

## **REPORT OF THE CONIAPS -XXXI**

The 31st International Conference of the International Academy of Physical Sciences (CONIAPS XXXI) on Emerging Trends in Physical Sciences was organized by the School of Studies in Chemistry and the School of Studies in Physics and Astrophysics, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, during December 20-21, 2024. The conference was sponsored by the DST Purse Grant, Pt. Ravishankar Shukla University, Anusandhan National Research Foundation, New Delhi, Defence Research and Development Organization (DRDO), New Delhi, Council of Scientific and Industrial Research (CSIR), New Delhi, and Pt. Ravishankar Shukla University, Raipur. Over 430 participants from India and abroad attended the conference.

The Honourable Governor of Chhattisgarh, Sri Ramen Deka, was the Chief Guest at the Inaugural Function. In his inaugural address, the Governor of Chhattisgarh praised the interdisciplinary approach of the conference and emphasized that science can solve many of the country's problems. He also discussed the National Education Policy (NEP-2020) and its comprehensive vision for transforming India's education ecosystem. He stressed the importance of research, innovation, and technology for fostering a culture of inquiry and promoting scientific excellence, citing examples of scientific discoveries from ancient India.

The Vice Chancellor of Central University of Haryana, Mahendragarh, Prof. Tankeswar Kumar, graced the occasion as the keynote speaker. Prof. H. S. Dhami, former Vice-Chancellor of Kumaun University, Nainital and President of IAPS and Prof. P. K. Bajpai, Vice Chancellor of Jai Prakash University, Chapra, were the Guests of Honour. The inaugural session was presided over by the Vice Chancellor of Pt. Ravishankar Shukla University, Raipur, Prof. Sachchidanand Shukla.

The conference was inaugurated with the lighting of traditional lamps by the Chief Guest and other dignitaries, followed by the welcome address by Prof. Kallol Kumar Ghosh, Convener of the conference. Prof. Ghosh extended a warm welcome to the delegates and briefly discussed the aims and objectives of the conference. Prof. Sachchidanand Shukla briefed the participants about the research initiatives undertaken by the University. He informed that the conference had participants from 18 states of India, including Haryana, Rajasthan, Manipur, Madhya Pradesh, Uttar Pradesh, Bihar, Odisha, Uttarakhand, Chhattisgarh, Delhi, Telangana, Himachal Pradesh, Karnataka, Tamil Nadu, West Bengal, Jharkhand, Gujarat, etc. Additionally, invited speakers from Malaysia, Australia, the UK, and the USA were also present. He highlighted that a conference of this nature provides a platform to exchange ideas for the promotion of science and technology for the betterment of society.

Prof. H. S. Dhami, President of the International Academy of Physical Sciences (IAPS), gave a brief introduction about the activities of the Academy, including the young scientist awards, memorial lectures, and fellowships conferred for the promotion of research and innovation.

The entire inaugural program was conducted by Dr. Bhanushree Gupta and Dr. Smita Sharma. At the end of the session, Dr. Shailendra Patel, Registrar, proposed the formal vote

of thanks. During the inaugural session, the Abstract Book of CONIAPS XXXI was released. The Honourable Governor also officially inaugurated the Central Analytical Laboratory of the DST Purse Project and the Section 8 company of the University.

After the inaugural program, Prof. Tankeswar Kumar delivered a keynote address entitled **“Research and Innovation: Catalyst for Viksit Bharat.”** A special lecture was delivered by Prof. P. K. Bajpai on **“Need for Including Indian Knowledge Systems for Multidisciplinary, Holistic, and Flexible Higher Education.”**

Separate sessions were held for Physics, Mathematics, Chemistry, Computer Science, and Bioinformatics. A large number of postgraduate students, research scholars, members of the faculty, scientists from various institutes, and executive members of IAPS attended the program and appreciated the deliberations. Other members of the Organizing committee like Prof. Nameeta Brahme ( Convener), **Prof. Balwant Singh Thakur** ( Convener) , Prof. Sanjay Kumar ( Convener), Prof. Manas Kanti Deb ( Co-convener) , Prof. D.P. Bisen ( Co Convener), Prof. Kavita Thakur ( Co convener), Prof. Kamlesh Shrivastava ( Organizing Secretary), Dr. Manmohan Lal Satnami ( Organizing Secretary), Dr. Yugal K Mahipal ( Organizing Secretary), Dr. Indrapal Karbhal ( Jt. Secretary), Dr. Banushree Gupta ( Jt. Secretary) and Chitrakant Belodiya ( Jt. Secretary) were also graced the occasion.

