by forced expiratory volume.

**Results:** Asthmatic children had significantly higher leukocyte counts ( $9.12 \times 10^3/\mu\text{L}$  vs.  $5.06 \times 10^3/\mu\text{L}$ ,  $p < 0.0001$ ), eosinophil percentage (10.50% vs. 3.00%,  $p < 0.0001$ ), IgE (501.00 IU/mL vs. 78.57 IU/mL,  $p < 0.0001$ ), and hs-CRP levels (6.93 mg/L vs. 1.36 mg/L,  $p < 0.0001$ ). MATI levels were significantly elevated in asthmatic children for metofluthrin, allethrin, transfluthrin, and imiprothrin. IL-4, IL-5, and IL-13 were significantly higher in asthmatic children ( $p < 0.0001$ ). FcεR1β heterozygous (CT) and mutant (TT) genotypes were associated with higher asthma risk (1.76-fold and 2.39-fold, respectively). Positive correlations were observed between MATI levels and cytokines and leucocyte subsets ( $r = 0.22-0.81$ ).

**Conclusion:** Elevated MATI exposure correlates with increased Th2 cytokine production in asthmatic children, with FcεR1β genetic variants enhancing immune responses and contributing to asthma severity.

**Keywords:** Asthma, cytokines, FcεR1β, Mosquito repellents, eosinophils, IgE, children.

# *Flash Talks*

**FT01**

## **Effect of Butanol Isomeric Structure on the Density of Choline Chloride–glycerol Based Deep Eutectic Solvents**

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### **Abstract**

Deep eutectic solvents (DESs) have emerged as promising alternatives to conventional solvents owing to their tunable physicochemical properties, low toxicity, and biodegradability. Among them, choline chloride–glycerol(glyceline) based DESs have gained significant attention for their potential applications in separation processes, catalysis, and green chemistry. In this work, we systematically investigate the effect of butanol isomeric structure (1-butanol, 2-butanol, and 3-butanol) on the density of ChCl–glycerol DESs over the temperature range of 293.15–323.15 K at atmospheric pressure. The density values were measured with high precision using a vibrating-tube densimeter, and the influence of temperature and mole fraction of butanol on density was analyzed. The results reveal a clear dependence of density on the structural variations of butanol isomers: linear 1-butanol exhibited higher density values compared to branched counterparts, indicating stronger packing efficiency and intermolecular interactions with the DES matrix. Additionally, density decreased with increasing temperature, consistent with thermal expansion behavior. These findings highlight how alcohol isomerism modulates the microscopic interactions in DESs, thereby influencing their macroscopic properties. Such insights are crucial for tailoring DES-based systems for specific industrial and green chemistry applications.

**Keywords:** Deep eutectic solvents, Choline chloride, glycerol, Butanol isomers, Density, Thermophysical properties

FT02

## **Omics Approach to investigate the Viral community existing in the river Varuna in the Varanasi region of Uttar Pradesh**

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### **Abstract**

River Varuna a significant tributary of river Ganga and an important native river of Varanasi soon going to be endangered due to the extensive exploitation and anthropogenic activities. In the presented research study, the entire stretch of river Varuna was divided into four major domains (RV1, RV2, RV3 and RV4) to assess the viral diversity and functional analysis suggesting the overall quality of water at sampled locations. RV1 having highest species richness followed by RV2, RV3 and RV4 has lowest 1500 species. The identification of *Negarnaviricota* as the dominant phylum across all sites (RV1-RV4) with varying abundance patterns provides superior insights into viral community structure. This phylum's role in water quality maintenance represents a novel discovery in environmental virology. Discovery of *Yunchangviricetes* as a dominant class, particularly in RV1, alongside *Insthoviricetes* demonstrates diverse taxonomical profile. The detection of previously unreported viral classes highlights the study's contribution to viral taxonomy. Despite lowest diversity, RV4 exhibited maximum enzymatic activity (742 units), demonstrating superior functional analysis capabilities. This significant finding reveals that environmental stress can enhance metabolic activity, a novel insight in environmental genomics. The Varuna River genus level community analysis provides new information about the ecological implications and diversity. *Pakpunavirus* was the most prevalent genus identified at RV3 and RV4 sites. Significant ecological role and biotechnological applications were studied for the viruses identified in river Varuna like *Betabucolovirus*, *Choristoneura fumiferana granulovirus* considered to infect budworms that infect coniferous forest, playing an important role as biopesticide for timber and paper industries. *Tequatrovirus*, *Polybotosvirus* a viral species studied for its phage therapeutics and genetic engineering applications. The detection of Peptidylprolyl isomerase (E.C. 5.2.1.8) identified in all sampling sites of river Varuna in functional metagenomic analysis reveals integration, replication and virus induced tumorigenesis directly involved in SARS-CoV-2, Human Immunodeficiency virus and Hepatitis B viruses. All viral metabolism at higher units were studied in all sampled sites of river Varuna. Using Metagenomic sequencing and R package pipeline the entire study on river Varuna was accomplished aiming to set policy, regulations and guidelines with respect to United Nations Sustainable Development Goals (UNSDGs).

**Keywords:** Varuna, Viral Community, Metagenomics, Negarnaviricota, Functional Metagenomics, UNSDGs

FT03

## **Green Chemistry Approaches in The Synthesis of Next – Generation Antibiotics**

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### **Abstract**

Antimicrobial resistance (AMR) is a serious and growing health issue worldwide. It reduces the effectiveness of many current antibiotics and limits treatment options. This situation has created an urgent need for new antibiotics that work well and are made in a sustainable, environmentally friendly way. Traditional antibiotic production often uses harmful solvents, consumes a lot of energy, and produces significant chemical waste, which can harm the environment. Green chemistry offers solutions to produce antibiotics in a safer, cleaner, and more efficient manner. This study examines how green chemistry can be applied in making  $\beta$ -lactams, macrolides, tetracyclines, and oxazolidinones. It compares these green methods to traditional processes based on factors like the use of harmful solvents, energy consumption, atom economy, and overall yield. The results show that green synthesis techniques can reduce harmful solvent use by about 55%, cut energy consumption by up to 40%, improve atom economy by 25%, and increase product yield by 17 to 18%. Techniques such as microwave- and ultrasound-assisted synthesis, solvent-free reactions, and biocatalysis using renewable raw materials have proven to be effective. These methods lead to faster reactions, lower environmental impact, and better resource use, making production more sustainable. In addition to benefiting the environment, green chemistry also makes production more cost-effective, reducing expenses and enabling large-scale manufacturing of antibiotics. Overall, the findings highlight the great potential of green chemistry to transform how pharmaceuticals are made. By combining high efficiency with low ecological impact, green synthesis methods can support the sustainable production of next-generation antibiotics, providing a promising solution to address the growing issue of AMR globally.

**Keywords:** Green Chemistry, Antibiotic Synthesis, Sustainable Production, Solvent Reduction, Energy Efficiency, Atom Economy, Yield Improvement, Next-Generation Antibiotics.

