

DEPARTMENT OF ELECTRONICS ENGINEERING

IIT (ISM) Dhanbad



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2025

MONTHLY
NEWS LETTER

SPARK

2nd edition, Feb'25

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From The HoD's Desk



Dear Readers,

In February 2025, several notable events took place in our department, showcasing innovation and expertise in the field of technology and research.

The month started with the Annual R&D Fair in which our department showcased cutting-edge research and innovation, highlighting student-faculty collaboration. Followed by the IEEE APS/MTT-S Student Branch Chapter hosted a series of three distinguished invited talks. Renowned speakers, including Prof. Jérôme Tissier, Prof. Gabriel M. Rebeiz, and Prof. Satish Kumar Sharma, highlighted about cutting-edge advancements in antenna systems, microwave engineering and semiconductor technologies, offering students and researchers valuable perspectives.

Additionally, a workshop on Phased Array Antenna Systems was held, focussing on its revolutionary role in modern communication and defence applications.. This event emphasized the importance of phased array technology in enhancing communication systems, radar operations and defense technologies.

This month also saw the sanctioning of new research projects, spearheaded by esteemed faculty members Prof. Jitendra Kumar(Inspire), Prof. Swati Rajput and Prof. Yericharla Mary Asha Latha. These projects aim to contribute to advancements in semiconductor technologies and communication systems, fostering further academic growth and innovation.

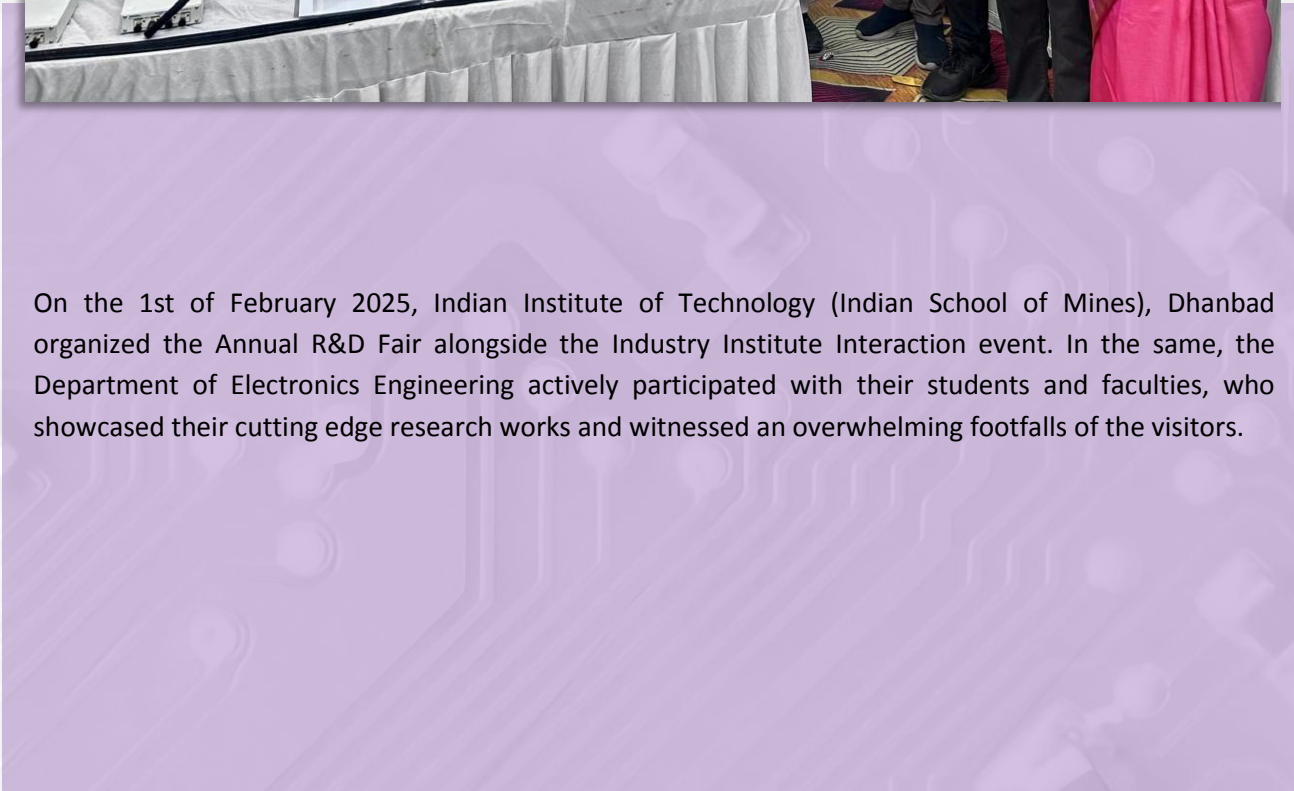
Prof. Manodipan Sahoo and Prof. Rajeev Kumar Ranjan delivered invited talks as esteemed experts in their relevant fields.