The technical sessions followed the inaugural session and the main keynote lecture. The conference was structured to foster discussion between participants. A colourful cultural program was organized by the students which showcase heritage and culture of Chhattisgarh.

The report of the three parallel technical sessions are as follows:

## **[A] Physics Session**

The Physics session held at the School of Studies in Physics and Astrophysics included **memorial lectures, invited talks, and oral presentations** by esteemed academicians, researchers, and young scientists covering a wide spectrum of Physical Science topics.

### **Highlights of the Physics Session**

#### **Day 1: December 20, 2024**

- **Session II: Memorial Lectures (Chairperson: Prof. P. K. Bajpai)**
  - **Professor O. N. Shrivastava Memorial Lecture** delivered by **Prof. P. C. Pandey** (IIT BHU) on the topic “Study of doped SrMoO<sub>4</sub> Phosphors for Luminescence thermometry and Lighting applications.”.
- **Session III: Invited Talk (Chairperson: Prof. Jagjeet Kaur Saluja)**
  - **Prof. Ramesh T Subramaniam** (University of Malaya, Kuala Lumpur) on " Next-Generation Polymer Electrolytes and Electrodes: Powering Tomorrow's Energy Devices."

- Dr. Krishna Manaswi Digumarti (Queensland University of Technology, Brisbane, Australia) on “Exploiting electrostatics for soft robotics”.
- **Session III (Parallel): Young Scientist**
  - 10 participants presented their research work for the Young Scientist award.
- **Session IV: Invited Talk and Oral Presentation (Chairperson: Dr. G. Nag Bhargavi)**
  - **Prof. S.J Dhoble** (RTM Nagpur University, Nagpur) on “Rare earth free Cr activated phosphors for night vision lamp and challenges”.
  - **Dr. Amit Ramesh Bansod** (RTM Nagpur University, Nagpur) on “Application of Ferrites in various fields”.
  - 05 Oral Presentation were given by the participants.

## **Day 2: December 21, 2024**

- **Session I: Invited Talks and Oral Presentations (Chairperson: Prof. Kavita Thakur)**
  - **Prof. P.K. Bajpai** (Vice Chancellor, Jai Prakash Vishwavidyalaya, Chapra) on “Accelerators as tools for developing Science & Technology: Bringing societal change through Ion Beams”.
  - 02 Oral Presentation were given by the participants.
- **Session I (Parallel) : Invited Talks and Oral Presentations (Chairperson: Dr. Ravi Sharma)**
  - **Prof. Abhay M. Varade** (RTM Nagpur University, Nagpur) on “Geological and Thermoluminescence studies of Gypsum, Calcite and Bivalves Samples using High Radiation Dose Dosimetry”.
  - 03 Oral Presentation were given by the participants.
- **Session II: Invited Talks and Oral Presentations (Chairperson: Prof. R. C. Agrawal, Prof. R. K. Pandey)**
  - **Prof. S. K Pandey** (Formar VC, Pt. RSU Raipur) on “A Physicist’s View of The Universe”
  - **Dr. G. Nag Bhargavi (ITT)** “Effect of rare-earth substitution on the structural and dielectric properties of Barium Zirconium Titanate ceramics”.
  - 12 Oral Presentation were given by the participants.
- **Session II(Parallel): Invited Talks and Oral Presentations (Chairperson: Prof. R. N. Baghel, Dr. B. G. Sharma)**

- **Dr. Tapas Ranjan Sahoo** (KIIT, Bhubaneswar, Odisha) on “Nanoceria, a redox active nanoparticle: Its Environmental and Biomedical applications”
- **Dr. Siteshwari Chandrakar** (ITT) “Up-conversion Luminescence Mechanism and Its Applications”.
- 11 Oral Presentation were given by the participants.
- **Session III: Oral Presentations (Chairperson: Prof. Ragini Pandey)**
  - 06 Oral Presentation were given by the participants.
- **Session II(Parallel): Oral Presentations (Chairperson: Dr. B. R. Verma, Dr. Shubra Mishra)**
  - 06 oral presentations were held in this parallel session.

In summary, one memorial lecture, eight invited talks, ten young scientist award presentations, and forty-five oral presentations were conducted. The Unique feature of this CONIAPS 31st is innovative Poster Presentations by M. Sc. Students. Under the stream of Physics 24 Poster Presentation were done by students. The outcomes of this conference are multifaceted, ranging from scientific discoveries and technological innovations to fostering international collaboration and setting research agendas. Such events play a crucial role in pushing the boundaries of materials science and translating fundamental research into practical, impactful solutions across various industries.