**FT04**

## **Improving Liver Disease Detection Accuracy: A Study on Machine Learning Models with Real-World Healthcare Data**

**Ashish Vishvakarma<sup>1</sup> and Dr. Sandhya Dwivedi<sup>2</sup>**

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<sup>2</sup>Associate Professor, Department of Computer Science and Engineering, Asian International University, Manipur

### **Abstract**

Liver disease is a major global health challenge, with late diagnosis often resulting in severe complications and increased mortality rates. This study aims to improve the accuracy of liver disease detection by evaluating the performance of various machine learning models on a large, real-world clinical dataset. This work leverages real patient records to assess the robustness of machine learning (ML) algorithms in practical healthcare scenarios. Several supervised learning models work like Random Forest, Support Vector Machine, Logistic Regression, and Artificial Neural Networks. Data preprocessing, including normalization and feature selection, was applied to ensure model reliability and consistency. Performance metrics such as accuracy, precision, recall, F1 score, and ROC-AUC were used to compare model effectiveness. future work will focus on integrating temporal data, refining feature engineering techniques, and exploring deep learning approaches for future improvements.

**Keywords:** Machine Learning, clinical data, supervised learning, Random Forest, ROC-AUC

**FT05**

## **miRNA as a Therapeutic target for cervical cancer**

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### **Abstract**

Cervical cancer is the fourth most common cancer among women worldwide and remains a significant cause of mortality, especially in low- and middle-income countries. Although persistent infection with high-risk human papillomavirus (HPV) is the principal etiological factor, additional molecular events drive the transition from precancerous lesions to invasive carcinoma. Among these, microRNAs (miRNAs), a class of small non-coding RNAs that regulate gene expression post-transcriptionally, have emerged as pivotal players in cervical carcinogenesis. Dysregulated miRNAs contribute to tumor initiation and progression by modulating key cellular pathways involved in proliferation, apoptosis, epithelial mesenchymal transition, angiogenesis, and therapeutic resistance. Oncogenic miRNAs, such as miR-21 and miR-221/222, are commonly overexpressed in cervical cancer, leading to suppression of tumor suppressor genes including PTEN and p27Kip1. In contrast, tumor suppressor miRNAs such as miR-34a, miR-143, and miR-145 are frequently downregulated, resulting in unchecked oncogene activation and enhanced HPV-driven signalling. These dual roles underscore miRNAs as both diagnostic biomarkers and therapeutic targets. Therapeutic strategies focus on two major approaches: restoration of downregulated tumor suppressor miRNAs via synthetic mimics or viral vectors, and inhibition of oncogenic miRNAs using antagomirs, locked nucleic acid (LNA) inhibitors, or miRNA sponges. Recent advances in nanotechnology, exosome-based carriers, and chemically modified oligonucleotides have improved delivery efficiency and stability, addressing major translational hurdles. Although clinical application is still limited, preclinical studies demonstrate that miRNA modulation can inhibit tumor growth, sensitize cervical cancer cells to chemo-radiotherapy, and overcome resistance. Integration of miRNA therapeutics with existing treatment regimens holds promise for developing personalized and durable therapeutic strategies. Continued investigation into delivery platforms, safety, and patient-specific miRNA profiling will be critical to advance these approaches toward clinical use.

**Keywords:** Cervical cancer, microRNA, therapeutic target, HPV, miRNA mimics, antagomirs, nano delivery, personalized medicine.

**FT06**

## **Synthesis and Characterization of SiO<sub>2</sub> Nanoparticles by Green Method and Their Structural and Optical Properties**

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### **Abstract**

The synthesis of eco-friendly and cost-effective nanoparticles has received much attention in the recent past. This paper has prepared silica (SiO<sub>2</sub>) nanoparticles using aqueous extract of *Momordica dioica* (spiny gourd) fruit as a stabilizing and reducing agent. Flavonoids, alkaloids, and phenolic compounds that are phytochemical constituents of *M. dioica* serve as natural capping molecules that control the nucleation and stabilisation of the nanoparticles. The process is a green synthesis method that does not use any toxic chemicals; hence, it is sustainable and biocompatible. The produced SiO<sub>2</sub> nanoparticles were thoroughly characterised in physicochemical terms. The formation of the nanoparticles was confirmed by UV-Visible spectroscopy, as there was a distinct absorption peak in the ultraviolet region. Fourier Transform Infrared Spectroscopy (FTIR) was used to identify the functional groups of phytochemical capping agents, and these groups were found in the surface modification and stability. The synthesized SiO<sub>2</sub> was mainly amorphous, as X-ray Diffraction (XRD) patterns found it. SEM images showed a morphology of spherical to quasi-spherical. In addition, the purity of the material by its elemental constituents was determined using Energy Dispersive X-ray Spectroscopy (EDX). The paper emphasises that *M. dioica* fruit extract is an effective biological template for producing stable SiO<sub>2</sub> nanoparticles. This is an alternative promising approach to nanoparticle production on a large scale using a green synthetic route that could be used in biomedicine, catalysis, and the remediation of the environment. The results highlight the importance of the plant-mediated synthesis as a green approach in nanotechnology.

**Keywords:** SiO<sub>2</sub> nanoparticles; green synthesis; *Momordica dioica*; phytochemicals; characterization

**FT07**

## **AI-Driven Biogenic Synthesis of Nanoparticles: Towards Sustainable Nanotechnology**

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### **Abstract**

The combination of artificial intelligence(AI) with biogenic synthesis of nanoparticles is the most emerging approach for sustainable nanotechnology. As biogenic materials provide an eco-friendly, cost effective route for the synthesis of nanoparticles but often leads to inconsistent morphology, size and yield. Here, AI plays crucial role by predictive modeling, artificial neural networks and optimization across the synthesis process. The machine learning algorithm can be used to analyze datasets of precursor temperature, pH, concentration, and solvents to predict the optimal reaction parameters for synthesizing the nanoparticles with the desired characteristics. AI-driven image recognition when combined with the spectroscopy data, it enhances the real time characterization and enables the accurate prediction of nanoparticles morphology, size distribution, stability and crystallinity. Additionally, the deep learning framework of AI can help in designing the biogenic synthesis protocols by corresponding to plant phytochemical profiles with their capping, stabilizing and reducing efficiency, results in reducing the experimental trial and error. AI-driven nanoparticles have significant potential in various application including biomedical, environmental and energy applications. The synergy of principles of green chemistry with AI-driven predictive intelligence offers scalability, reproducibility and alignment with sustainable development goals. Thus, this work outlines a sustainable approach in designing and optimizing the comprehensive framework for AI-driven biogenic synthesis of nanoparticles.

**Keywords:** Biogenic synthesis, green synthesis, artificial intelligence, sustainable, nanoparticles, nanotechnology

**FT08**

## **Forecasting Decline in Clients in The Telecom Industry with Machine Learning Methods**

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### **Abstract**

In the telecommunication industry, a massive generation of data is done on a day-to-day basis by a huge number of customer base. Here, acquiring a new customer base would be more expensive than retaining the existing customers where churn is the activity of customers shifting from one firm to another within a particular specified time frame. Telecom analysts and managers are discovering reasons why customers leave subscriptions and behavior activities of the holding churn customers' data. The system utilizes classification methodology to determine the leave subscriptions and accumulates reasons behind the leave subscription of customers in the telecommunication sector. The key objective of this system is to examine the diversified machine learning algorithms which are needed to make customer churn prediction models and detect churn reasons to provide them with retention plans and strategies. Leave subscriptions in this system gathers customers' information by using classification algorithms like Random Forest (RF), machine learning algorithms like KNN and decision tree Classifier. It provides an effective business model that studies customer churn information and provides precise forecasts about churn customers to ensure that business management can act during the churn time to prevent churn as well as loss of profit. System attains 99 % accuracy with the use of the random forest classifier for churn predictions; the classifier matrix has attained a precision of 99 % with a recall rate of 99 % and an overall received accuracy of 99.09 %. Similarly, our research study enhances churn prediction, extend other business domains, and give prediction models to retain their current customers customer service, and prevent churn effectively.

