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INDIAN INSTITUTE OF ENGINEERING SCIENCE AND TECHNOLOGY, SHIBPUR
भारतीय अभियांत्रिकी विज्ञान एवं प्रौद्योगिकी संस्थान, शिवपुर

DEPARTMENT OF METALLURGY AND MATERIALS ENGINEERING

METALETTER

A bi-annual Newsletter

April 2025 - September 2025
Volume 1 | Issue 3

METALETTER

A Bi-Annual Newsletter

Mar 2025 – Sept 2025

IIEST Shibpur

MESSAGE FROM HOD

Dear Readers,

I am pleased to present the third issue of our bi-annual newsletter, highlighting the activities and achievements of the Department of Metallurgy and Materials Engineering at IIEST Shibpur from March to September 2025.

This term witnessed several significant events. The Annual General Meeting of the Indian Institute of Metals (IIM), organized by the A.K. Seal Memorial Lecture Committee on 26th July at the Biswa Bangla Convention Centre, Kolkata, was graced by Prof. B. S. Murty, Director of IIT Hyderabad and Shanti Swarup Bhatnagar Prize awardee. The department also co-hosted the Industry–Academia Meet with the IIM Howrah Chapter on 10th July at IIEST Shibpur, fostering closer ties between research and industry. Furthermore, the 29th International Conference on Non-Ferrous Metals (ICNFM 2025), held on 11th–12th July at Hotel Taj Bengal, Kolkata, brought together global experts to deliberate on advancements and challenges in the non-ferrous sector. Adding to this, the Eastern Regional Laboratory, Bureau of Indian Standards, in collaboration with IIEST Shibpur, organized a two-day Workshop on Metallography Testing on 17th–18th July, offering participants hands-on exposure to advanced facilities including SEM, XRD, EDM, and Heat Treatment labs.

Our students and researchers have also made the department proud. Mr. Kabir Baidya, PhD scholar under Dr. Kaushik Das, delivered both oral and poster presentations at the European Coatings Show and Conference 2025, Nuremberg, Germany. At ICNFM 2025, Ms. Samjukta Sinha secured the First Prize for her poster presentation, adding another feather to our cap. Alongside these, our students have excelled in research, cultural, and sporting arenas, strengthening the department's presence on national and international platforms.

We remain committed to excellence in teaching, research, and industry collaboration, while nurturing the holistic development of our students. I extend my heartfelt appreciation to all faculty, students, alumni, and collaborators for their dedicated contributions to the department's progress.

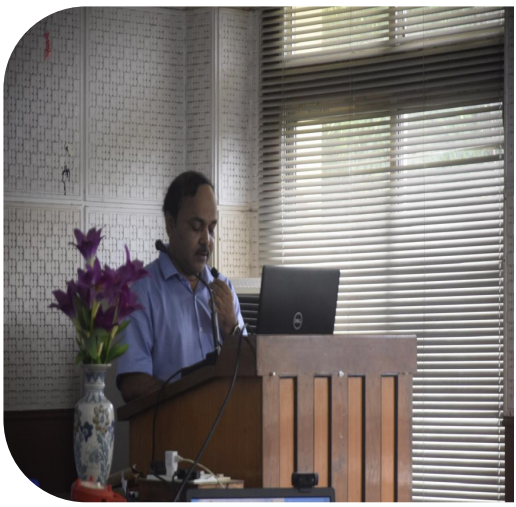
Warm regards,
Dr. Sukumar Kundu
Head of the Department
Metallurgy and Materials Engineering
IIEST Shibpur

EVENTS

- The **Annual General Meeting of the Indian Institute of Metals (IIM)**, organized by the **A.K. Seal Memorial Lecture Committee** on **26th July 2025** at the Biswa Bangla Convention Centre, Kolkata, was graced by Prof. B. S. Murty, Director of IIT Hyderabad and Shanti Swarup Bhatnagar Prize awardee.