## **[B] Mathematical Sciences Session**

The Mathematical Sciences session held at the School of Studies in Mathematics included **Memorial Lectures**, **Invited Talks**, and **Oral Presentations** by esteemed academicians, researchers, and young scientists covering a wide spectrum of mathematical topics.

### **Highlights of the Mathematical Sciences Session**

#### **Day 1: December 20, 2024**

- **Session II: Memorial Lectures**
  - **Prof. T. Pati Memorial Lecture** by **Prof. H. S. Dhimi**(President IAPS) on "The Role of Mathematics in the 21st Century."
  - **Prof. H. P. Dixit Memorial Lecture** by **Prof. Avanish Kumar**(Bundelkhand University, Jhansi) on "Distributed System: Dynamic Load Distribution Policy for Optimal Assignment."



- **Prof. P. R. Sharma Memorial Lecture** by **Prof. Kalpna Sharma**(Manipal University Jaipur, Jaipur) on "Enhanced Heat Transfer in Casson Hybrid Nanofluid Between Parallel Plates under Magnetic Field, Radiation, and Joule Heating."
- **Session III: Invited Talk presented by**
  - **Prof. Pradyumn Kumar Sahoo**(Birla Institute of Technology and Science-Pilani, Hyderabad) on "Gravastar in the Framework of Symmetric Teleparallel Gravity."
- **Session III: Young Scientist and Oral Presentations**
  - Seven participants presented their research work for the Young Scientist award.
  - There were six oral presentations in this session.

## **Day 2: December 21, 2024**

- **Session I: Invited Talks presented by**
  - **Prof. M.K.Sharma** (Guru Jambheshwar University of Science & Technology, Hisar) on "Flow Characteristics of some non-Newtonian Fluid Flow".
  - **Prof. S. K. Tiwari** (K.S.Saket P.G.College, Ayodhya) on "Certain Fundamental Transformations in Finsler Space."
  - **Prof. Binayak S. Choudhury**(Indian Institute of Engineering Science and Technology, Shibpur) on "New Trends in Metric Fixed Point Theory."
  - **Prof. Chayan Kumar Mishra** (Dr. R. M. L. Avadh University, Ayodhya) on "Study of some connection with - Shen's square-metric".
  - **Prof. M.M. Tripathi** (BHU, Varanasi) on "Wintgen inequality for Kulkarni-Nomizu tensor fields and its applications".
  - **Prof. Ratnesh Kumar Mishra** (National Institute of Technology, Jamshedpur) on "Finitely generated free abelian groups".
  - **Prof. D. R. Sahu** (BHU, Varanasi) "Self-Adaptive Accelerated Iterative Techniques for Split Feasibility Problems: Theory and Applications."
  - **Prof. Shruti** (U.P. Rajarshi Tandon Open University, Prayagraj) on "Statistics and Sustainable Development Goals".
  - **Prof. V. Lokesh** (Vijayanagara Sri Krishnadevaraya University, Ballari) on "Exploring the Integration of Topological indices with Machine learning for Enhanced molecular property Prediction".
  - **Prof. Yumnam Rohen Singh** (Manipur University, Canchipur, Imphal) on "Fixed Point On Generalizations Of Metric Space And Applications".
- **Session II: Oral Presentations**

- 17 oral presentations were held in three parallel sessions.

In summary, three memorial lectures, eleven invited talks, seven young scientist award presentations, and twenty-three oral presentations were conducted. The Mathematical Sciences section of CONIAPS XXXI showcased innovative research and discussions on contemporary mathematical theories and applications. The event provided a platform for experts and budding researchers to collaborate, share insights, and explore emerging trends in mathematics. The success of the conference highlighted the commitment of the mathematical community to addressing global challenges through research and innovation.

## **[C] Chemical Sciences / Computer Science/ Bioinformatics Sessions**

The Chemistry, Computer Sciences, Biochemistry, Pharmaceuticals and Bioinformatics sessions were held at the School of Studies in Chemistry, where included **Invited Talks and Oral Presentations** by esteemed academicians, researchers, and young scientists covering a wide spectrum of topics. At the end of the presentation, speakers were felicitated with the certificates by the chair-person of the session.

