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R&D Newsletter

Quarterly Newsletter of the Office of the Dean (R&D), IIT(ISM) Dhanbad

Vol. 8, January-March, 2026



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Dear Reader,

This issue of "*R&D Newsletter*" is to showcase our excellence in academic and research activities. With our ever expanding academic network and research base, we are able to show our strength as an Institute of National Importance.



Dean (R&D)

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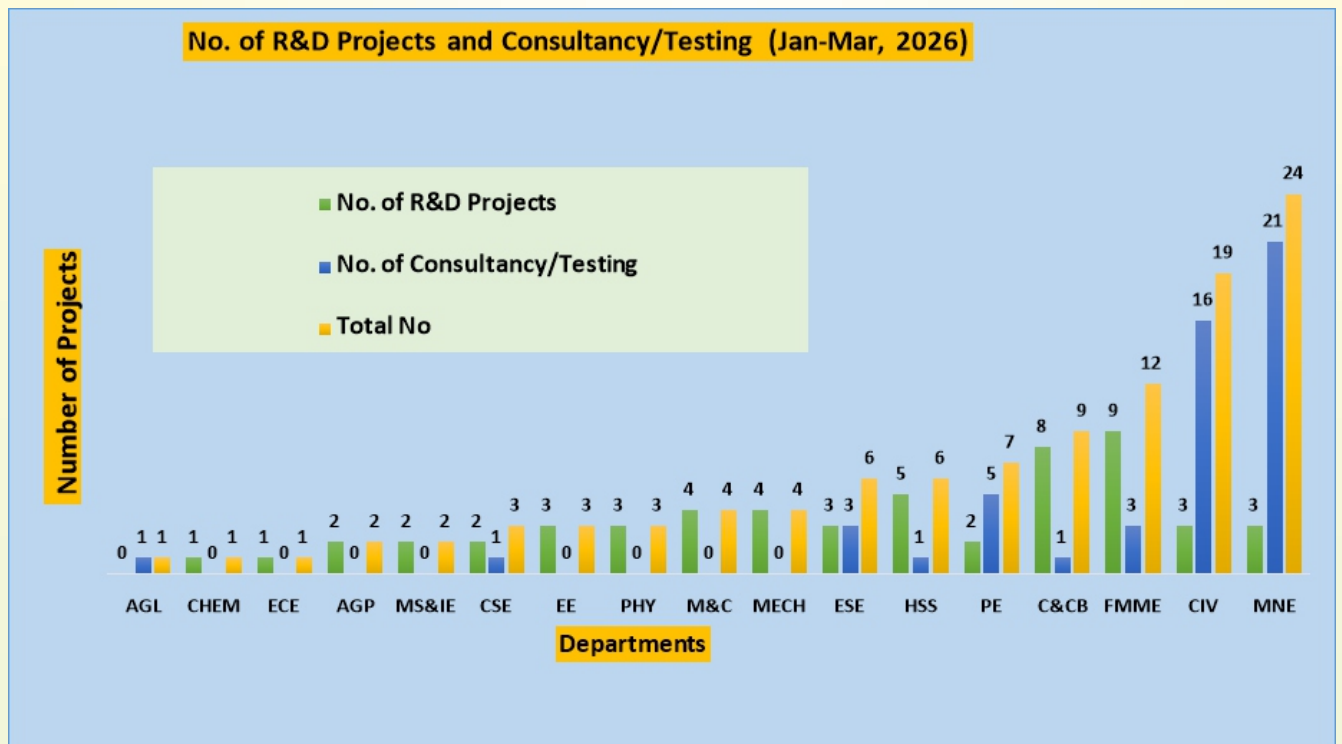
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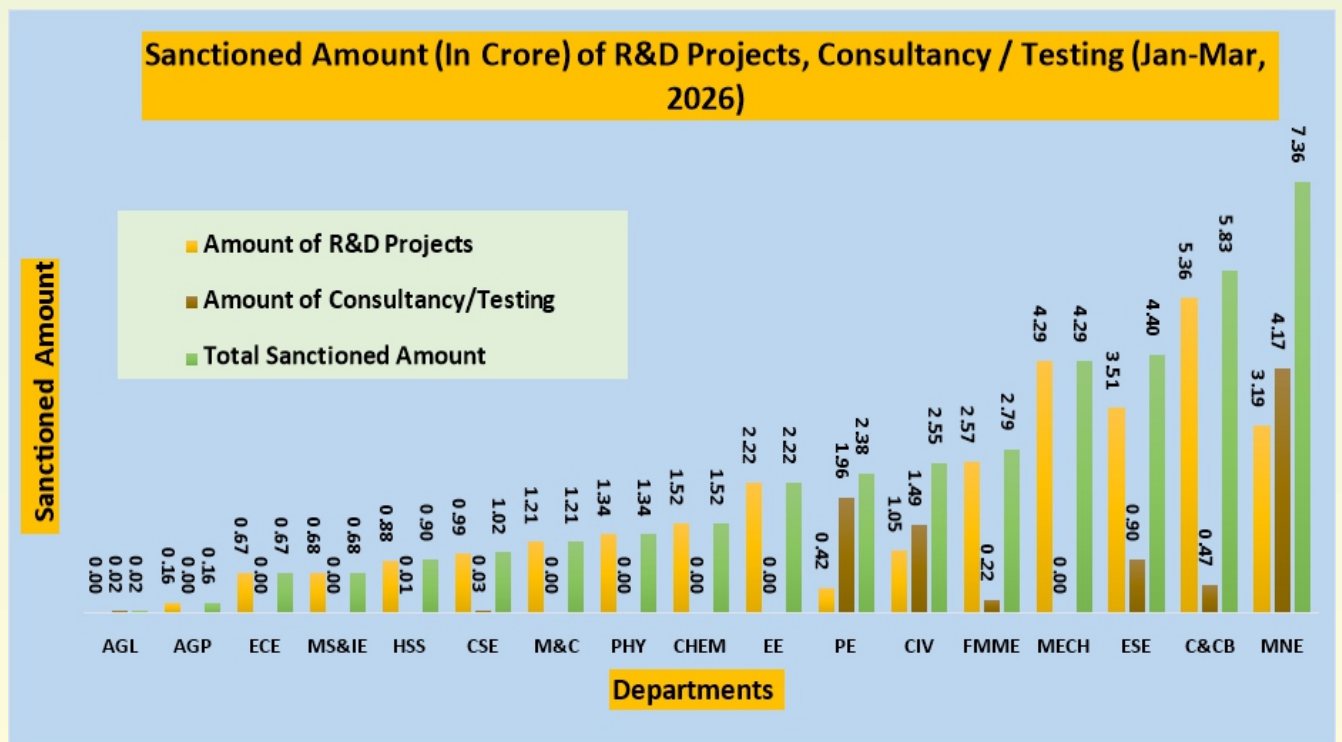


