

DEPARTMENT OF  
**ELECTRONICS  
ENGINEERING**

IIT (ISM) Dhanbad



**NEWS LETTER**

November 2024

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# From The HoD's Desk



Dear Readers,

We are here to update you about the overall progress and a few milestones achieved by the Department of Electronics Engineering in November 2024.

The month began with congratulating two of our B.Tech. students to get selected as one of the top 75 women engineering students in the prestigious Women in Tech Program followed by a couple of guest lectures by Prof. Nihar Ranjan Mohapatra from IIT Gandhinagar and Prof. Shubham Sahay from IIT Kanpur. Additionally, Dr. Sean R Kavanagh from Harvard University and Dr. Krishanu Dey from University of Oxford delivered invited talks which consisted of many exciting and inspiring technical discussions.

Dr. Jitendra Kumar (Inspire Faculty) has published his latest outcomes in the ACS Inorganic Chemistry Journal. On 26<sup>th</sup> November, our department witnessed the Constitution Day by reading out the Preamble of the Indian Constitution in our department. Finally, I would like to highlight that an exciting workshop on "Phased Array Antenna Systems" is going to happen in February 2025.

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

# GUEST LECTURE

It was our immense pleasure to host Prof. Nihar Ranjan Mohapatra from IIT Gandhinagar, at the Electronics Engineering department of IITISM Dhanbad. The faculties of our department had fruitful conversation with Prof. Mohapatra and gained insights from his vast range of expertise. Moreover, Prof. Mohapatra delivered a talk on “Ultrathin Body Nanosheets for Future Generation CMOS Technology: Progress, Dead Ends and New Horizon” which enlightened future roadmaps of transistor scaling, its challenges and possible solutions.

Thank you, Prof. Mohapatra, for visiting and giving your valuable time.



We were delighted hosting Prof. Shubham Sahay from IIT Kanpur, at the Electronics Engineering department, IITISM Dhanbad. The faculties of our department had fruitful conversation with Prof. Sahay and gained insights from his vast range of expertise. Moreover, Prof. Shubham Sahay delivered a talk on “Neuromorphic Computing: Mapping Neural Networks to Hardware” which enlightened future roadmaps of neuromorphic system, its challenges and possible solutions.

Thank you, Prof. Sahay, for visiting our department and giving your valuable time!

# INVITED TALKS

## Modelling the Impact of Defects in Solids



**SPEAKER**

**Dr. Seán R. Kavanagh**  
Harvard University

Dr. Seán Kavanagh obtained his undergraduate degree in Nanoscience, Physics and Chemistry of Advanced Materials at Trinity College Dublin (TCD) in his native Ireland, graduating in 2019. For his PhD, he was jointly supervised by Prof David O. Scanlon at University College London (UCL) and Prof Aron Walsh at Imperial College London, graduating in 2024. Seán's PhD research focused on understanding and predicting the behaviour of defects and disorder in solid-state materials, along with software and method developments (including the doped, ShakeNBreak and easyunfold codes).

Seán is now an Environmental Fellow at Harvard University, hosted by the group of Prof Boris Kozinsky, where he is trying to adopt machine-learning methods to tackle defect modelling challenges. Seán has mentored a number of young researchers, receiving a UCL Education Award and Associate Fellowship of the Higher Education Authority in recognition of these efforts. He has been an active member of the defects research community, being a committee member of the *Psi-k Materials and Devices for Energy* working group and having been awarded the IOP and APS Computational Physics Thesis Prizes in 2024.

1. The E3RL Group at the Department of Electronics Engineering recently hosted a guest lecture titled "Modelling the Impact of Defects in Solids" by Dr. Sean Kavanagh from Harvard University in online mode. Dr. Kavanagh shared his research on first-principles simulations of atomic and electronic structures in solids, focusing on defect modelling. The talk also highlighted case studies on the impact of defects in emerging energy materials, such as solar cells.
2. The E3RL Group at the Department of Electronics Engineering recently hosted a guest lecture, "Mixed-Metal Halide Perovskites: From Fundamentals to Devices," by Dr. Krishanu Dey from the University of Oxford, UK. Dr. Dey shared his research on the impact of tin-alloying in halide perovskites, exploring how metal alloying affects ion dynamics and photoinduced compositional instabilities. His talk provided valuable insights into the implications of these factors on the performance of photovoltaic and transistor devices.

Thank you Dr. Sean Kavanagh & Dr. Krishanu Dey for giving your valuable time!