**FT09**

## **Sustainable Mental Health Care Delivery: AI as a Supportive Tool**

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### **Abstract**

**Introduction:** Mental health disorders represent a significant global burden, with an estimated 1 in 8 people affected worldwide (WHO, 2023). Limited availability of trained professionals, high treatment costs, and stigma continue to restrict access to timely and effective care, particularly in low- and middle-income countries. Innovations such as artificial intelligence (AI) driven chatbots, predictive analytics, and tele-psychiatry have shown promise in addressing treatment gaps by supporting clinicians and enhancing patient engagement. Evidence suggests that AI-based tools can improve diagnostic accuracy by up to 20%, reduce appointment no-show rates by 15%, and facilitate remote monitoring, making mental health care more accessible and sustainable. A systematic evaluation of AI's role in advancing sustainable mental health care delivery is therefore warranted.

**Objectives:** This study aims to evaluate the effectiveness of AI applications in mental health care delivery, with a focus on sustainability, accessibility, and patient outcomes.

**Methodology:** A comprehensive literature search was conducted across PubMed, Scopus, and PsycINFO for studies published between 2010 and 2024. Inclusion criteria targeted peer-reviewed studies assessing the impact of AI-based interventions such as digital therapy platforms, clinical decision support systems, and predictive analytics on mental health outcomes. Data extraction followed PRISMA guidelines, and the quality of included studies was evaluated using the Cochrane Risk of Bias Tool. A narrative synthesis was conducted, and where feasible, meta-analysis was performed using a random-effects model.

**Results:** Out of 30 screened articles, 18 studies met the inclusion criteria, representing diverse populations across high- and low-resource settings. AI-driven interventions demonstrated improvements in early diagnosis and symptom monitoring, with reductions in depression and anxiety symptom scores by 10–25%. Chatbot-based therapy and tele-psychiatry platforms enhanced treatment adherence, lowering dropout rates by 18%. Additionally, predictive analytics supported clinicians in identifying high-risk patients, reducing psychiatric hospital readmissions by 12%. However, challenges included limited generalizability, concerns about data privacy, and varying levels of digital literacy among patients.

**Conclusion:** Artificial intelligence has significant potential to support sustainable mental health care delivery by improving accessibility, efficiency, and patient engagement. While AI can enhance clinical outcomes and reduce system burdens, ethical considerations and equitable access must remain central to implementation. Sustainable integration of AI into mental health care requires a multidisciplinary approach, investment in digital infrastructure, and ongoing evaluation of long-term effectiveness and cost-efficiency.

**Keywords:** Artificial Intelligence, Mental Health, Sustainability, Digital Psychiatry, Patient Outcomes, Healthcare Delivery

FT10

## **Serum Vitamin A, Iron, Zinc, and Copper Levels as Predictors of Anemia Severity in Pregnant Women**

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**\*Presenting author**

### **Abstract**

**Background:** Anemia is a common health problem during pregnancy, and nutritional deficiencies during pregnancy are associated with adverse maternal and fetal outcomes, with various factors influencing its occurrence which significantly impacting maternal and fetal health.

**Objective:** This study aims to investigate the complete blood count and nutritional status, including iron, zinc, copper, and vitamin A in anemic and non-anemic pregnant women.

**Materials and Methods:** The study involved 200 participants, out of which 121 anemic pregnant and 79 non-anemic pregnant women. The severity of anemia among the participants was classified according to WHO guidelines. The iron, zinc, and copper were estimated using ICPMS and Vitamin A was estimated using LCMS/MS.

**Results:** The Hb and TLC were significantly reduced in anemic pregnant women than non-anemic ( $p < 0.05$ ). The iron ( $53.35 \pm 30.85$  vs.  $63.40 \pm 36.04$ ;  $p = 0.036$ ), zinc ( $898.95 \pm 755.78$  vs.  $578.23 \pm 507.44$ ;  $p = 0.006$ ), copper ( $397.92 \pm 205.34$  vs.  $1056.56 \pm 833.86$ ;  $p = 0.002$ ), and vitamin A ( $506.24 \pm 223.42$  vs.  $662.52 \pm 220.15$  pg/mL;  $p = 0.0001$ ) were significantly reduced in anemic women as compare to non-anemic women. Among the anemic severity, the severe anemic women had lower levels of vitamin A, iron, zinc, and copper than moderate and mild ( $p < 0.05$ ). The Hb was also positively correlated with iron ( $r = 0.38$ ;  $p = 0.001$ ), zinc ( $r = 0.32$ ;  $p < 0.0001$ ), and copper ( $r = 0.27$ ;  $p < 0.0001$ ), and vitamin A ( $r = 0.29$ ;  $p = 0.019$ ).

**Conclusion:** Anemia severity was correlated with reduced levels of iron, zinc, copper, and vitamin A. These findings provide valuable insights into the nutritional status of pregnant women and also highlight that during pregnancy, nutritional deficiency needs to be addressed by targeted interventions.

**Keywords:** Pregnancy, Anemia, ICPMS, LCMS/MS, Vitamin A, Copper, Zinc

**FT11**

## **Perception of School Students towards using Mobile Applications in Enhancing English Language**

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### **Abstract**

Due to technological advancements, the entire teaching and learning environment has changed significantly. After COVID -19 the younger generation at worldwide is using a wide range of educational applications on Mobile and Computers. These Apps are generating a lot of interest among students who want to study independently and at their own pace. These applications can be utilised as Supplementary tools to help students learn effectively and develop their learning skills specially in English language skills also. The current study investigates how school Students perceive the use of mobile applications to improve their English language skills at their own pace and promoting and utilising individualised learning with these Mobile Applications for English language learning. The main objective of the research was to examine the perception of school students towards the use English language learning mobile applications to enhance the English language. The present study was qualitative in nature A semi structured interview was conducted with 30 school students who were taught English with some Mobile Applications specially designed for learning various components of English Language. The data was analysed using Thematic analysis. The themes were reviewed and reported upon following the analysis. The findings of the study revealed that majority of the students had enjoyed learning English language specially while practising speaking and reading. Most of them had positive attitude towards the use of mobile applications. However, very few students were hesitant and feeling shy to respond to the use of mobile apps. which posed as challenge.

**Keywords:** Mobile Applications, Language Skills, Perception, School students

**FT12**

## **Social and Mental Development Challenges Facing School-Aged Children in Himachal Pradesh**

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### **Abstract**

Psychological, educational, and socio-environmental elements are progressively influencing the social and mental development of school-aged children in Himachal Pradesh. Even though the state has a comparatively high reading rate, new research has shown alarming tendencies in children's behavior, peer interactions, emotional health, and learning outcomes.

According to a government assessment on adolescent health, 6.9% of young people in the state exhibit symptoms of depression, while 15.5% of them suffer from anxiety. Addiction to mobile phones (about 19.6%), exposure to violence (8.2%), and substance misuse are all contributing issues. It is concerning to note that around 30% of teenagers aged 13 to 17 have abused substances, including illegal and over-the-counter drugs. Poor access to mental health resources exacerbates these problems; in rural regions, understanding of emotional wellbeing is still low, and only a small percentage of schools provide psychological treatment.