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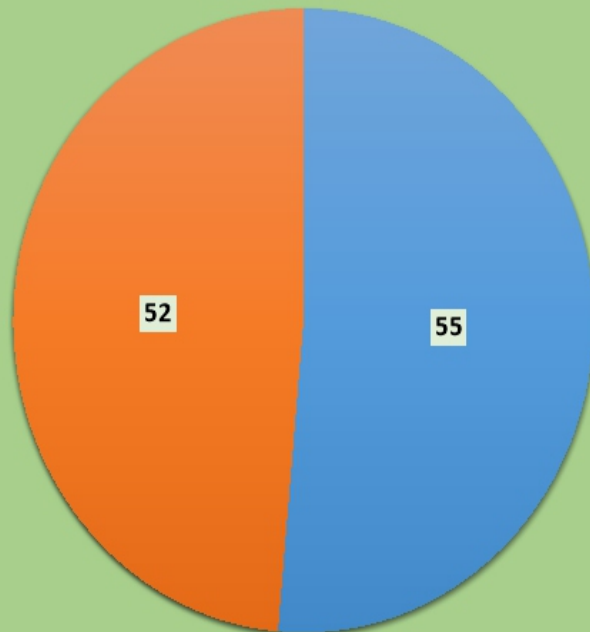
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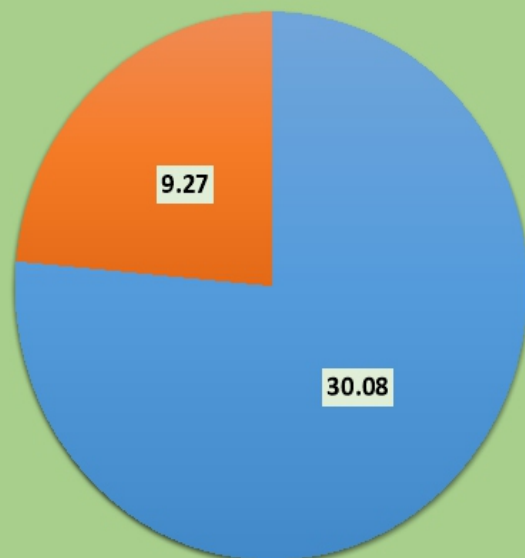
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Publications