### **( I) Highlights of the Chemical Sciences Session**

**Day 1: December 20, 2024**

#### **Session II: Invited Lectures and Young Scientist Award Presentations**

- **Prof. S. N. Upadhyay** delivered a lecture on “Curcumin-loaded Nanofibrous Dressing for Rapid and Scarless Wound Healing”. (ONLINE)
- **Prof. Nitin Chattopadhyaya** (Jadavpur University, Kolkata) delivered a lecture on “Development of Potential Strategies from Simple Ideas”.
- **Prof. Tarasankar Pal** (Former Professor Department of Chemistry, IIT Kharagpur) delivered a lecture on “Liquid-Liquid Interface A Platform For Porous Nanostructures of Gold And Palladium”.
- Four participants presented their research work for the Young Scientist award.

### **Session III: Special Session on DST-PURSE PROJECT and Oral Presentations**

- **Prof. Shankar G. Aggarwal** (CSIR NPL, New Delhi) delivered a lecture on “Atmospheric Gases and Particle Chemistry in Real Scenarios”. (ONLINE)
- **Dr. Anil K. Shrivastava** (Former NMRL, Ambarnath, DRDO) on “Current Trends in Environmental Management of Submarines”.
- There were sixteen oral presentations in this session.

**Day 2: December 21, 2024**

#### **Session I: Invited Lectures by**

- **Prof. Puru Jena** (Virginia Commonwealth University, USA) on “Superatoms as Superior Catalyst”. (ONLINE)
- **Dr. Biswarup Chakraborty** (IIT Delhi) on “Recognizing the Oxygen Evolution Reaction Pathway on  $\text{SnFe}_2\text{O}_4$  Electrocatalyst”.
- **Dr. Surendra Singh Bisht** (FRI Dehradun) on “Exploring Phytochemical Diversity of MAPs Using Cutting-Edge Analytical Tools for Bioactive Compound Profiling”. (ONLINE)
- **Dr. Kishore Kumar Krishnani** (Indian Institute of Agricultural Biotechnology, Ranchi) on “Occurrence and remediation of Contaminants of emerging concern with major emphasis on microplastics and nanomaterials”.
- **Prof. Anjali Pal** (Former Professor IIT Kharagpur) on “Metal catalyst on admicellar support for nitrophenol reduction”.
- **Prof. Gautam Kumar Patra** (Guru Ghasidas University, Bilaspur) on “Anion Sensing: Challenges and Opportunities”.
- There were twelve oral presentations in this session.

#### **Session III: Oral Presentations**

- There were six oral presentations in this session.

**SPECIAL POSTER SESSION FOR M. Sc. STUDENTS**

## **(II) Highlights of the Computer Sciences Session**

**Day 2: December 21, 2024**

### **Session II: Invited Lectures**

- **Dr. Neeraj Rathore** (IGNTU, Amarkantak) delivered a lecture on “AI in Action: Revolutionizing the Modern World”.

### **Session III: Invited Lectures and Oral Presentations**

- **Dr. Pramod Gaur** (Nottingham Trent University, Nottingham, United Kingdom) delivered a lecture on “A Brain-Computer Interface”. (ONLINE)
- There were eleven oral presentations in this session.

## **(III) Highlights of the Biochemistry, Pharmaceutical and Applied Sciences Session**

**Day 1: December 20, 2024**

### **Session II: Invited Lectures**

**Prof. Basant K. Tiwary** (Pondicherry University) delivered a lecture on “Machine Learning in Clinical Diagnosis”.

**Day 2: December 21, 2024**

### **Session II: Invited Lectures and Oral Presentations**

**Prof. Dwijendra Kumar Gupta** (Central University of Allahabad) delivered lecture on “LYSOSOMAL STORAGE DISEASES: Possible Use of Nanophosphor-Nanogold coated Immunoconjugates in Affinity purification of Lysosomal Transport Vesicles”.

**Dr. Vijay Tripathi** (Sam Higginbottom University of Agriculture, Technology & Sciences ) delivered lecture on “Remedies for Contaminants in wastewater by Moringa oliefera and Azadiarchta indica Biochars: Cost-effective, sustainable and Eco-friendly approach”. (ONLINE)

- There were eight oral presentations in this session.

## **VALEDICTORY SESSION & PRIZE DISTRIBUTION**

The Valedictory Session of CONIAPS XXX-I was held on December 21, 2024, at 5:30 PM in the Sir C.V. Raman Hall of the Science Block. All the conveners briefly presented their reports, and some participants shared their feedback on the event. Prof. H.S. Dhami, President of IAPS, and Prof. P.K. Bajpai, an executive member of IAPS, expressed their appreciation for the grand success of the conference. They applauded the dedication and contribution of the student volunteers. The concluding speech was delivered by the Vice-Chancellor, Prof. Sachchidanand Shukla. The Vote of Thanks was extended by Prof. C.K. Mishra and Dr. Manmohan Lal Satnami.