Socially, a lot of kids deal with bullying, exclusion from their peers, and a lack of inclusive teaching methods. Inadequate teacher preparation exists, and only 30% of schools are set up to serve students with special needs. Children in isolated areas like Chamba and Lahaul-Spiti also encounter physical and infrastructure obstacles, such as hazardous routes to school during the monsoon season.

Development is further hampered by educational obstacles. Basic literacy and numeracy abilities are a problem for a large percentage of kids in government schools. Lack of participation, low motivation, and absenteeism are prevalent, particularly in rural areas with little resources.

**Keywords:** Social, Mental, Children, Emotional and Development.

FT13

## **Artificial Intelligence in Agrometeorology: Enhancing Agro-Advisory Services for Farmers**

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### **Abstract**

Frequent extreme weather events, resource scarcity, and climatic variability are all posing growing threats to global agriculture. Although agro meteorological advisories have long offered important weather-based updates, their conventional methods are sometimes inaccurate and delayed. Artificial Intelligence (AI) is now changing this environment by allowing farmers to receive data-driven, site-specific, and real-time decision support. Agrometeorological systems driven by AI integrate IoT-based microclimate sensors, satellite and drone imagery, and advanced machine learning algorithms to generate real-time advice. Precision agrometeorology platforms that integrate AI and IoT can increase water-use efficiency by 20–25% and decrease agricultural losses caused by weather by up to 30% (Kumari *et al.*, 2025). Similarly, early detection of pest and disease outbreaks is made easier by convolution neural networks (CNNs) applied to remote sensing and imaging data, which reduces the need for pesticides by 20–30% (Javaid *et al.*, 2022). According to Meghwanshi (2024), yield forecasting models that integrate AI and remote sensing have shown error reductions of 5–10%, improving predicted accuracy when compared to conventional methods.

Additionally, by optimizing the use of inputs like water, fertilizer, and agrochemicals and offering farmers local recommendations through SMS platforms and mobile applications, these innovations support sustainability and climate resilience. Persistent obstacles to wider adoption, however, include low digital literacy among smallholders, interoperability problems among data platforms, connectivity constraints in rural areas, and expensive deployment costs. To overcome these obstacles, inclusive policies, reasonably priced digital infrastructure, and focused capacity-building programs are needed. AI-powered agrometeorology represents a paradigm change in agriculture toward farmer-centric and climate-smart methods. Artificial intelligence (AI) can significantly enhance agro-advisory services by fusing real-time environmental monitoring with predictive analytics to support climate change resilience and sustainable output.

**Keywords:** Artificial Intelligence, Agrometeorology, Agro-Advisory Services, IoT

FT14

## **AI-Driven Digital Compensation and Employee Motivation in Healthcare: The Mediating Role of Perceived Fairness**

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### **Abstract**

#### **Purpose**

Amidst the global shift toward digitalization and AI-driven sustainability, the transformation of Human Resource (HR) practices plays a pivotal role in shaping employee experience. This study explores how AI-enabled digital compensation systems influence employee motivation in private healthcare organizations, with a focus on the mediating role of perceived fairness.

#### **Design/methodology/approach**

Adopting a quantitative research approach, data were collected from 149 employees working in hospitals, clinics, and diagnostic centers. Structured questionnaires captured perceptions of digital compensation practices, fairness, and motivation. The data were analyzed through regression and mediation models using SPSS and JASP.

#### **Findings**

Results indicate a significant positive relationship between digital compensation practices and employee motivation. Perceived fairness partially mediates this relationship, underscoring that the effectiveness of AI-driven digital tools in enhancing motivation is contingent on employees' sense of fairness and equity.

#### **Research limitations/implications**

The findings are limited to private healthcare settings and self-reported measures. Future research should extend to public sector institutions and conduct cross-industry comparisons to assess broader implications of AI-driven HR practices for sustainable workforce engagement.

#### **Originality/value**

This study contributes to the growing discourse on sustainable digital transformation by highlighting how fairness perception shapes the motivational outcomes of AI-driven compensation systems. It emphasizes the need for human-centered AI adoption in HR to balance technological efficiency with employee well-being.

**Keywords:** AI in HR, Digital Compensation, Sustainability, Employee Motivation, Perceived Fairness, Healthcare Management

FT15

## **In vitro cellulase, Invertase, Xylanase and $\beta$ -glucosidase activity of Termite Mound Soil**

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### **Abstract**

Termite mound soil represents a unique and biologically enriched microenvironment with high microbial activity, particularly in the degradation of complex plant biomaterials. This study investigates the enzymatic activity of cellulase, xylanase, invertase, and  $\beta$ -glucosidase in termite mound soil, with the aim of evaluating its potential for biotechnological applications. Quantitative enzyme assays revealed significant activity levels, indicating the presence of diverse and active microbial communities capable of degrading cellulose, hemicellulose, and disaccharides. High cellulase and  $\beta$ -glucosidase activity suggest efficient cellulose decomposition, while xylanase activity points to effective hemicellulose breakdown. Invertase activity further supports the presence of sucrose-utilizing microbes. These findings highlight termite mound soil as a promising natural source of hydrolytic enzymes, which could be harnessed for biomass conversion, composting, and other industrial processes. The study underscores the ecological importance of termite-associated microbial consortia in organic matter recycling and their potential for enzyme-based applications.

**Keywords:** Termite mound soil, cellulase, xylanase, invertase,  $\beta$ -glucosidase, microbial enzymes, lignocellulose degradation, biomass conversion.

FT16

## **Advanced Cybersecurity through Machine Learning: Cyber Risk Identification, Mitigation, and Management**

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### **Abstract**

In the current digital era, cyber threats are growing rapidly in both complexity and scale, making cybersecurity a critical concern for individuals, organizations, and governments alike. Traditional security measures, such as signature-based antivirus solutions and rule-driven intrusion detection systems, often struggle to keep up with the constantly evolving threat landscape. This study investigates the application of machine learning techniques to enhance cybersecurity, with a focus on cyber risk identification, mitigation, and management. The research begins by providing an overview of machine learning principles and their relevance to modern cybersecurity frameworks. It then explores a range of machine learning approaches, including deep learning, anomaly detection, and signature-based methods, evaluating their effectiveness in detecting and countering cyber threats. By leveraging these intelligent techniques, cybersecurity systems can identify unusual patterns of activity, anticipate potential risks, minimize damage from attacks, and adapt proactively to emerging threats. Additionally, machine learning enables predictive analytics, which supports more informed decision-making and faster response to incidents. The study highlights that integrating machine learning into cybersecurity strategies not only improves threat recognition and response but also strengthens the resilience, adaptability, and overall security posture of digital infrastructures. Ultimately, the research emphasizes that machine learning-driven cybersecurity is essential for managing modern cyber risks, offering organizations the tools to protect sensitive data, maintain operational continuity, and respond effectively to the dynamic and sophisticated nature of contemporary cyber threats.