Total No. of Publications : 311

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Major instrumental facilities created

A basic rock testing facility has been established in the Rock Mechanics Laboratory under the FIST Project. The facility is equipped with a computer-controlled Servo Hydraulic Cyclic Compression Testing Machine and an advanced Creep Testing Setup capable of operating under both stress-controlled and strain-controlled modes. The 3000 kN capacity Servo Hydraulic Basic Rock Mechanics Testing System is specifically designed for the characterization of brittle materials such as rock and concrete. The system incorporates high-stiffness loading frames that significantly reduce deformation energy accumulation within the frame, thereby ensuring enhanced accuracy and stability during experimental investigations.



Hydrogen Permeability Analyzer (Dept. of FMME)



High Temperature Microwave Furnace with Waveguide Isolator (Dept. of FMME)



Labtherm Vertical Tube Furnace cum Customized TGA (Dept. of FMME)



Continuous High-pressure fixed-bed reactor (Dept. of FMME)

Individual Faculty Achievements

- **Prof. Sahendra Singh** delivered two expert lectures on “*Gold Metallogeny with special reference to India*” and “*Application of Nano-geoscience in gold exploration*” in the training programme entitled “*Refresher Course on Gold Exploration*”, organised by Geological Survey of India Training Institute at FTC Kuju, Ramgarh on 9 March 2026.
- Ms. Arya Vinod, a Ph.D. scholar of **Prof. Anup Krishna Prasad**, has received an “*Early Career Scientist*” grant from EGU to present an oral paper at the European Geosciences Union (EGU) General Assembly 2026 (3–8) May 2026, Vienna, Austria). The EGU General Assembly is one of the world's largest geoscience conferences, attracting thousands of researchers globally. The abstract titled “A Novel Method for Rapid and Reliable.
- **Prof. Arup Krishna Prasad** : Estimation of GCV of Coal Using Mid-Infrared FTIR Spectroscopy and a Multi-Model Machine Learning Approach” has been accepted under Session GI2.1: Artificial Intelligence in Geosciences: applications, innovative approaches and new frontiers. The study integrates mid-IR FTIR spectroscopy with machine learning algorithms to develop a rapid and reliable method for predicting coal calorific value, demonstrating advancements in artificial intelligence techniques in geoscientific analysis.
- **Prof. Deepak Kumar Jha** delivered a talk on “*Climate Context for Human Evolution in India: Evidence from Sedimentary Lipids, Stable Isotopes and Charcoal*” as a Keynote Speaker at the National Workshop on “Collaborative Paleo-anthropology and Population Genetics Research” during 23-24 March 2026, organized by the BHU- Anthropological Survey of India, at BHU, Varanasi, India.
- **Prof. Deepak Kumar Jha** delivered a talk on “*Deep-time geoaerchaeological perspectives: A climate-driven human-environment dynamics in the Ganga watershed, India*” as a Keynote Speaker at the 1st National Conference on “MissionY: Land Acquisition for Rivers (National Framework for Rejuvenation of Small Watersheds)” during 22-23 March 2026 at Department of Environmental Science and Engineering, IIT (ISM) Dhanbad, India.