Finally, an ongoing 12-day online refresher course on “Atom to Device Understanding of Emerging Semiconductor Technology”, offering deep insights into semiconductor innovations and their real-world applications, supporting both academic learning and professional development.

Please find the Newsletter for detailed updates and give your valuable feedback to fertilize us to be bigger and better.

Wish you all the best!

Prof. Ravi Kumar Gangwar
HoD, Department of Electronics Engineering,
IIT(ISM) Dhanbad



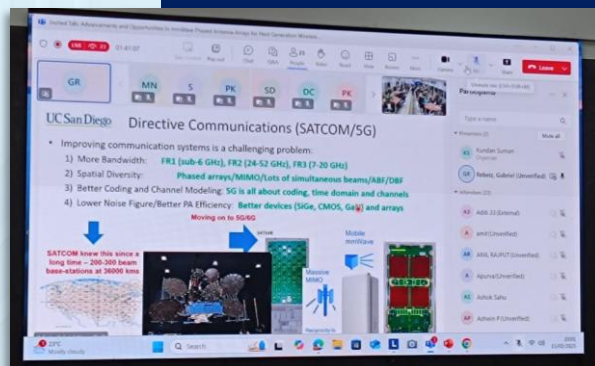
INVITED TALKS

The **IEEE APS/MTT-S Student Branch Chapter of IIT (ISM) Dhanbad** successfully hosted three invited talks in February 2025, featuring distinguished speakers **Prof. Jérôme Tissier**, **Prof. Gabriel M. Rebeiz** and **Prof. Satish Kumar Sharma**.

Prof. Jérôme Tissier Associate Professor at 'Ecole Supérieure d' Electronique de l'Ouest' (ESEO), Angers, France and associate researcher at the Gustave Eiffel University (Nantes campus, France), delivered a talk on **"GPR Application: Evaluation and Classification of Fouled/Clogged Ballast Layers in Railway Tracks."** His session covered Ground Penetrating Radar (GPR) techniques, including measurements, simulations, and advanced data processing methods such as Machine Learning (SVM), Matrix Pencil Method (MPM), and Full Waveform Inversion (FWI) for improved classification of ballast layers.



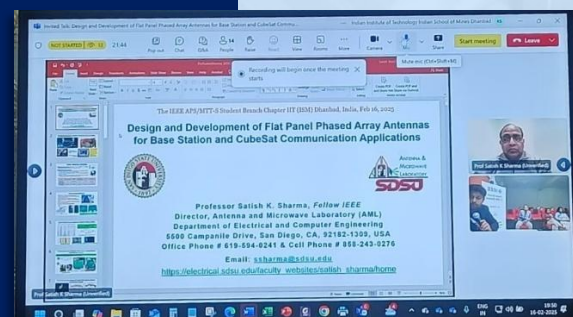
INVITED TALKS



Prof. Gabriel M. Rebeiz, Wireless Communications Industry Chair Professor at University of California, San Diego (UCSD), USA, presented a talk on ***“Advancement and Opportunities in mmWave Phased Antenna Arrays for Next Generation Wireless Systems”***. He shared insights into the latest advancements in millimeter wave phased antenna arrays, silicon RFIC technologies, and their applications in 5G/6G networks, automotive radar, and satellite communications.