**Keywords:** Cybersecurity, Malware Classification, Intrusion Detection, Botnet Detection, Machine Learning, Deep Learning

# *Oral Presentations*

OP01

## **Hormonal Homeostasis Meets Artificial Cognition: Architecting the Future of Precision Endocrinology**

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### **Abstract**

Artificial Intelligence (AI) is redefining the contours of modern medicine, and its convergence with endocrinology signals a profound shift in diagnostic precision, therapeutic personalization, and systemic understanding of hormonal dynamics. Recent advancements in deep neural networks, generative algorithms, and reinforcement learning are enabling unparalleled insights into endocrine disorders. These models, trained on vast multimodal datasets-including continuous glucose monitoring, hormonal panels, genomics, and electronic health records-are capable of detecting subclinical patterns, forecasting disease trajectories, and optimizing treatment regimens with unprecedented accuracy. Endocrine pathologies such as diabetes, thyroid dysfunction, adrenal disorders, and polycystic ovary syndrome are now being reevaluated through algorithmically enhanced lenses. Key emphasis is placed on the integration of federated learning and edge computing to facilitate decentralized, privacy-preserving AI model training across global medical infrastructures. Natural language processing is being harnessed to extract diagnostic value from unstructured clinical narratives, while explainable AI frameworks aim to ensure interpretability and transparency in decision-making processes, a critical factor in clinical adoption. Further emphasis is placed on the deployment of explainable AI (XAI) techniques-such as SHAP values, attention heatmaps, and concept bottleneck models-to bolster clinical interpretability and trust. The future of endocrinology is envisioned as a hybrid paradigm, where intelligent systems augment clinical acumen rather than replace it, enabling endocrinologists to deliver anticipatory, adaptive, and highly individualized care. By illuminating the endocrine system through the prism of machine intelligence, the paper offers a compelling blueprint for how AI can decode, demystify, and ultimately transform one of the body's most intricate regulatory networks. This narrative also explores cutting-edge innovations in AI and their transformative implications within the field of endocrinology, where data-driven inference intersects with the biological complexity of the human endocrine system.

OP02

## **Multi Neural / Non-Neural Style Transfer: A Deep Learning Approach for Multi-Style Image Blending**

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### **Abstract**

Neural style transfer (NST) combines the content of one image with the artistic style of another, creating visually striking results. Traditional NST, however, is limited to applying a single style, which restricts creative flexibility. This paper introduces a Multi Neural Style Transfer (MNST) framework that seamlessly blends multiple artistic styles into a single content image, offering enhanced creative control. By leveraging a pre-trained VGG-19 model for feature extraction, the proposed method utilizes Gram matrix-based style representations and custom designed loss functions to balance content preservation and style integration. An innovative edge-aware blending technique further refines the output quality, ensuring sharp content boundaries and vibrant style application. The framework was evaluated using Structural Similarity Index (SSIM), Mean Squared Error (MSE), and Gradient Magnitude Similarity Deviation (GMSD) metrics, alongside computational efficiency benchmarks. Results demonstrate that the MNST framework produces high-quality outputs with clear content preservation and rich stylistic details, achieving near real-time performance on medium-resolution images (1280×720) using GPU acceleration. Comparative analysis with traditional methods, including histogram matching, highlights the superiority of the modified MNST approach in both visual quality and structural accuracy. Despite challenges with high-resolution processing and memory usage, the framework's flexibility and user-controlled style weights make it highly suitable for real-time applications in digital art, media production, and augmented reality. This work paves the way for future advancements in dynamic style blending and interactive creative tools, offering a robust solution for multi-style artistic expression.

OP03

## **Predictive Modelling of Fracture Behaviour in Plastic Deformation**

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### **Abstract**

Fracture prediction in plastic deformation processes is a critical challenge in modern manufacturing and material science, as it directly influences product quality, structural reliability, and production efficiency. This study focuses on the development of a predictive modeling framework to analyze fracture behaviour under plastic deformation conditions. The research integrates principles of fracture mechanics, continuum plasticity, and computational modeling to establish reliable criteria for fracture initiation and propagation. Numerical simulations, coupled with experimental validation, are employed to investigate the influence of stress states, strain localization, and microstructural factors on material failure. The predictive model aims to identify critical conditions—such as stress triaxiality, strain rate, and temperature—that govern the onset of fracture in metals during forming and machining operations. Advanced constitutive models are applied to capture the non-linear response of materials under complex loading paths. The results demonstrate that the proposed framework not only enhances the accuracy of fracture prediction but also provides valuable insights into failure mechanisms at both macroscopic and microscopic levels. Such predictive capability has significant implications for the optimization of forming processes, reduction of defects, and improvement of material design strategies. The study concludes that predictive modeling of fracture behaviour can serve as a powerful tool for designing safer, more efficient, and sustainable manufacturing systems.

**Keywords:** fracture prediction, plastic deformation, predictive modeling, fracture mechanics, stress triaxiality, strain localization, computational modeling, material failure.

OP04

## **Computer-Aided Biopharmaceutical Characterization**

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### **Abstract**

The integration of computer-aided tools into biopharmaceutical characterization has revolutionized the early stages of drug development, offering rapid, cost-effective, and reliable predictions of drug performance. Biopharmaceutical characterization involves the assessment of critical parameters such as solubility, permeability, stability, dissolution behavior, and absorption, which directly influence a drug's bioavailability and therapeutic efficacy. Traditionally, these studies have relied heavily on experimental methods, which are time-consuming, resource-intensive, and often require large quantities of drug substance. Computer-aided approaches, including in silico modeling, molecular docking, molecular dynamics simulations, quantitative structure–activity relationship (QSAR) models, and physiologically based pharmacokinetic (PBPK) modeling, provide a powerful alternative. These tools enable the prediction of physicochemical properties, drug–membrane interactions, and absorption kinetics under various physiological conditions. In particular, in silico dissolution models and a virtual screening of drug candidates have demonstrated significant potential in forecasting oral absorption profiles and establishing in vitro–in vivo correlations (IVIVC). The Biopharmaceutics Classification System (BCS) further benefits from computational methods by allowing a virtual categorization of compounds based on solubility and permeability, thereby guiding formulation strategies. Moreover, machine learning and artificial intelligence are increasingly being applied to analyze large datasets, refine predictive accuracy, and accelerate decision-making in preclinical stages.

By reducing experimental workload and providing mechanistic insights, computer-aided biopharmaceutical characterization supports the rational design of dosage forms, minimizes attrition rates in clinical development, and enhances regulatory compliance. Overall, the adoption of these technologies bridges the gap between theoretical predictions and experimental validation, establishing a more efficient and predictive framework for modern drug development.

**Keywords:** Biopharmaceutical characterization, in silico modeling, PBPK, IVIVC, BCS, drug development

OP05

## **AI in Multi-Model Medical imaging: Towards Personalized Healthcare**

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### **Abstract**

Artificial Intelligence (AI) is rapidly transforming multi-modal medical imaging, ushering in a new era of personalized healthcare. By leveraging sophisticated machine learning and deep learning techniques, AI can analyze and integrate information from various imaging methods—such as MRI, CT, PET, and ultrasound—to provide more comprehensive and precise insights than traditional diagnostic approaches. These capabilities support accurate image segmentation, automated disease identification, and real-time visualization, which lead to earlier, more reliable diagnoses and optimized, patient-specific treatment plans.

The integration of AI across different imaging platforms not only streamlines diagnostic processes but also strengthens predictive analytics, enabling clinicians to monitor disease progression or therapy responses with exceptional precision. By linking imaging data with genetic, molecular, and clinical information, AI further personalizes treatment recommendations and enhances patient outcomes. Innovations such as image-guided procedures, explainable AI models, and federated learning are advancing both the accuracy and transparency of clinical decision-making.