- **Prof. S. Sarangi** delivered an invited lecture on “*A futuristic REE deposit in an unconventional host rock*” in Odisha Mining Corporation, Bhubaneswar, Odisha in Feb 2026 and carried extensive fieldwork in Carbonatite and Bauxite mines near Rayagada& Koraput, Odisha along with his PhD scholars Mr. M. K. Surdas Singh and Ms. Subhrajyostna Paul in association with OMC Officials. The OMC sponsored the entire field visits from transport to hospitality.

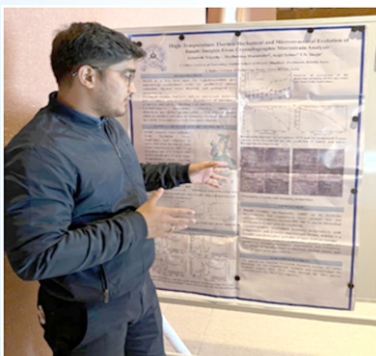


- **Prof. Udit Bansal** attended Field workshop on “*Depositional dynamics and their role in sequence development, Vindhyan Supergroup, Central India*” under the aegis of Indian Association of Sedimentologists during 16-20 Feb 2026 in and around Maihar, MP.



(Photo: Prof. Udit Bansal with Prof. Subir Sarkar, a renowned Sedimentologist)

- **Prof. Ashutosh Tripathy** attended the 16th EuroConference on “*Rock Physics and Rock Mechanics*” held in Les Diablerets, Switzerland during 19-23 Jan 2026. Prof. Tripathy received the young researcher grant from the organizers of the 16th Euroconference and the International Travel Support from DST-ANRF to attend the 16th Euroconference.



- **Prof. M. K. Mukherjee** (centre) along with the research team on the outcrop near Ziro, in Arunachal Pradesh.



Note the dark black graphite vein in the centre of the photograph behind the team.

- **Prof. M. K. Mukherjee** carried out field investigations including data collection, section measurement, sample analysis and structural geological mapping of the mineralized zones of Vanadim and graphite in the Khetabari formation around Ziro and Siru Rizo in Arunachal Pradesh. This is as a part of ongoing collaborative research between IIT(ISM) Dhanbad, Geological Survey of India and School of Environmental Science, JNU New Delhi, for critical mineral exploration.



- **Prof. M. K. Mukherjee** (second from right) in the outcrops of graphite bearing Khetabari formation in Daba Gamlin area near Siru Rizo, Arunachal Pradesh. Other members are geologists from GSI Itanagar

- **Prof. Arup K. Pal** received the best paper award for the following paper: “*Shukla Mondal, Arup Kumar Pal, Pooja Mishra, and Manish Raj, Deep Learning Approaches for Automated Osteoporosis Classification on Indian Hip X-Ray Data*”, 12th IBS Conference on Marketing & Business Strategy (ICOMBS 2026), IBS Hyderabad, India, 13-14 March, 2026”



Prof. R. Anand delivered a talk as a Resource Person in the “International Conference on Recent Advances in Geochemistry” organized by the Department of Geology, Fakir Mohan University, Balasore, Odisha on 17th January 2026.

- **Dr. Khalid Ansari** received best paper award in an 1st International Conference “*Recent Advancement in Physical Sciences (ICRAPs-2026)*” organized by NIT Uttarakhand during 6-8 February 2026
- **Prof. Umakanta Tripathy**, Prof. Sudeshna Sen, and Prof. Sudipto Singha Roy received competitive project funding from the **Anusandhan National Research Foundation (ANRF)**, New Delhi, recognizing the Physics department's growing contribution to frontier scientific research.
- **Prof. Manu Kurian** participated in the international workshop “*Exotic Quarkonia in Heavy-ion Collisions (EQHC 2025)*” organized at Johannes Gutenberg University Mainz, Germany, where he presented a talk titled “Off-Equilibrium Effects on Quarkonia and Heavy Flavor in the QCD Medium.” His visit facilitated interactions with leading theorists and experimentalists and opened avenues for future collaborations.
- **Prof. Manu Kurian** also visited RIKEN, Japan, and participated in the Annual RIKEN Meeting 2025. His participation was sponsored by RIKEN in recognition of his contributions to collaborative international research.
- **Prof. Avijit Misra** delivered an invited talk titled “*Estimating Dipole-Dipole Interaction and Localization in Atomic Networks*” at the workshop “Quantum Crossroads: Materials,

Computation, Communications and Information.”