Prof. Satish Kumar Sharma, Professor in the Department of Electrical and Computer Engineering at San Diego State University, USA, gave a talk on ***“Design and Development of Flat Panel Phased Array Antennas for Base Station and CubeSat Communication Applications”***. His session focused on the theory, design, development, and experimental verification of wideband flat panel phased arrays, highlighting their importance in mobile terminals, base stations, and CubeSat communication systems, along with data throughput testing and over-the-air (OTA) performance validation.



Workshop On Phased Array Antenna Systems: A Revolutionary Technology For Modern Communication And Defence Applications



The five-day workshop on “Phased Array Antenna Systems: A Revolutionary Technology for Modern Communication and Defence Applications”, organized by the Department of Electronics Engineering, IIT(ISM) Dhanbad, was successfully held from 15th – 19th February 2025 in a physical mode, with few sessions delivered online. The event took place at the TexMin Smart Classroom, Ground Floor, i2h Building, IIT (ISM) Dhanbad.

The event was inaugurated by Chief Guest Dr. P. Hanumantha Rao (DG-SAMEER), who spoke about the rapid evolution of phased array technology, its role in 5G/6G, and its applications in communication and defense. The event was also attended by Prof. Dheeraj Kumar, Deputy Director, and Prof. Sagar Pal, Dean (R&D), IIT (ISM) Dhanbad, who emphasized the importance of research and innovation in this field. The workshop was coordinated by Prof. Ravi Kumar Gangwar (HOD, Department of Electronics Engineering, IIT (ISM)), whose leadership played a key role in organizing this knowledge-sharing platform.

The workshop featured renowned speakers, including Prof. S. P. Singh (Former Professor, IIT- BHU), Dr. Milind B. Mahajan (SAC-ISRO), Prof. Gabriel M. Rebeiz (UC San Diego), Dr. Veer Singh Gangwar (LRDE-DRDO), Dr. Jayaprakash Thakur (Intel Technology, Bangalore), Dr. Gourab Banerjee (IISc, Bangalore), Prof. Satish Kumar Sharma (San Diego State University), Mrs. Savita Gond (Scientist-F, CABS, DRDO), Mr. Amit Goel (Scientist-E, LRDE-DRDO), Mr. Marvin Coutinho (Rohde & Schwarz, Hyderabad), Mr. Virendra Kumar (Scientist-F, LRDE- DRDO), and Dr. P. Radhakrishna (Former Director, LRDE-DRDO).

This workshop was made possible with the generous support of ROHDE & SCHWARZ, CENTUM, DRDO (Defence Research and Development Organisation), RFMW Innovations Lab, and JV Micronics. Their contributions played a vital role in facilitating knowledge exchange between academia, industry, and research organizations, ensuring the success of this event.

The workshop witnessed enthusiastic participation from faculty, PhD scholars, researchers, and professionals from DRDO, ISRO and industry, leading to valuable discussions, knowledge sharing, and future collaborations. Through this event, IIT(ISM) Dhanbad continues to drive cutting-edge research and innovation in antenna systems, radar technology and wireless communications.



Media Corner

A glimpse from print media regarding workshop on Phased Array Antenna Systems for Radar and Modern Communication Applications

IIT-ISM Dhanbad Hosts Workshop on Phased Array Antenna Systems

Dhanbad: The Department of Electronics Engineering at IIT (ISM) Dhanbad is hosting a five-day workshop on Phased Array Antenna Systems for Radar and Modern Communication Applications, running from 15 to 19 February.

The workshop aims to explore the applications of phased array technology in radar and communication systems.

Thirty-five participants from prominent organizations, including DRDO, ISRO, vari-



ous IITs and NITs, and L&T, have gathered to learn about key topics such as phased array antenna principles, RF front-end design, frequency synthesizers, and communication applications for Cube-Sats.

Day two covered essential topics, and tomorrow's sessions will include expert lectures on wireless connectivity, 5G mm-wave integration, and airborne applications. Speakers include Dr. Jayprakash Thakur from In-

tel, Savita Gond from CABS, and experts from Rohde & Schwarz and LRDE.