However, challenges like data interoperability, ethical concerns, and privacy protection still need to be addressed. Continued collaboration among engineers, healthcare professionals, and policymakers is critical to fully realize AI's potential and reduce disparities in healthcare access. With ongoing research and development, AI-powered multi-modal imaging is set to revolutionize personalized medicine through precise diagnostics, proactive monitoring, and patient-centered care. Beyond technical and ethical issues, practical obstacles include resistance to change among healthcare professionals, gaps in digital literacy, and the ongoing cost of maintaining robust computational infrastructure. Finally, regulatory and legal uncertainties such as defining responsibility in the event of AI-related diagnostic errors pose barriers to widespread adoption and safe clinical use.

Addressing these challenges requires multi-disciplinary collaboration, clear ethical and privacy frameworks, ongoing clinician training, and continuous system evaluation to ensure AI enhances, rather than hinders, patient care.

**Keywords:** Artificial Intelligence, Multi-Modal Imaging, Machine Learning, Medical Imaging, Personalized Healthcare, Deep Learning, Predictive Analytics, Diagnostics, Interoperability, Data Privacy.

OP06

## **Travelling Salesman Problem using 2-RNN with CUDA**

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### **Abstract**

Travelling Salesman Problem (TSP) is one of the NP- hardest combinatorial optimization problems. The k-Repetitive-Nearest-Neighbor (k-RNN) heuristic was previously introduced as a variation of the famous Nearest Neighbor algorithm, regarding which the experimental findings indicated that the 2-RNN algorithm performs adequately in terms of the quality of the found solution. We present a new CUDA-parallel version of 2-RNN that takes full advantage of GPU massive parallelism to make it possible to drastically increase speed in the case of large TSP instances. We introduce the background of 2-RNN algorithm, our own architecture based on CUDA and the integration of the algorithm with TSPLIB benchmark dataset. The work builds on the implementations of prior versions of K-RNN with the objective to ensure the scalability of the heuristics to both real-time and large-scale implementation of TSP. Preliminary results and implementation strategies are outlined, with further evaluation underway using standard benchmarks.

OP07

## **Wireless Charging of Electric Vehicles: A Hybrid-Compensated Photovoltaic Approach to Sustainable Transportation**

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### **Abstract**

One important component of environmentally friendly electric vehicles is wireless charging devices that use solar electricity. The future of electric vehicle (EV) charging using wireless power transfer (WPT) seems bright, but there are still issues with alignment and optimizing efficiency. But traditional Maximum Power Point Tracking (MPPT) causes power fluctuations and compromises system reliability. To enhance WPT performance when misalignment is present, hybrid compensated WPT systems have been suggested in studies. In most cases, compensating topologies cannot keep load power and power transfer efficiency at their ideal levels under variable operating circumstances. This study introduces a Hybrid Compensation Network Optimized Wireless Charging System that incorporates a solar PV source and a controller for optimal efficiency and power point tracking to improve power quality. The suggested system is capable of operating in both Constant Current (CC) and Constant Voltage (CV) modes, guaranteeing efficient and reliable charging regardless of the load. Various coupling points, load circumstances, CC and CV conditions are simulated using MATLAB/Simulink to assess the system's performance.

**Keywords:** Electric Vehicle (EV), Wireless power transfer (WPT), Constant current (CC), Constant voltage (CV), MPPT.

OP08

## **CRISPR-Integrated Biosensors and AI for Environmental Surveillance of Antimicrobial Resistance**

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### **Abstract**

Antimicrobial resistance (AMR) has rapidly evolved into one of the most pressing sustainability challenges of our time, spreading far beyond hospitals into natural and agricultural environments. Rivers, wastewater systems, and farmlands increasingly serve as hotspots for resistant genes, enabling their circulation in ecosystems long before they are detected in clinical settings. Conventional monitoring systems are slow, centralized, and unable to capture these early signals, leaving critical blind spots in our fight against resistance. Overcoming this limitation calls for approaches that merge precise molecular tools with intelligent, data-driven technologies capable of translating raw detection into actionable insights.

Here proposed is an integrated approach that combines the specificity of CRISPR-based biosensors with the analytical power of artificial intelligence. Programmable CRISPR–Cas enzymes, including Cas12 and Cas13 that can be tailored to recognize resistance genes such as blaNDM, mcr-1, and vanA. When paired with portable biosensing platforms whether paper-based strips, electrochemical devices, or fluorescence readouts these systems are capable of generating rapid, on-site results even from complex samples like soil or sewage, bypassing the need for laboratory infrastructure. Artificial intelligence enhances this framework by automating signal interpretation, forecasting resistance hotspots through machine learning, and creating geospatial maps that connect individual detections into a larger, real-time surveillance network.

By equipping field workers, public health professionals, and environmental monitoring teams with such accessible tools, this strategy shifts the paradigm from reactive detection to predictive prevention. The synergy between CRISPR technology, AI-driven analytics, and sustainability-focused monitoring provides not only a diagnostic solution but also a transformative pathway to anticipate, track, and mitigate antimicrobial resistance before it escalates into a global crisis.

**Keywords:** Antimicrobial Resistance, CRISPR-Cas, Biosensors, Artificial Intelligence, Environmental Surveillance, Sustainable Healthcare

OP09

## **Widespread Challenges in Rabies Control in India**

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### **Abstract**

In our country, cases of rabies in humans and animals due to dog bites are increasing very rapidly. The outbreak of this rabies is increasing very rapidly in most of the metros cities and most of the urban areas of the country. Most of the Grater Municipal Corporations/Municipal Corporations/Nagar Mahapalikas and Nagar Panchayats of the country are proving unsuccessful in controlling such rabies. There are no suitable resources to control rabies in the Grater Municipal Corporations/Municipal Corporations/Nagar Mahapalikas and Nagar Panchayats located in most of the metros and cities of the country. There are many challenges in controlling rabies on a large scale in our country under the Animal Birth Control (ABC) Rules 2023. The ABC Rules 2023 in the country are being administered by the Animal Welfare Board of India (AWBI) Government of India. In India, Animal Birth Control (ABC) Center is also being recognized by (AWBI) to Grater Municipal Corporations/Municipal Corporation and Animal Welfare Organization (AWO). ABC Center has been established in every grater municipal corporation/municipal corporation and animal welfare organization of the country. And there is adequate arrangement for OT Light, OT Table, CCTV Camera, Air Conditioner, Freezer, Stretcher, Dog Kennel, Veterinary Surgeon, Dog Catcher, Animal Handler etc. The same institute is being recognized as ABC Center by the AWBI, Government of India. This type of process takes years to complete, and thus controlling rabies in India is a very challenging task. ABC Center has been established in PFA Institute of Research Prayagraj in the year 2022. But due to the very slow attitude of the Animal Welfare Board of India (AWBI) the Animal Birth Control (ABC) Center has still not been able to operate.