- **Prof. Tusharkanti Dey** delivered invited talks at multiple academic events, including the Spintronics and Magnonics Symposium (SMS3-2026) at IIT Hyderabad and the QMEC 2025 Conference at IISER Bhopal, presenting research on unconventional magnetism and frustrated magnetic systems.
- **Prof. Nigel Mason from the University of Kent, UK**, delivered a distinguished lecture in the department titled “*Exploring the Origins of Life on Earth and the Quest to Find Life Across the Universe*,” discussing astrobiology and the search for extraterrestrial life.

Major Research Output



- The Department of **Fuel, Minerals and Metallurgical Engineering (FMME)** made notable research contributions in the areas of sustainable resource recovery, clean energy and advanced materials. Significant advances in critical mineral recycling were achieved through the development of efficient pathways for the recovery of valuable rare earth elements. In parallel, materials informatics approach accelerated the design of high-entropy shape memory alloys, demonstrating the potential of data-driven methodologies for next-generation materials development. Innovative waste valorization studies further demonstrated the conversion of coal washery rejects into carbon nanomaterials and highlighted the potential of waste-derived feedstocks as advanced sustainable materials. Collectively, these research outcomes advance resource efficiency, sustainable manufacturing, and clean technology development, strengthening the department's commitment to addressing challenges associated with the energy transition and circular economy.

Women Faculty Achievers



- **Dr. Samapika Mallik** received the **Women Researcher Award** at the **3rd International Conference and Award Ceremony for Women Researchers (IACWR-2026)** held during March 7–8, 2026. She presented her research work titled “*Ion-based Neuromorphic Devices for AI Hardware Systems*”, focusing on next-generation neuromorphic computing architectures inspired by brain-like information processing. Her research explores ion-driven devices for efficient and intelligent AI hardware systems and contributes to the rapidly emerging area of neuromorphic artificial intelligence technologies.
- **Prof. Shalini Gautam** secured a sponsored research project worth **₹50.63 lakh on bio-based carbon materials for industrial energy systems**, focusing on decarbonization pathways for India's energy transition.
- **Prof. Aarti Kumari** received **WIN-COE sponsored project worth ₹57.40 lakhs** for developing technology for **extraction of critical metals from spent NdFeB magnets** for research on sustainable recovery of valuable metals from end-of-life products. She also represented IIT (ISM) Dhanbad at the India–South Africa Critical Minerals Symposium, strengthening international collaborations in the area of critical mineral processing and resource recovery.
- **Prof. Shubhi Gupta** was appointed as Guest Editor for a special collection on '**Biomass and Waste Valorization**' in the **Scientific Reports Journal**, recognizing her research contributions in sustainable biomass conversion, waste valorization, and clean energy technologies. She continues to serve as editor for journals, such as, **Scientific reports and Discover Energy**.