## Mixed-Metal Halide Perovskites: From Fundamentals to Devices

Halide perovskites have revolutionized the field of emerging optoelectronic devices, where the device performances of solar cells, LEDs and detectors have exhibited an unprecedented growth over the last decade. Despite such meteoric rise, the phenomenon of ion migration remains a common and longstanding Achilles' heel limiting their operational stability. In this talk, I will primarily share our understanding of the impact of metal alloying on the ion dynamics and photoinduced compositional instabilities in halide perovskite compositions and their implications on photovoltaic and transistor devices. Towards the end, I will also share brief updates of my current work on evaporated perovskites for LED applications.



**SPEAKER**

**Dr. Krishanu Dey**  
University of Oxford

Dr. Krishanu Dey is a postdoctoral researcher at the University of Oxford in Professor Henry Snaith's group, a Junior Research Fellow at Worcester College, and a Stipendiary Lecturer in Engineering Science at Trinity College. His research focuses on fabricating and characterizing superlattice halide perovskites for LEDs, as well as studying lower-dimensional lead-free perovskites and single crystalline thin films for photovoltaic applications. He completed his PhD in 2023 at the University of Cambridge under Professor Sam Stranks, where he investigated mixed Pb-Sn perovskites, resulting in publications in high-impact journals, including *Nature Materials*, *Energy & Environmental Science* and *Advanced Materials* and earning the Best PhD Thesis Award from the Royal Society of Chemistry (Energy Sector). Prior to his move to the UK in 2018, he obtained his M.Eng in Electrical and Computer Engineering from NUS, specializing in transparent conductive oxides for photovoltaics. Dr. Dey has received several notable awards, including the Cambridge India Ramanujan Scholarship (2018–2022) and the E-MRS Graduate Student Award (2021).

**Mode of Talk**  
**Virtual**

# Students' Achievement



**Congratulations!**



**Swasti Mishra**

B. Tech, 3<sup>rd</sup> Semester, ECE Department  
IIT(ISM), Dhanbad

*for getting selected as one of the Top 75 women engineering students in the prestigious*

**WOMEN IN TECH PROGRAM**  
Batch III

[wit.nxp.com](http://wit.nxp.com)



**Congratulations!**



**Stuti Dash**

B. Tech, 3<sup>rd</sup> Semester, ECE Department  
IIT(ISM), Dhanbad

*for getting selected as one of the Top 75 women engineering students in the prestigious*

**WOMEN IN TECH PROGRAM**  
Batch III

[wit.nxp.com](http://wit.nxp.com)

Congratulations to both Ms. Swasti Mishra and Ms. Stuti Dash from the B.Tech. ECE Department, 3rd semester, on being selected as part of the top 75 participants for the prestigious NXP Women in Tech (WIT) Program! This is an incredible achievement that reflects your hard work, talent, and dedication. We are proud to see our students excel and take such important strides in their careers. Wishing you both a successful and inspiring journey in this program!

## "Honoring Our Roots, Upholding Our Rights."



Employees read the Indian Constitution's Preamble in Observance of Our Legacy

Constitution Day also known as 'Samvidhan Divas', is celebrated in our country on 26th November every year to commemorate the adoption of the Constitution of India. On 26th November 1949, the Constituent Assembly of India adopted the Constitution of India, which came into effect from 26th January 1950.

The Ministry of Social Justice and Empowerment on 19th November 2015 notified the decision of Government of India to celebrate the 26th day of November every year as 'Constitution Day' to promote Constitution values among citizens.