**Keywords:** Dog Kennel, Veterinary, Dog Catcher, Animal Birth Control Center

OP10

## **Cloning, Recombinant Expression, and Preliminary Characterization of a Thermostable Glyceraldehyde-3-Phosphate Phosphatase from *Pyrococcus furiosus***

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### **Abstract**

This study presents the cloning, expression, and preliminary characterization of Glyceraldehyde-3-Phosphate Phosphatase (GPP-Pf) from the hyperthermophilic archaeon *Pyrococcus furiosus*. Utilizing molecular cloning techniques, we successfully amplified the GPP-Pf gene and integrated it into the pST50Trc1 expression vector for optimized recombinant protein expression. Following purification via Ni-IDA affinity chromatography and gel permeation chromatography, we obtained a homogenous enzyme in a monomeric form, consistent with its theoretical molecular weight. Biophysical characterization through Circular Dichroism spectroscopy revealed a mixed  $\alpha/\beta$  secondary structure, while thermal stability studies indicated irreversible unfolding at 87.6°C, affirming the enzyme's thermostability. Protein crystallization efforts yielded diffraction-quality crystals, which were analyzed at the INDUS-2 synchrotron facility, achieving a resolution of 1.6 Å. To gain insights into the protein's three-dimensional configuration, Ab Initio Modelling using AlphaFold3 was employed, highlighting key interactions with a magnesium ion ( $Mg^{2+}$ ) and identifying critical active site residues, including Asp-8, Asp-141, Asp-166, Asp-171, and Thr-12. Future work will focus on refining the protein structure from X-ray diffraction data and conducting enzymatic characterization, substrate screening, and mutation analysis to further elucidate the functional roles of active site residues. This study establishes a solid foundation for understanding the stability, structure, and function of GPP-Pf, paving the way for future research.

OP11

## **Sustainable Bioremediation of Pharmaceutical Residues by *Chlorella* Species.**

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### **Abstract**

The increasing contamination of aquatic ecosystems with antibiotics, pharmaceuticals, and heavy metals demands innovative and sustainable remediation strategies. Among microalgae *Chlorella* species, particularly *Chlorella vulgaris*, offer a versatile solution by efficiently removing nutrients and pollutants from wastewater through mechanisms such as adsorption, bioaccumulation, and enzymatic degradation, while producing biomass rich in bioactive compounds. Beyond pigments such as chlorophylls and carotenoids, the accumulated biomass can be valorized for applications in animal feed, biofuel production, and other high-value bioproducts, contributing to circular bioeconomy frameworks. Advances in omics technologies, including genomics and transcriptomics, have illuminated the metabolic pathways responsible for pollutant uptake and bioproduct synthesis, while genetic engineering holds potential to enhance growth, stress tolerance, and product yield. Cultivation parameters, including light, pH, and nutrient availability, critically influence both remediation efficiency and biomass composition. By combining environmental remediation with the production of valuable bioproducts, *Chlorella* species, especially *C. vulgaris*, serve as a cost-effective and eco-friendly strategy with strong potential for industrial-scale biorefinery and resource recovery.

**Keywords:** Microalgae, Bioremediation, *Chlorella vulgaris*, Pharmaceuticals, Wastewater treatment

OP12

## **Integrative Multi-Omics and Bioinformatics for Personalized Cosmetic Interventions in Skin and Hair Health**

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### **Abstract**

The integration of bioinformatics and cosmetology is revolutionizing our comprehension of skin, hair, and their associated microbiomes. Recent advancements in high-throughput sequencing, multi-omics profiling, and computational modeling have facilitated the identification of molecular markers related to skin aging, pigmentation, elasticity, and oxidative stress responses. Proteomic and metabolomic analyses enhance our understanding of the biochemical impacts of cosmetic actives, such as plant-derived polyphenols, peptides, and antioxidants. Furthermore, microbiome sequencing has illuminated the significant roles of both commensal and pathogenic microorganisms in various skin conditions, including acne and atopic dermatitis, with specific functional pathways like lipase activity and porphyrin biosynthesis influencing skin health and cosmetic effectiveness. The use of integrative bioinformatics platforms allows for a comprehensive exploration of host-microbe interactions and molecular responses to cosmetic applications. Machine learning and network biology methodologies contribute to the development of predictive models assessing ingredient safety, efficacy, and personalized responses. Case studies, including transcriptomic analyses of photoaged skin and metabolomic profiling of antioxidant compounds, illustrate the promise of multi-omics approaches in discovering new cosmetic targets and biomarkers. This review evaluates current computational tools and methodologies in cosmetology, highlighting bioinformatics translational potential to create evidence-based, personalized skincare and haircare products. By addressing the opportunities and challenges in data integration, predictive modeling, and functional interpretation, this paper emphasizes the pivotal role of bioinformatics in advancing precision cosmetology and personalized dermatological treatments.

OP13

## **Advancing Patient Care through Precision Medicine: Integrating Genomics, Data Analytics, and Personalized Therapeutics**

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### **Abstract**

Precision medicine is transforming healthcare by shifting from a one-size-fits-all approach to individualized treatment strategies based on genetic, environmental, and lifestyle factors. This paradigm leverages advances in genomics, bioinformatics, and molecular diagnostics to enable tailored interventions that improve patient outcomes and reduce adverse effects. The integration of multi-omics data (genomics, transcriptomics, proteomics) with clinical phenotypes allows for a comprehensive understanding of disease mechanisms, risk stratification, and therapeutic responsiveness.

Recent innovations in next-generation sequencing (NGS), artificial intelligence (AI), and big data analytics have significantly accelerated the implementation of precision medicine in oncology, rare diseases, pharmacogenomics, and chronic conditions such as diabetes and cardiovascular disorders. For instance, targeted therapies based on tumor-specific mutations have improved survival rates in cancer patients, while pharmacogenomic profiling is guiding drug selection and dosing to minimize toxicity and enhance efficacy.

However, challenges remain in clinical translation, data standardization, ethical considerations, and ensuring equitable access across diverse populations. Interdisciplinary collaboration between clinicians, researchers, data scientists, and policymakers is essential to address these gaps and build sustainable precision medicine frameworks.

This presentation will highlight key developments, real-world applications, and future directions in precision medicine, with a focus on its impact on clinical decision-making and health system efficiency. By embracing a data-driven, patient-centric model, precision medicine holds the promise of more proactive, predictive, and preventive healthcare.

**Keywords:** Precision medicine, genomics, personalized therapeutics, bioinformatics, pharmacogenomics, data analytics, artificial intelligence, targeted therapy, clinical decision-making, patient-centered care.

OP14

## **Exploring the potential of membrane proteins in the regulatory mechanism of Human sperm metabolism: Prospective drug targets**

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### **Abstract**

In the intricate landscape of human reproduction, membrane proteins stand as pivotal orchestrators, governing the multifaceted journey of sperm cells towards successful fertilization. This review delves into the integral role of membrane proteins in sperm function, emphasizing their significance in regulating critical processes such as motility, capacitation, acrosome reaction, and fertilization. These proteins, embedded in the sperm's plasma membrane, serve as gatekeepers bridging the intracellular and extracellular environments. Notably, Catsper and bicarbonate channels emerge as key players in regulating sperm motility and capacitation, while protein tyrosine kinases and voltage-dependent anion channels contribute to the orchestration of these intricate processes. The review navigates through the nuanced functions of these membrane proteins, shedding light on their indispensable role in the reproductive narrative. With a focus on understanding the mechanisms that underlie successful fertilization, this exploration sets the stage for future research directions in the dynamic realm of membrane proteins in sperm and their implications for fertility and reproductive health.

OP15

## **Artificial Intelligence in Drug Discovery: Transforming the Future of Therapeutic**

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### **Abstract**

The application of artificial intelligence(AI) in medicine, particularly through machine learning (ML), marked a significant progression in drug discovery. AI acts as a powerful catalyst in narrowing the gap between disease understanding and the identification of potential; therapeutic agents. This review provide an inclusive summary of the latest advancements in AI and its application in drug discovery. We examine the various stages of the drug discovery process, starting from disease identification and encompassing diagnosis, target identification, screening and lead discovery. AI capability to analyse extensive datasets and discern patterns is essential in these stages, enhancing predictions and efficiency in disease identification, drug discovery and clinical trail management. The role of AI in expediting drug development is emphasized, highlighting its potential to analyse vast data volumes, thus reducing the time and costs associated with new drug market introduction. The importance of data quality, algorithm training, and ethical considering these factors, AI promises to transform drug development, offering significant benefits to patients and society.