International Visits in the Department



- **Prof Scindia Laxmi** Presented the research paper titled "*A Robust Xg-PINN Approach for Physics-Informed Forward and Inverse PDE Learning in Cancer Detection*" at the SIAM Conference on Parallel Processing for Scientific Computing 2026 (SIAM PP26), Zuse Institute Berlin, Germany, from March 4-6, 2026
- **Prof Jyotidas Gupta** Attended a research school on "*Cox Rings and Applications*" in CIRM (Centre International de Rencontres Mathématiques), Luminy, Marseille, France during 23-27 March 2026, where she presented a poster and a short talk titled "Equivariant vector bundles on T-varieties and Bruhat-Tits buildings".
- **Prof. Maitreya Mohan Sahoo** participated in the MINEXCHANGE 2026 SME Annual Conference & Expo held in Salt Lake City from 22–25 February 2026. As an invited participant, he presented his research titled "*A Comparison of Lateritic Bauxite Mapping Indices Using Multispectral and Hyperspectral Remotely Sensed Data.*" His presentation emphasized the economic importance of aluminum and highlighted the application of spectral sensing techniques for bauxite characterization in opencast mines to enhance aluminum production. The conference was organized by the Society for Mining, Metallurgy and Exploration.
- **Prof. Siddharth Agarwal** participated in the India–South Africa Critical Minerals Symposium held from March 17–19, 2026, at the University of Pretoria, South Africa. The symposium was organized in collaboration with the High Commission of India Pretoria and served as an important platform for fostering international collaboration and promoting knowledge exchange in the areas of exploration, extraction, and sustainable management of critical mineral resources.
- **International Invited Lecture on Advanced Manufacturing and Additive Manufacturing (Centenary Lecture Series):** The FMME Department at IIT (ISM) Dhanbad organized a centenary lecture on 25 February 2026 by Dr. -Ing. Jan Wegner from the University of Duisburg-Essen, Germany, who is a leading researcher in metal additive manufacturing. The talk focused on advanced manufacturing research, particularly on the role of additive manufacturing in modern engineering. Dr. Wegner highlighted the importance of understanding the relationship between material, process, and properties, along with key research areas like metal composites, metamaterials and in-situ monitoring.

Workshop / Conference / Seminar

- **Prof. Alik Sundar Majumdar:** The National Symposium on Critical Mineral Exploration 2026 (NSCME 2026) was held at the Indian Institute of Technology (Indian School of Mines), Dhanbad, on 19–20 March 2026, being organized by the Department of Applied Geology, IIT (ISM) Dhanbad, in technical association with TEXMiN (TTRP) and the ANRF-Partnerships for Accelerated Innovation and Research (PAIR)-B Project, under the aegis of the CoE on Critical Minerals, NCMM, Govt. of India. The inaugural session was graced by Dr. Thamban Meloth, Director, National Centre for Polar and Ocean Research, Goa (Chief Guest), Prof. Arvind Mishra, Director, CSIR CIMFR Dhanbad (Special Guest of Honour), Prof. Sukumar Mishra, Director, IIT (ISM) Dhanbad (Patron), Shri Rajiva Kumar Singh, Executive Director (Exploration), Coal India Limited (Guest of Honour), and Prof. Dheeraj Kumar, Deputy Director, IIT (ISM) Dhanbad and Project Director, TEXMiN & ANRF PAIR-B Project (Co-Patron). The valedictory session was dignified by Shri Asit Saha, Director General, Geological Survey of India (Chief Guest), Shri Manoj Kumar Agarwal, CMD, Bharat Coking Coal Limited (Guest of Honour), and Dr. Gopika Vinod, Head & Scientific Secretary, BRNS, Department of Atomic Energy (DAE), Government of India (Guest of Honour), reinforcing the need for integrated scientific, policy, and technological approaches. The symposium was further enriched by the presence of Dr. Deepak Kumar Sinha (CEO, GMRICS, GMDC Official), Dr. Manoranjan Mohanty (Scientist-G, Department of Science & Technology, Government of India), and Dr. Joyesh Bagchi (ADG, Geological Survey of India), along with delegates from premier institutions, including IIT Bombay, Bhabha Atomic Research Centre (BARC) Mumbai, Jawaharlal Nehru University (JNU), Physical Research Laboratory, CSIR- National Geophysical Research Institute Uppal Road, NCPOR Goa, NIO Goa, and IISER Berhampur.

The symposium focused on three key themes:

- Deep-Sea Resources
- Land-Based Resources
- Critical Mineral Characterization

With participation of 100+ delegates, the event enabled strong technical exchange, including a

panel discussion on “Exploration Challenges in Critical Minerals: Science, Policy and Technology Solutions” and a poster session by young researchers. Gratitude is extended to the Anusandhan National Research Foundation (ANRF) and the Ministry of Earth Sciences (MoES) for their funding support, along with the technical association of TEXMiN (TTRP) and the ANRF-Partnerships for Accelerated Innovation and Research (PAIR)-B Project, sponsorship from GMDC Official Ltd,