The workshop's inauguration on February 15 was attended by Dr. P. Hanumantha Rao, Director General of SAMEER, along with IIT (ISM) officials Professor Dheeraj Kumar and Professor Sagar Pal. Coordinated by Professor Ravi Kumar Gangwar, Head of Electronics Engineering, the workshop offers a platform for knowledge sharing in phased array technology.

आइएसएम में रडार और आधुनिक संचार पर कार्यशाला
जासं, धनबाद : आइआईटी आइएसएम के इलेक्ट्रॉनिक्स इंजीनियरिंग विभाग की ओर से रडार और आधुनिक संचार अनुप्रयोगों पर पांच दिनी कार्यशाला का आयोजन किया गया। कार्यशाला में शरीक हुए डीआरडीओ, इसरो, विभिन्न आइआईटी और एनआईटी तथा एलएंडटी सहित कई अन्य संगठनों के 35 प्रतिभागियों को चरणबद्ध एंटीना तकनीक और इसके अनुप्रयोगों की जानकारी दी गई। संचार के लिए फ्रीक्वेंसी सिंथेसाइजर तथा बेस स्टेशन और क्यूबसैट संचार अनुप्रयोगों से संबंधित तकनीकी पहलुओं से अवगत कराया गया। सोमवार को विशेषज्ञ व्याख्यान का आयोजन होगा।

आइआईटी आइएसएम : एंटीना सिस्टम पर कार्यशाला शुरू

खरिव संवाददाता, धनबाद

आइआईटी आइएसएम के इलेक्ट्रॉनिक्स इंजीनियरिंग विभाग की ओर से 'रडार और आधुनिक संचार अनुप्रयोगों' पर पांच दिनों का कार्यशाला आयोजन की जा रही है। कार्यक्रम से शुरू कर कार्यशाला 19 फरवरी तक चलेगी। इसका उद्देश्य चरणबद्ध एंटीना तकनीक और इसके अनुप्रयोगों पर गहन जानकारी प्रदान करना है। कार्यशाला में डीआरडीओ, इसरो, विभिन्न आइआईटी, एनआईटी तथा एलएंडटी समेत प्रतिष्ठित संगठनों के 35 प्रतिभागियों हिस्सा ले रहे हैं। प्रतिभागियों ने कार्यशाला के तहत दिन 'फेज्ड एंटीना के सिस्टम', 'आधुनिक प्रोटोकॉल डिजाइन सिस्टम में चुनौतियाँ', 'रडार और संचार के लिए फ्रीक्वेंसी सिंथेसाइजर' तथा 'बेस स्टेशन और क्यूबसैट संचार अनुप्रयोगों के लिए फ्रीक्वेंसी सिंथेसाइजर' पर एंटीना



कार्यशाला में शामिल प्रतिभागी।

कोई (कमल खर)

का डिजाइन और विकास' जैसे महत्वपूर्ण विषयों पर जानकारी प्राप्त की। कार्यशाला के तीसरे दिन विशेषज्ञ व्याख्यान होगा, इसमें डॉ. जयप्रकाश थकुर (डीएन टेक्नोलॉजी, बंगलूर), डॉ. राजेश कुमार (एन सिस्टम, आइआईटी आइएसएम) और डॉ. सत्यम पात्र (डीएन, अनुसंधान एवं विकास) ने भी सम्मेलन में भाग लिया। कार्यशाला का समन्वयन इलेक्ट्रॉनिक्स इंजीनियरिंग विभाग के प्रमुख प्रो. रवि कुमार संस्कार ने किया।

उपलब्धि : प्रो प्रमून कुमार सिंह वाउंडवाटर एक्सप्लोसिव अवार्ड से किचे जायेंगे सम्मानित

धनबाद, आइआईटी आइएसएम के पार्थिव संवाददाता और इंजीनियरिंग विभाग के प्रो प्रमून कुमार सिंह को प्रतिष्ठित वाउंडवाटर एक्सप्लोसिव अवार्ड से सम्मानित किया जावेगा। यह सम्मान भूजल विज्ञान और इसके सतत प्रबंधन के क्षेत्र में उनके वैश्वव्यापी योगदान के लिए दिया जा रहा है।



