

Message from the HOD

It gives me immense pleasure to present the third (October, 2025) issue of the department newsletter, MECHRONICLE from the Department of Mechanical Engineering. This publication serves as a testament to the dedication, achievements and aspirations of our vibrant academic community.

This semester, we welcomed five new faculty members, each bringing expertise from diverse specializations, thereby enriching the academic and research environment of the department. Our faculty continue to make significant progress in research, with several publications in reputed journals and submission of competitive project proposals targeting real-world engineering challenges. These efforts not only enhance the department's academic stature but also contribute meaningfully to technological advancement and societal development.

One of the major highlights this semester was the successful organization of the 3rd International Conference on Energy Resources and Technologies for Sustainable Development (ICERTSD-2025), held in collaboration with the Chirasree Centre for Sustainable Infrastructure Development (CCSID), IIST Shibpur. Centred around the theme "Commitment to Sustainability," the conference provided a dynamic platform for the exchange of innovative ideas and cutting-edge research in energy resources, sustainable systems, and climate change mitigation technologies. The success of this event has laid a strong foundation for the 4th occurrence, scheduled for 2027.

In line with our commitment to continuous learning and faculty enrichment, the department has planned four Faculty Development Programs (FDPs) scheduled for the end of this semester and into the next. Additionally, preparations are underway for the organization of an Executive Development Program (EDP), aimed to the industry personnel in the third week of January 2026.

Our students continue to excel across academic and co-curricular domains. Their active participation in technical competitions, impactful industry visits and excellent placement outcomes reflect the department's holistic approach to education. These achievements are a source of immense pride and affirmation of our ongoing efforts to bridge theoretical knowledge with practical application.

I take this opportunity to express my sincere gratitude to all faculty members, staff, students and alumni for their continued support and contribution to the department's growth. I hope this issue of our newsletter captures the spirit of our collective journey and continues to inspire excellence in every endeavour.

With best regards,



Prof. Subhas Chandra Mondal

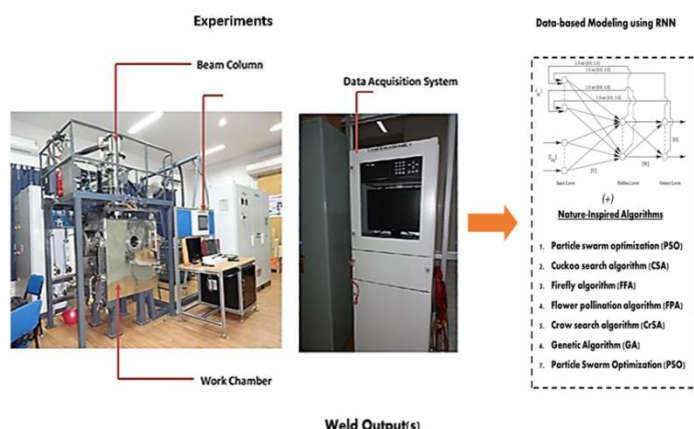
Professor and Head,
Department of Mechanical Engineering

Editorial

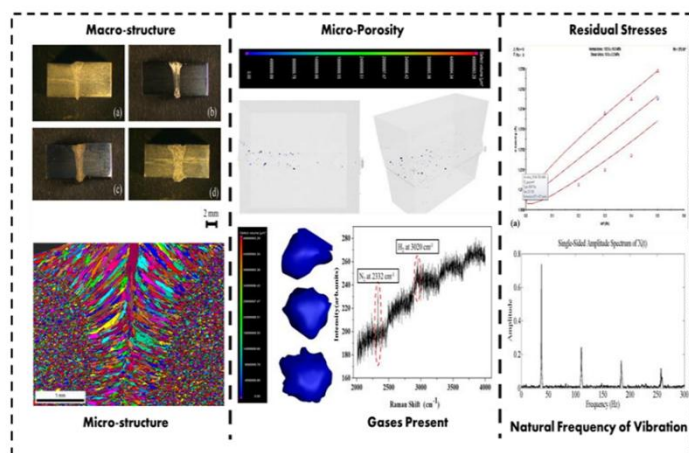
AI-ML in Manufacturing Engineering

Artificial intelligence (AI) and machine learning (ML) have increasingly become an integral part of mechanical engineering, transforming design, manufacturing, and maintenance processes. AI-ML powered tools, such as generative design and simulation algorithms, allow engineers to optimize designs more efficiently, reducing material usage and development time. In manufacturing, AI-ML enables