- The Alumni Meet “**EnviroSamagam2026**”, convened by **Prof. Manish Kumar Jain**, was successfully held on **January 10, 2026**, at the **Penman Auditorium**. Organized as a one-day event, the programme brought together around 300 participants, including distinguished alumni and members of the academic community. The event served as a vibrant platform for reconnecting, sharing experiences, and fostering continued engagement with the institution.
- An International Workshop on **Air Quality Monitoring and Data Analysis** was successfully organized under the convenorship of **Prof. Manish Kumar Jain**. Conducted over two days, from February 14 to February 15, 2026, at the **The Institute Innovation Hub (i2H)** of IIT

(ISM) Dhanbad, the workshop brought together approximately 150 participants. The event provided a valuable platform for knowledge exchange and skill development in the domain of air quality assessment and data analysis,

- The Department of Mathematics and Computing organized a one-week interdisciplinary short-term programme on **“Statistical Modeling through Simulation in R”** under the Malaviya Mission Teacher Training Programme from 23rd to 28th February 2026, featured expert lectures by eminent academicians from leading institutions, covering diverse topics such as statistical inference, simulation-based modeling, Bayesian methods, machine learning using R, time series analysis, and interdisciplinary applications in ecology, epidemiology, and health research. The structured schedule included multiple daily technical sessions, fostering hands-on learning and research-oriented discussions. The programme was organized by **Prof. G. K. Vishwakarma**. The inaugural function of the programme was graced by Prof. Somesh Kumar, Dean (Faculty), IIT Kharagpur, Prof. M. K. Singh, Dean (Academic), IIT (ISM) Dhanbad, and Prof. S.P. Tiwari, HoD (Mathematics & Computing), marking the commencement of the residential programme aimed at enhancing statistical modeling and computational skills.



- Two-Day Workshop on **“From Equations to Life: Mathematical Insights into Human Health”** was organized during March 27–28, 2026, with support from ANRF, to **Prof. R. K. Upadhyay**, PI under SSR activity of CRG project and the NASI Jharkhand Chapter. The workshop aimed to raise awareness of human health among faculty, researchers, and students across Jharkhand while promoting emerging research areas. It focused on neurological disorders such as Alzheimer's, Parkinson's, and epilepsy, highlighting the role of mathematical approaches in understanding brain dynamics and improving prediction and treatment strategies.



The workshop attracted more than 65 participants, and distinguished speakers from different institutions included Prof. B. V. Rathish Kumar, Prof. Subhas Khajanchi, and Prof. Subhamoy Mondal. It commenced with an

inaugural session graced by Prof. Sukumar Mishra (Director), Prof. S. P. Tiwari (Head of the Department), Prof. R. K. Upadhyay (Convenor), and Prof. Parimita Roy (Co-convenor). The program concluded with a valedictory session led by Prof. Parth Sarthi Das, Dean (R&D).



- The Department of Mining Engineering at IIT (ISM) Dhanbad has been successfully conducting a Skill Development Programme on the Assistant Mine Surveyor Course under the prestigious Pradhan Mantri Kaushal Vikas Yojana (PMKVY 4.0) scheme, in collaboration with the National Skill Development Corporation. The programme has received a positive response, with approximately 110 students enrolled. Commencing on 10 March 2026, the three-month training programme is scheduled to conclude on 10 June 2026. The course is meticulously structured to impart comprehensive knowledge of mine surveying techniques through a balanced integration of theoretical instruction and practical training utilizing advanced instruments and contemporary technologies. The programme seeks to develop industry-relevant competencies among participants, thereby enhancing their employability and preparedness to meet the evolving challenges of the mining sector