EVENTS

- The **29th International Conference on Non-Ferrous Metals (ICNFM 2025)** was held on **11th–12th July 2025** at Hotel Taj Bengal, Kolkata. Organized by Corporate Monitor in association with the Jawaharlal Nehru Aluminium **Research, Development, and Design Centre,** the conference brought together global experts, industry leaders, and researchers to explore advancements, challenges, and opportunities in the non-ferrous metals sector.



EVENTS

- The **IIM–IIEST Sustainability** Workshop was held on **12th September 2025** at **IIEST Shibpur**, jointly organized by **IIM Howrah Chapter, Millennium Institute for Energy & Environment Management**, and the **Department of Metallurgy and Materials Engineering, IIEST Shibpur**. The workshop brought together experts and industry leaders namely from Hindustan Copper Ltd., Tata Steel Ltd., and many other relevant industries to address pressing energy and environmental challenges in metallurgical industries.

- The **Indian Institute of Metals, Howrah Chapter**, in collaboration with the **Department of Metallurgy and Materials Engineering, IIEST Shibpur**, organized an Industry–Academia Meet on 10th July 2025 at IIEST Shibpur where various industry leaders discussed the scope and the need for strengthening innovations and research through industry-academia collaborations.

EVENTS

- The **Eastern Regional Laboratory (ERL), Kolkata, Bureau of Indian Standards**, organized a two-day workshop on Metallography Testing on 17th and 18th July 2025 in collaboration with **MoU Institute IIEST, Shibpur**. Participants explored key facilities such as the Metallography Lab, Scanning Electron Microscope (SEM), Electro Discharge Machining (EDM) Lab, XRD Lab, and Foundry & Heat Treatment section.

Journal Publications

- Neogy, S., A. Kumar, H. Donthula, S. Saini, N. K. Sarkar, A. P. Srivastava, S. K. Ghosh et al. "A comprehensive study on resistance brazing of bearing pad to fuel tube of pressurized heavy water reactor using amorphous filler." Nuclear Engineering and Design 442 (2025): 114245.
- Ghosh, S., G. Kumar, S. Pallaspuro, M. Somani, S. K. Mishra, A. Gokhale, and J. Kömi. "Alloying impacts on austenite stability and fatigue crack propagation in medium-carbon direct-quenched and partitioned steels." Procedia Structural Integrity 68 (2025): 1329-1336.
- Yadav, Muralidhar, Jayanta Kumar Saha, and Swarup Kumar Ghosh. "Surface, chemical, and mechanical properties of polyurethane-coated galvanized steel sheets." Journal of Materials Engineering and Performance 34, no. 2 (2025): 1177-1192.
- Anand, Gaurav, Santanu Sardar, Satesh Sah, Ashim Guha, Ibrahim Albaijan, and Debdulal Das. "Surface and subsurface characteristics of wire-electrical discharge machined Al-alloy and composite: a fundamental study on the role of machining variables." Journal of Materials Research and Technology 36 (2025): 9432-9461.
- Divakar, Sanoj, Santanu Sardar, Satesh Sah, and Debdulal Das. "A state-of-the-art review on SiC and MWCNTs reinforced hybrid metal matrix composites: processing, properties, and applications." Hybrid Advances (2025): 100454.
- Anand, Gaurav, Santanu Sardar, Satesh Sah, Ashim Guha, and Debdulal Das. "Multi-objective optimization to enhance surface integrity in WEDM for Al-matrix composite: A comparative assessment of self-weight adjusting MCDMs and objective weight integrated hybrid TOPSIS methods." Results in Surfaces and Interfaces 18 (2025): 100467.
- Sah, Satesh, Santanu Sardar, Ashim Guha, and Debdulal Das. "Electrical discharge machining of hybrid metal matrix composites: a comprehensive review." The International Journal of Advanced Manufacturing Technology 136, no. 2 (2025): 447-526.
- Ghasemi, Arash, Ali Reza Eivani, Seyed Mahdi Abbasi, Manojit Ghosh, and Hamid Reza Jafarian. "Optimizing the tensile properties of Al10Co25Cr8Fe15Ni36Ti6 high entropy superalloy." Journal of Alloys and Compounds 1037 (2025): 182593.
- Ghosh, Abhishek, and Manojit Ghosh. "Development of a next-generation high-strength Al–Zn–Mg–Cu alloy microalloyed with Ag and Sn through equal channel angular pressing." Journal of Materials Science (2025): 1-28.
- Ghosh, Abhishek, and Manojit Ghosh. "Development of a next-generation high-strength Al–Zn–Mg–Cu alloy microalloyed with Ag and Sn through equal channel angular pressing." Journal of Materials Science (2025): 1-28.
- Jain, Varnit, Vidyapati Kumar, Ankita Mistri, Rajan Kumar Verma, and Manojit Ghosh. "Predicting metallic implant degradation through patient-specific computational modeling." In Advancing Healthcare through Decision Intelligence, pp. 195-209. Academic Press, 2025.
- Adhikari, Jaideep, Prerona Saha, Pritam Mandal, Sudip Kumar Sinha, Asiful H. Seikh, Jabair A. Mohammed, and Manojit Ghosh. "A Review on High Entropy Alloys as Metallic Biomaterials: Fabrication, Properties, Applications, Challenges, and Future Prospects." Biomedical Materials & Devices (2025): 1-30.
- Dey, Debsundar, Anik Pal, Pranjal Biyani, Pritam Mandal, Snehanshu Pal, Suchandan Das, Santanu Dey, and Manojit Ghosh. "Developing new high-entropy alloys with enhanced hardness using a hybrid machine learning approach: integrating interpretability and NSGA-II optimization." Journal of Materials Science (2025): 1-26.