The valedictory function concluded with the prize distribution ceremony, where winners of the poster and young scientist paper presentations were honoured.

## **YOUNG SCIENTIST AWARD**

- 1. Physics:** Mr. Chitrakant Belodhiya & Ms. Kanchan Tiwari, Pt. Ravishankar Shukla University, Raipur.
- 2. Chemistry:** Ms. Ankita Beena Kujur, Pt. Ravishankar Shukla University, Raipur.
- 3. Mathematics:** Ms. Ayushi Sao, Pt. Ravishankar Shukla University, Raipur.

# GLIMPSES OF CONIAPS XXXI

## Inauguration











## Keynote Address, Prof. Tankeswar Kumar



## Special Lecture, Prof. P. K. Bajpai





## Invited Lectures and YSA & Oral Presentations (Physics)





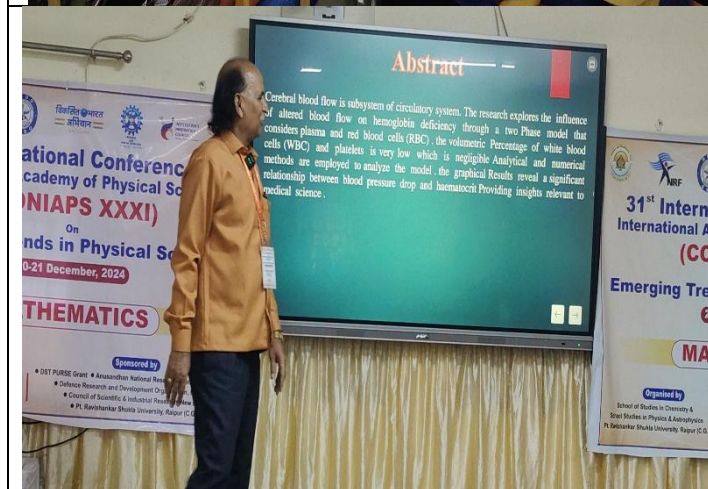








# Invited Lectures and YSA & Oral Presentations (Mathematics)







## Invited Lectures and YSA & Oral Presentations (Chemistry)





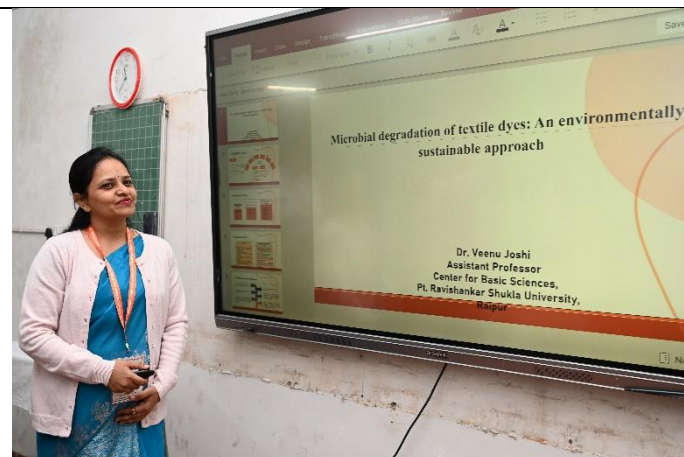




## Special Session on DST PURSE (Environmental Chemistry) and Oral Presentations







## Cultural Program



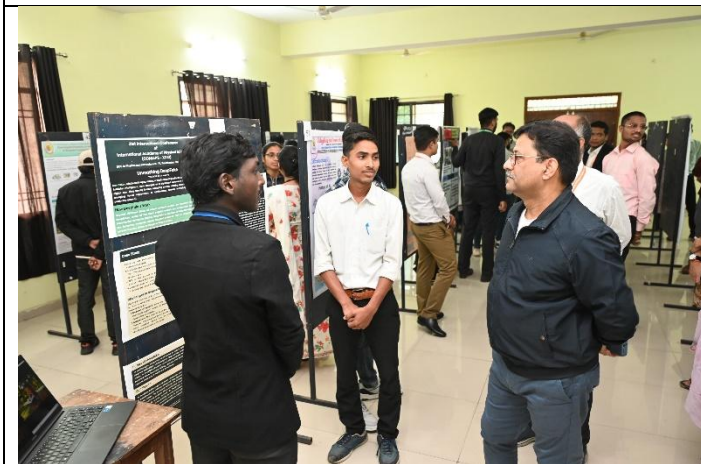








## Poster Competition for M.Sc. Students & Visit of DST-PURSE Lab







## Valedictory Session & Prize Distribution











Convener