- International Conference “**TARGETS-2026: Trends and Advances in Reforming Green Energy Technologies**,” organized during February 13–15, 2026, in collaboration with IIT Delhi.
- Five-Day Workshop on “**Recent Advances in Microscopy and Spectroscopy**” organized during February 23–27, 2026, under the Indo-Norwegian “Bioscopy” project.
- The Department of Physics, IIT (ISM) Dhanbad organized Science Fest 2026, a month-long celebration of scientific learning, outreach, innovation, and academic interaction in connection with National Science Day. The programme commenced on February 9, 2026, with opening remarks by the Head of the Department, Prof. Vineet K. Rai, followed by the inaugural address by Director **Prof. Sukumar Mishra**. The inaugural lecture, titled “*Science, and Science for Society*”, was delivered by **Prof. Bobby Antony**, encouraging scientific curiosity and innovation among students. The event was coordinated by **Prof. Binata Panda**, **Prof. Shreya Banerjee**, **Prof. Sumit Kumar**, and **Prof. Samapika Mallik**.
- **Prof. Bobby Antony** delivered an engaging lecture titled “*Science, and Science for Society*” on 9 February 2026, highlighting the importance of science in everyday life and its broader societal impact.
- Prof. L. Sriramkumar from IIT Madras delivered a lecture titled “*Decoding Cosmic Origins with Rays and Ripples*” at Raman Hall of Physics Department on 12 February 2026. He discussed how observations of the Cosmic Microwave Background and discoveries such as gravitational waves are transforming our understanding of the early universe. The session included interactive discussions with students and faculty members.
- As part of *Science Fest 2026 – A Month of Discovery and Innovation*, the department celebrated National Science Day 2026 with great enthusiasm. The event featured two insightful lectures: “*Raman and His Legacy*” by **Prof. Pankaj Mishra** and “*Namami Ganga: Not Just a River Story*” by **Prof. Sumit Kumar**. The talks beautifully connected fundamental scientific discoveries with their broader societal and environmental relevance, reflecting the spirit of scientific awareness, sustainability, and innovation promoted through the festival. Science Fest 2026 also included student-orient

activities such as science quiz competitions, interactive hackathons, and outreach events that encouraged innovation, teamwork, and scientific engagement among participants.

- The Department of Physics hosted Prof. Ashoke Sen, Infosys Madhava Chair Professor at ICTS and recipient of the Padma Shri and Padma Bhushan awards. His lecture titled “*How to Create a Higher-Dimensional Space-Time*” attracted enthusiastic participation from students, research scholars, and faculty members. The lecture combined deep conceptual insights with technical clarity and concluded with an engaging interaction session.

In collaboration with the Gender in Physics Working Group (GIPWG), Indian Physics Association, the Department of Physics organized the event “*Spotlight on the Rising Stars*” on 11 February 2026. Prof. Poonam Mehta from Jawaharlal Nehru University delivered a lecture titled “*Gender Parity in Physics – The Broken Symmetry.*” The programme highlighted the scientific contributions and research journeys of women researchers across diverse areas of physics while promoting discussions on inclusivity and gender equity in science.

- The Department of Physics organized a popular lecture by Prof. Dr. O.S.K.S. Sastri from the Central University of Himachal Pradesh titled “*God is Omnipresent, Omnipotent and Omniscient: Based on Fourier Transform.*” The event was followed by a panel discussion, “*Voices of Research Scholars: Challenges, Choices, Change,*” which provided an interactive platform for research scholars to discuss academic

challenges, career pathways, and research experiences. Seminar by Dr. Nirman Chakraborty titled “*Perturbative Operando Spectroscopy to Probe Spin Exchange Mechanisms in Surface-Analyte Quasi-States for Energy Applications.*”

- **Webinar on Global Academic Opportunities with University of Latvia:** The Department of Physics organized an international webinar on opportunities for IIT students in Bachelor's, Master's, and Doctoral programmes at the Faculty of Science and Technology, University of Latvia. The session was delivered by Prof. Aigars Ekers, Dean of the University of Latvia, and provided valuable insights into higher education pathways, research collaborations, and international academic opportunities for students and researchers.

- **Workshop on Fundamentals of Nuclear Reactor Engineering and Materials:** IIT (ISM) Dhanbad successfully conducted a national workshop titled “*Fundamentals of Nuclear Reactor Engineering and Materials*” from 16–19 March 2026. The program was convened by Dr. Vishnu Teja Mantripragada, Assistant Professor, Dept. of FMME, and co-convened by Dr. Alok Kumar Das, Dean (IIE). It was organized for IIT (ISM) Dhanbad faculty members to build foundational expertise and encourage interdisciplinary engagement in nuclear science and engineering. The initiative reflects the institute's growing focus on expanding its academic and research activities in the nuclear domain, particularly in areas aligned with national energy priorities.