Journal Publications

- Koley, Ishita, Arindam Dhar, Avinash Kumar, Mainak Ghosh, and Sukumar Kundu. "Study on Thermal Simulation, Microstructural, Mechanical, and Electrochemical Behavior of Ultra-Low-Carbon Steel Friction Stir Welded Joints." Journal of Materials Engineering and Performance (2025): 1-23.
- Ghosh, Sangeeta, Debajit Laha, Sukumar Kundu, Swarnendu Baduri, Debasish Ray, and Chinmoy Bhattacharya. "Optimization of growth condition of n-type Bi2O3 semiconductors for improved photoelectrochemical applications." Journal of Solid State Electrochemistry 29, no. 1 (2025): 117-128.
- Barai, Binod, Keshava Boorgula, Howa Begam, Subhasish Sarkar, Ananya Barui, Sukumar Kundu, Buddhadeb Oraon, and Tapendu Mandal. "Multiphysics simulation and experimental investigation of HA and Zn-doped HA coatings on magnesium alloys for resorbable implant applications." Materials Today Communications 42 (2025): 111241.
- Barai, Binod, Vikash Kumar, Pratik Das, Subhashish Sarkar, Piyali Basak, Buddhadeb Oraon, and Tapendu Mandal. "A hybrid multi-objective optimization framework for designing superhydrophobic coatings on magnesium alloys for biomedical applications." Biomaterials Advances (2025): 214469.
- Mandal, Rupam, Nitesh Mondal, Anamitra Ghosh, Ankita Mallick, Subhasish Sarkar, Tapendu Mandal, Rajat Subhra Sen, and Gautam Majumdar. "Estimation of surface roughness upon electroless Ni–Fe–P coatings: experiments, characterization, modelling and optimization." International Journal on Interactive Design and Manufacturing (IJIDeM) (2025): 1-15.
- Chatterjee, S., B. Keshava, H. Kumar, A. Vishwakarma, S. Kundu, and T. Mandal. "Experimental investigation and numerical simulation of electrochemical response of Mg-Al-Zn-Ca alloy." Corrosion Engineering, Science and Technology (2025): 1478422X251321942.
- Barai, Binod, Keshava Boorgula, Howa Begam, Subhasish Sarkar, Ananya Barui, Sukumar Kundu, Buddhadeb Oraon, and Tapendu Mandal. "Multiphysics simulation and experimental investigation of HA and Zn-doped HA coatings on magnesium alloys for resorbable implant applications." Materials Today Communications 42 (2025): 111241.
- Ahmad, Owais, Vishal Panwar, Kaushik Das, Rajdip Mukherjee, and Somnath Bhowmick. "Scope of generative artificial intelligence in microstructural studies: a case study." Physica Scripta (2025).
- Baidya, Kabir, R. O. Y. Amritendu, and D. A. S. Kaushik. "Electro-elastic properties of a polyaniline grafted polyurethane/barium titanate piezoelectric composite for energy harvesting application." Materials Today Communications (2025): 112979.
- Manna, Mouparna, Shailesh Kumar Singh, and Snehanshu Pal. "Molecular Dynamics Simulation Study of Irradiated High-Entropy Alloy with Crystalline–Amorphous Nanolaminate." High Entropy Alloys & Materials (2025): 1-15.
- Mishra, S., K. Vijay Reddy, and S. Pal. "Role of grain architecture in shock behavior and spalling behavior of Al metal-Al 90 Sm 10 metallic glass nanolaminates: S. Mishra et al." Shock Waves (2025): 1-20.
- Reddy, K. Vijay, Punit Kumar, Saurabh Vashistha, Snehanshu Pal, and Shailesh Kumar Singh. "Effect of structural modulation of B2 phase on the deformation mechanism in FeNiCrCoAl high entropy alloy: an atomistic insight." Materials Chemistry and Physics 340 (2025): 130840.
- Lakshmikant, Pala, Raju DV, and Suman Guha. "Numerical investigation of the fatigue life of center sill of a BFNSM wagon." Proceedings of the Institution of Mechanical Engineers, Part L: Journal of Materials: Design and Applications (2025): 14644207251345076.