उन्हें यह सम्मान इंटरनेशनल ऑफ एडवांस्ड इंजीनियरिंग एंड टेक्नोलॉजी (आइएल) के भारतीय राष्ट्रीय सेंटर की वार्षिक बोर्ड द्वारा दिया जावेगा। डॉ. सिंह को यह पुरस्कार अतिरिक्त रूप से एक यू.ए.सी. 2025 की पहिली विधाविज्ञान, जल, भू-मिनी एवं वातावरण के क्षेत्र में उनके योगदान के लिए दिया जा रहा है।



धनबाद आइआईटी आइएसएम धनबाद ने रडार के लिए चरणबद्ध एंटीना सिस्टम पर पांच दिनी कार्यशाला की मेजबानी की। आइआईटी के इलेक्ट्रॉनिक्स इंजीनियरिंग विभाग की ओर से आयोजित कार्यशाला में रक्षा अनुसंधान सहित प्रतिष्ठित संगठनों से कुल 35 प्रतिभागियों ने भाग लिया। विकास संगठन (डीआरडीओ), भारतीय अंतरिक्ष अनुसंधान संगठन (इसरो), विभिन्न आइआईटी और एनआईटी और एलएंडटी, टेक्सएसआईएन स्मार्ट क्लास, आइआईटी आइएसएम में एकत्रित हुए हैं।

RESEARCH PROJECTS SANCTIONED



Prof. Jitendra Kumar has been awarded a project titled “SPIE-OPE (Sb_2S_3 Photovoltaic Device: Pioneering Interface Engineering and Optoelectronic properties Enhancement)”.

The proposed research aims to develop high-efficiency, cost-effective and environmentally friendly photovoltaic (PV) devices based on antimony sulfide (Sb_2S_3). Sb_2S_3 is a stable, non-toxic material with a high absorption coefficient, allowing thin films to absorb 98% of sunlight. Its unique ribbon structure could lead to electronically benign grain boundaries. However, existing Sb_2S_3 PV devices suffer from low efficiency due to interface recombination and bulk defects. The research will focus on: synthesizing (hk1)-oriented Sb_2S_3 films, tuning optoelectronic properties through doping, developing cadmium-free contact layers, and studying interface diffusion. This aims to enhance open-circuit voltage and overall efficiency. The project supports India's climate goals and aims to nurture young scientists in advanced PV technologies.

Prof. Yericharla Mary Asha Latha has been awarded a project titled “Harnessing the Harmonics in Sequential Load Modulated Balanced Amplifiers for Efficiency and Linearity Enhancement for 5G/6G Applications” under the Prime Minister Early Career Research Grant (PM-ECRG) by the Anusandhan National Research Foundation (ANRF).



Prof. Swati Rajput has been awarded a project titled, "Development of 2D Material-Enhanced Silicon Photonic Devices for High-Performance Point-to-Point Optical Communication," has been approved under the Prime Minister Early Career Research Grant by the Anusandhan National Research Foundation (ANRF).

EXCHANGING IDEAS AND INNOVATIONS

Prof. Manodipan Sahoo, Associate Professor of our department presented an invited talk on "Modeling and Simulation of FET-based Biosensors" in a conference titled "Emerging Trends in Advanced Materials" held during February at CSIR-CGCRI, Jadavpur, Kolkata.

The conference focused on cutting-edge functional materials and their applications, highlighting their crucial role in advancing modern technology. It discussed interdisciplinary advancements at the intersection of chemistry, physics and materials science.



A One-Week Short-Term Training Program (STTP) on "AI in Instrumentation and Control (AIIC-2025)" was successfully conducted from February 24 to 28, 2025 by the Department of Electrical and Instrumentation Engineering, SLIET Longowal, Punjab. As part of this program, **Prof. Rajeev Kumar Ranjan** delivered an insightful expert talk on "Memristor Emulators and Neuromorphic Applications for AI in Instrumentation and Control".