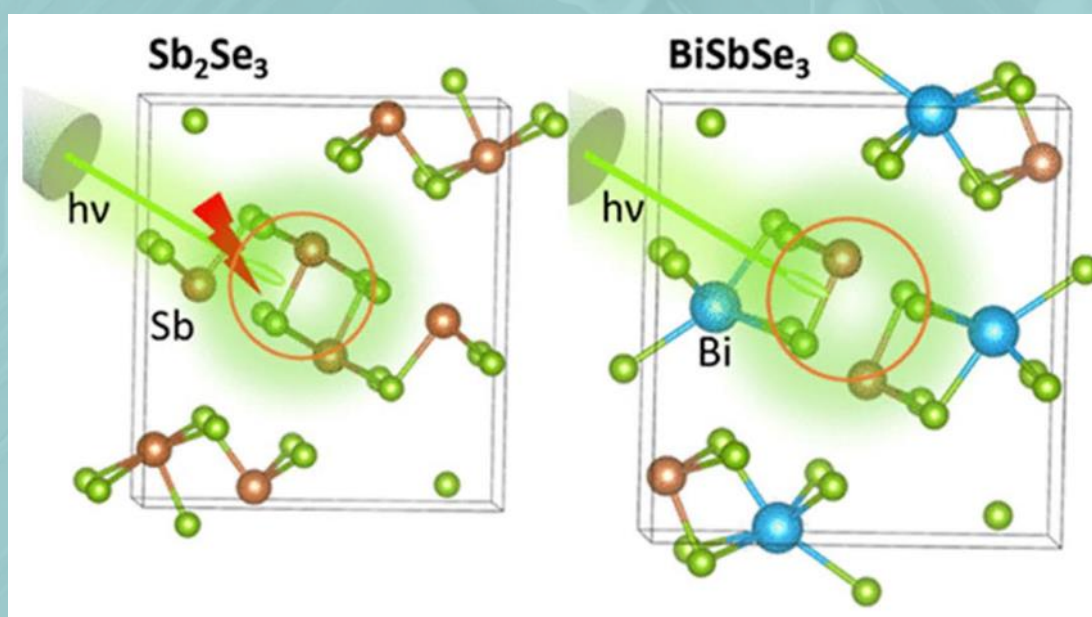
## PUBLICATION



Dr. Jitendra Kumar, INSPIRE Faculty at our department, has recently co-authored a paper titled “What Can Chemical Bonding Tell Us about Photoinduced Phase Transition Reactions in Inorganic Semiconductors? Insight from Bismuth–Antimony Selenide”.

Published in ACS Inorganic Chemistry ([DOI](#)).

The research examines materials like antimony selenide ( $\text{Sb}_2\text{Se}_3$ ) and its bismuth-alloyed version  $(\text{Bi,Sb})_2\text{Se}_3$ , which can repair themselves after being damaged by light. This self-repair mechanism holds great potential for long-lasting solar cells. As more bismuth is added to the material, this self-repair ability weakens and stops completely when the material reaches about 19% bismuth. The study suggests that changes in how atoms bond in the material affect this self-healing, providing insight into designing better, resilient solar materials.





# UPCOMING EVENT

Mark your calendar for our upcoming workshop on the Phased Array Antenna System from 15th to 19th February 2025. Kindly register and grab your seat asap!

[FORM LINK](#)

## Key-note Speakers / Resource Persons

- **Prof. Satish Kumar Sharma**  
Professor, San Diego State University, San Diego, CA, USA.
- **Prof. Gabriel M. Rebeiz**  
Professor, UC San Diego, Franklin Antonio Hall 9500 Gilman Drive, MC 0407, La Jolla, CA 92093, USA.
- **Prof. Gourab Banerjee**  
Professor, Department of Electrical Communication Engineering, Indian Institute of Science, Bangalore 560012, India
- **Prof. S. P. Singh**  
Professor (Retd.), Department of Electronics Engineering, IIT(BHU), Varanasi, U.P. India.
- **Dr. A. K. Singh**  
Dr Raja Ramanna DRDO Distinguished Fellow & Former Director, DLRL Hyderabad.
- **Dr. Milind B. Mahajan**  
Group Director, Antenna System Group, Space Application Centre (ISRO), Ambawadi Vistar P.O., Ahmedabad-380015, Gujrat, India
- **Dr. Prashant Vasistha**  
Scientist 'G' and HEAD DEST & Project Director, Defense Laboratory, Ratanada Palace, Jodhpur-342011
- **Dr. V. S. Gangwar**  
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- **Dr. Prashant Kumar Mishra**  
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- **Dr. Nikesh Kumar Sahu**  
Senior Engineer, RF Design Company: Amphenol Omnicomnect India Pvt Ltd, Chennai.
- **Dr. Jayprakash Thakur**  
Principal Engineer, Antenna Design & Wireless System Integration Architect Intel Technology, Bangalore.
- **Mr. Marwin Coutinho**  
Senior Manager, Rohde & Schwarz, Hyderabad
- **Prof. Ravi Kumar Gangwar**  
Professor, Department of Electronics Engineering, IIT(ISM) Dhanbad, Jharkhand.



Patron  
**Prof. Sukumar Mishra**  
Director, IIT(ISM) Dhanbad

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WORKSHOP ON

**Phased Array Antenna Systems:  
A Revolutionary Technology for  
Modern Communication and  
Defence Application**

15<sup>th</sup>-19<sup>th</sup> February, 2025



Organized by



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## Find out more

<https://electronics.itism.ac.in/>

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