Conference Publication

- Supriti Pramanik and Swarup Kumar Ghosh, Microstructure Analysis and Hardness Evaluation of High Strength Medium Manganese Steel, 3rd International Conference on Recent Trends in Materials Science & Devices (ICRTMD 2025), 24-26 March, 2025, Haryana, India, 2025

Book Chapters

- Sneha Roy and Swarup Kumar Ghosh, Bio-inspired Steel Coatings for Corrosion Resistance and Sustainability, in: Sustainable Manufacturing of Advanced Materials, Wiley-Scrivener, Beverly, Massachusetts, 2025

- Muralidhar Yadav and Swarup Kumar Ghosh, Sustainable Steel Processing Techniques: Minimising Waste and Energy Consumption, in: Sustainable Manufacturing of Advanced Materials, Wiley-Scrivener, Beverly, Massachusetts, 2025
- Indrajit Dey and Swarup Kumar Ghosh, Advanced High-Strength Steel Alloys for Sustainable Applications, in: Sustainable Manufacturing of Advanced Materials, Wiley-Scrivener, Beverly, Massachusetts, 2025

- Ankita Bhattacharya, Ghanshyam Das and Swarup Kumar Ghosh, High-Performance Steels for Sustainable Manufacturing of Vehicles, in: Sustainable Manufacturing of Advanced Materials, Wiley-Scrivener, Beverly, Massachusetts, 2025

- Gurudas Mandal, Swarup Kumar Ghosh, Snehanshu Pal and Sandip Kunar, Sustainable Manufacturing of Advanced Materials, Wiley-Scrivener, Beverly, Massachusetts, 2025

Research Project & Consultancy

Dr. Sukumar Kundu
Associate Professor

Dr. Tapendu Mandal
Assistant Professor

- Dr. Sukumar Kundu and Dr. Tapendu Mandal received a Consultancy on **Comparative study of Bio-organic corrosion Resistance of Ductile Iron Pipe**. Funding Agency: **Electrosteel Casting Limited, Kolkata-700115**. Amount: **10,50,200/-**.