The ATAL Online Six-Day Faculty Development Program (FDP) on "Power-Efficient VLSI-Based Hardware Accelerators in High-Performance Computing (HPC)" was successfully conducted from January 20 to January 25, 2025. This prestigious program was sponsored by the All India Council for Technical Education (AICTE) and organized by the Department of Electrical and Electronics Engineering, BITS Pilani, Hyderabad Campus, India. As part of this program, **Prof. Rajeev Kumar Ranjan** from the Department of Electronics Engineering, IIT(ISM) Dhanbad, delivered an insightful expert talk on "Signal Processing Circuits for High-Frequency Applications."

ONGOING EVENT

The Department of Electronics Engineering is organizing a 12-days online refresher course on “Atom to Device Understanding of Emerging Semiconductor Technology” from 24th February to 7th March under the MMTP.

The course will cover a wide range of topics under the emerging semiconductor technologies like 2D Material-based Devices, CMOS Technology, Quantum Material and Devices, Flexible Electronic Devices, Photovoltaic Technology and many more. The talks consist of fundamental concepts to the state-of-the-arts of simulation/modeling, material synthesis/growth, device fabrication process flow and material/device characterization techniques of the emerging material and devices.

Legacy that Inspires the Future

भारतीय संशोधन विद्यापीठ
भारतीय विद्यापीठ संस्थान
भारतीय विद्यापीठ संस्थान

IIT INDIAN INSTITUTE OF TECHNOLOGY
DHANBAD

24th February to 7th March, 2025 at IIT (ISM) Dhanbad

- Enhance your research expertise with our comprehensive refresher course tailored for faculty members working/interested in Electronic Devices and Materials Physics.
- This course covers fundamental concepts and engineering steps from the atom to the device level technology, including simulation, fabrication and characterization techniques.
- The participants will gain insights into thin film growth, device fabrication process technology, electrical/optical/material/thermal characterization, and DFT/MD simulations.
- This course will help in getting a deeper understanding of material to device physics and advanced data analysis.

Application Procedure:

1. Register at <https://mmc.uqc.ac.in> and create an account.
2. Login and click on "Apply for other Programmes".
3. Click on "Apply For Drop Down Menu and Select "Refresher Course".
4. Click on "Centre & Programme Date" and Select "Indian School of Mines, Dhanbad (24/02/2025-07/03/2025)".
5. Fill in other details, upload the NOC duly signed by your Head of Institution and submit the application form.

Let's start your learning journey right!

**MALAVIYA MISSION
TEACHER
TRAINING PROGRAMME**

**An Online Interdisciplinary Refresher Course on
Atom to Device Understanding of Emerging Semiconductor Technology**

Distinguished speakers

 Dr. Daniel Abou-Ras Department of Structure and Dynamics of Energy Materials, Helmholtz-Zentrum Berlin	 Prof. S. S. K. Iyer Department of Electrical Engineering, IIT Kanpur	 Prof. Mayank Shrivastava Department of Electronic Systems Engineering IISc, Bangalore	 Prof. Saurabh Lodha Department of Electrical Engineering, IIT Bombay	 Prof. Kausik Majumdar Department of Electrical Communication Engineering IISc, Bangalore	 Prof. Bhaskaran Muralidharan Department of Electrical Engineering, IIT Bombay
 Prof. Eran Edri Department of Chemical Engineering, Ben-Gurion University of the Negev, Israel	 Prof. Nihar Ranjan Mohapatra Department of Electrical Engineering, IIT Gandhinagar	 Dr. Sushil Kumar Chief Scientist & Professor (ACSR) CSIR-NPL, New Delhi	 Prof. Nilesh Prakash Gurao Department of Materials Science & Engineering, IIT Kanpur	 Prof. Anil Kottantharayil Department of Electrical Engineering, IIT Bombay	 Prof. Pradeep R. Nair Department of Electrical Engineering, IIT Bombay

Salient Features:

- Application/Registration is free of cost.
- Mode of delivery : Online.
- Duration: 2 weeks, 12 working days, 72 contact hours.
- Assessment: MCQ-based examination for Certificate upon successful completion.
- Eligibility: Faculty members from UGC-recognized universities and colleges.

**Registration Deadline:
February 22, 2025**

For more details, contact to our coordinators

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Find out more

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