Recent advancements highlight AI's role in repurposing existing drugs for emerging diseases, a strategy that significantly shortens development timelines. Moreover, predictive modeling of toxicity, safety, and efficacy helps in early risk assessment, thereby improving clinical trial outcomes. Despite these advantages, challenges remain, including data quality,interpretability of AI models, and ethical concerns related to patient data usage.

Overall, AI is revolutionizing drug discovery by bridging the gap between computational predictions and experimental validation. Its integration into pharmaceutical research pipelines has the potential to drastically reduce development costs, shorten drug discovery cycles, and accelerate the delivery of novel therapeutics to patients. As AI technologies continue to evolve, their synergistic application with experimental biology promises a paradigm shift toward more efficient, precise, and patient-centric drug discovery.

Artificial Intelligence (AI) has emerged as a transformative technology in the field of drug discovery, addressing challenges of high cost, prolonged timelines, and low success rates traditionally associated with conventional approaches.

OP16

## **Unraveling the Microbial diversity of Human Health: Shaping Physiology and Disease**

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### **Abstract**

The human microbiome, a consortium of microorganisms such as bacteria and fungi, constitutes a dynamic ecosystem fundamental to host physiology and survival. Far from a passive collection, this "microbial mosaic" features distinct communities specialized to ecological niches like the gastrointestinal tract, skin, oral cavity, respiratory and urogenital tract. These microbes actively interact with host tissues to modulate critical functions, including digestion, nutrient absorption, immune regulation and defense against pathogens. They also influence neurocognitive health via the gut-brain axis through the production of bioactive metabolites like short-chain fatty acids and neurotransmitters. Disruption of this microbial equilibrium, or dysbiosis, is increasingly implicated in the pathophysiology of numerous disorders, encompassing inflammatory bowel disease, obesity, diabetes, cancer and mental health conditions. While high-throughput sequencing and metagenomics have revolutionized our understanding of microbial diversity and function, significant challenges remain. Key obstacles include vast inter-individual variability, the unculturability of many taxa, the dynamic impacts of diet and antibiotics, and the difficulty of distinguishing causation from correlation. Nevertheless, microbiome research heralds transformative possibilities for medicine. Emerging strategies, from probiotics and prebiotics to fecal microbiota transplantation and microbiome-derived bioengineering, illustrate the profound therapeutic potential of modulating microbial networks to restore balance, laying the groundwork for the future of precision interventions and personalized preventive health.

**Keywords:** Human Microbiome, Host-Microbe Interactions, Gut Microbiota, Personalized Medicine

OP17

## **Latent Infections at the Intersection of Pathogen Survival and Chronic Disease**

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### **Abstract**

Latent infections represent a hidden yet transformative dimension of human health. Unlike acute infections, which provoke immediate symptoms or clearance, many microbes adopt dormancy as a survival strategy, persisting silently within host cells for years. This state of latency is far from benign—it allows pathogens to evade immune surveillance and re-emerge during periods of stress, immunosuppression, or aging, often driving chronic illness and long-term health complications.

The global impact is striking. *Mycobacterium tuberculosis* persists in nearly one-quarter of the world's population, while hepatitis viruses, herpesviruses, and human papillomavirus remain leading causes of liver disease, cancers, and immune dysfunction. Even persistent colonizers like *Helicobacter pylori* demonstrate how microbial endurance can shape disease trajectories, underscoring the continuum between silent persistence and overt pathology.

At the molecular level, latency involves complex mechanisms such as immune evasion, episomal maintenance, and metabolic dormancy—an intricate interplay between host defense and microbial resilience. Yet this resilience creates diagnostic blind spots and therapeutic challenges: current medicines rarely achieve full eradication, and dormant reservoirs often remain undetected.

Recent advances in computational biology, omics technologies, and biomarker discovery are beginning to illuminate these hidden infections, reframing them not as peripheral anomalies but as central drivers of chronic disease. Recognizing the biology of dormancy is therefore essential for developing predictive diagnostics, preventive strategies, and precision therapies. Latent infections compel us to rethink health as a dynamic balance with persistent microbial companions, whose silent presence profoundly shapes global disease burdens.

**Keywords:** Pathogens, Chronic infection, Hidden infection, Dormant infection

OP18

## **Socio-legal appraisal of matrimonial disputes and judicial redressal frameworks in the State of Haryana**

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### **Abstract**

This research paper delivers an exhaustive socio-legal appraisal of matrimonial disputes and judicial redressal frameworks in the State of Haryana, inclusive of its joint capital, Chandigarh, over a quinquennial span from 2020 to 2024. Leveraging secondary datasets from the National Judicial Data Grid (NJDG), National Crime Records Bureau (NCRB), and allied authoritative repositories, the study delineates emergent trends across five principal domains of matrimonial litigation—dissolution of marriage, dowry-prohibition violations, domestic violence, spousal maintenance, and custodial adjudication of minors.

By systematically interrogating data from all 22 districts of Haryana alongside Chandigarh, the research illuminates pronounced regional asymmetries in filing-to-disposal ratios, underscores chronic pendency bottlenecks, and maps the evolving typologies of gendered discord within marital constructs. The temporal disruptions precipitated by the COVID-19 pandemic and its post-crisis ripple effects are meticulously contextualized, revealing anomalous surges and contractions in litigation volumes during the assessment window.

The inquiry rigorously evaluates the operational efficacy of family courts, state legal services authorities, and institutional mediation mechanisms, foregrounding the imperatives of expedited adjudication, psychosocial rehabilitation, and jurisprudential approaches steeped in gender equity. Empirical findings indicate pockets of procedural optimisation in certain jurisdictions, juxtaposed against systemic inertia and infrastructural deficits in others.

The study culminates in a set of surgically targeted policy directives aimed at fortifying the institutional architecture of matrimonial dispute resolution. It further advocates for transformative socio-cultural interventions to address the latent structural determinants precipitating marital disintegration in the region.

OP19

## **Membrane Proteins-Based Therapeutics in Immune and Metabolic Crosstalk**

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### **Abstract**

Membrane proteins have great potential in regulating immune responses and metabolism, particularly in the context of inflammatory diseases. These may include receptors, transporters, and ion channels, with crucial roles in immune cell signalling, metabolic regulation, and inflammation. These proteins are integral to processes like antigen presentation, immune activation, and cytokine production. In recent years, researchers have uncovered the significant involvement of these membrane proteins in immunometabolism, the intersection of immune function and cellular metabolism. Dysregulation in these pathways can contribute to chronic inflammatory diseases like autoimmune disorders, cancer, and metabolic conditions such as diabetes. Nanoparticle therapeutics offer a promising avenue for targeting these membrane proteins more precisely. By using nanoparticles as drug delivery systems, researchers can enhance the specificity and efficacy of therapies aimed at modulating immune responses or restoring metabolic balance. This approach is particularly useful in inflammatory diseases, where selective targeting of membrane proteins could reduce side effects and improve treatment outcomes.

**Keywords:** Immunometabolism, Membrane Proteins, Inflammatory Diseases, Nanoparticle Therapeutics, Immune Regulation



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