Patents

- Machine Learning System for Developing Carbide-Free Bainitic Steel-Design Patent Application No. 429217-001; dated 03.09.2024 - ***Prof. Swarup Kumar Ghosh***
- Carbon Fibre Based Smart Face Mask-Design Patent Application No. 411989-001; dated 29.03.2024 - ***Prof. Swarup Kumar Ghosh***
- Silica Coated Melting Oven for Production of Metal Artefacts-Design Patent Application No. 409157-001; dated 29.02.2024 - ***Prof. Swarup Kumar Ghosh***

- Machine Learning System for Developing Carbide Free Bainitic Steel-Design Patent Application No. 429217-001; dated 03.09.2024 – ***Dr. Snehanshu Pal***

- Jig For Bi-axial Testing Apparatus, Application No: 202231000467, Publication Date: 07/07/2023 – ***Dr. Suman Guha***
- A Zero Deflection Blade, Application No: 202231049879, Publication Date: 08.03.2024 – ***Dr. Suman Guha***
- System for Roll Forming and Process Thereof, Application No: 202331022121, Publication Dt: 04/10/2024 – ***Dr. Suman Guha***
- Crash Barrier, Application No: 202431019023, Publication Dt: 19/09/2025 - ***Dr. Suman Guha***
- Cantilever System for Electrical Transmission Line, Application No: 202431002246, Publication Dt: 18/07/2025 – ***Dr. Suman Guha***

- **Srijan Yadav** completed a research internship at **Ritsumeikan University**, Japan, during his 6th–7th semester break in 2025. He also showcased his musical talent by winning **1st**, **2nd**, and **3rd** prizes at **Crescendo 2025**, the annual music competition of Euphony — IIEST Shibpur's music society.

STUDENTS ACHIEVEMENTS

- **Jasmine Hafiz Rahaman Mallick** won the Best Presentation Award at the national-level seminar *Behind the Teacher's Desk* held at **NIT Jamshedpur**, showcasing clarity of thought and effective communication skills.

- **Yash Chandekar** powered **Raptors FC** to back-to-back triumphs in **IFL 4.0** and **5.0**. With his passion and teamwork shining through, he became a driving force in the **IIEST Football League** — the campus's most thrilling, professional-style showdown.

STUDENTS ACHIEVEMENTS

- **Pratyusha Sarkar** is serving as the **Vice President** of **Euphony**, **the music society of IIEST Shibpur**, where her leadership and love for music inspire many of her peers.

EUROPEAN COATINGS SHOW 2025 conference

Certificate of Participation

Kabir Baidya

attended the

European Coatings Show Conference

as a Speaker

in Nuremberg, Germany
from 24 to 26 March 2025

Europe's leading Conference on Coatings, Inks, Adhesives, Sealants, Construction Chemicals

Thank you very much for your attendance!

Damir Gagro
Director Content / Editor-in-chief
Coatings Division
Vincentz Network

Ilham Harisache
Senior Event Manager Trade Shows
Coatings Division
Vincentz Network

VINCENTZ

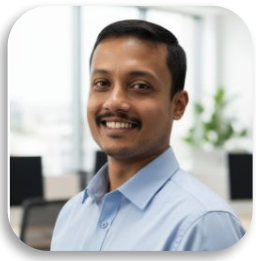
Mr. Kabir Baidya, a PhD scholar under **Dr. Kaushik Das**, delivered both an oral presentation and a poster at the **European Coatings Show and Conference 2025**, held in Nuremberg, Germany.

STUDENTS ACHIEVEMENTS

Samjukta Sinha, a PhD Scholar under **Prof. Manojit Ghosh**, won **1st prize** in the poster presentation at the **29th International Conference on Non-Ferrous Metals (ICNFM-2025)**, held on **11th–12th July 2025** at Hotel Taj Bengal, Kolkata. Organized by Corporate Monitor in association with the Jawaharlal Nehru Aluminium Research Development and Design Centre.

Editorial Team

Faculty Member



Dr. Suman Guha, *Assistant Professor*

Student Member

Mr. Bishal Kanrar, *Research Scholar*

Ms. Samjukta Sinha, *Research Scholar*

Mr. Sayan Mukherjee, *Research Scholar*

Mr. Sayantan Dutta, *Research Scholar*