predictive maintenance by analysing real-time data to prevent equipment failures, while robotics and automation enhance precision, safety, and productivity. Quality control is also improved through AI-ML-driven inspection systems that detect defects faster and more accurately than traditional methods. Overall, AI-ML is helping engineers work smarter, accelerate product development, and improve operational efficiency. For example, as of now, we are already aware of the use of different AI-ML-based expert systems in detecting diseases, developing agriculture robots, level-2 ADAS systems in cars, etc.



Weld Output(s)



Looking forward, AI-ML is expected to dive deeper into individual lives and influence in industrial areas like autonomous systems, adaptive manufacturing, the medical sector, the agriculture sector, energy-efficient designs and many more. Mechanical engineers will see

a deeper collaboration with AI-ML systems, data analysis, and creative problem-solving. This will create new opportunities, such as AI-ML-based design engineers and smart manufacturing specialists, which will require interdisciplinary skills combining the conventional mechanical engineering knowledge with the latest AI-ML capabilities. In essence, AI-ML is not only reshaping the tools used in mechanical engineering but also redefining the profession itself.



Prof. Bijan Kumar Mandal
Professor,
ME Dept.



Dr. Debasish Das
Assistant Professor,
ME Dept.

Content

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Departmental Activities

The department mourned the unfortunate and untimely demises of two prominent ex-faculty members of the department, Prof. R. N. Dey and Prof. A. K. Chattopadhyay.

Four new regular faculty members have joined the department with another expected to join soon. Now the department has 21 faculties of which, 5 are professors, 3 are associate professors and 13 are assistant professors. The thermal specialization has 8 faculty members, the manufacturing specialization has 5 faculty members and the m/c design specialization has 8 faculty members.

This year, in the first year of AY 2025-26 admission batch, 104 student have been enrolled in the B. Tech. programme in Mechanical Engineering.

Academic Arena

The department has implemented NEP2020 for both UG and PG programmes from AY 2025-26. Under the programmes some new subjects and remodelling of the specialization and their curricula and some new subjects were introduced.

At par the curricula of the IITs/IISc/other premium institutes in the country and abroad, advanced subjects like 'AI-ML Applications in Mechanical Engineering', 'Laser Material Processing', 'Electric Vehicles Technology', 'Energy Storage Technology', 'Additive Manufacturing' and 'Biomechanics' are being offered as electives in UG and similarly, 'Machine Learning for Mechanical Engineering', 'Modern Materials', 'Data-Driven Dynamical Systems', 'Hydrogen Energy & Fuel Cells', 'Carbon Capture & Storage', 'Micro and Nano Manufacturing' are being offered in PG.

Infrastructural Planning and Development

One of our illustrious alumni Sri Debabrata Mukherjee, batch of 1999 has donated Rs. 1.00 lac for purchase of books for ME and allied subjects.

In this regard, it is planned to renovate the sub-library in the department and an appeal has been made to the Executive Committee of the GAABESU for funding of about 6 lacs for the purpose.

Respective students of the department have requested for modifications of Gallery 5 and Gallery 6 for better air-circulation and audio systems. The DFC has recognised the issues and planned to upgrade the Galleries to Smart Classrooms using the support from the institute and/or the alumni.

The department has sought additional rooms and lab space in the new G+5 building being developed in the north of the department.

Renovation of the roof by waterproofing and changing the damaged rain water pipes have been done.

The 'Bench-top Green Hydrogen Generator' set up was installed in the Renewable Energy Lab (3rd FL) on 24 June 2025, under the supervision of Dr. Uttam Rana.

On 30 June 2025, the newly procured RAC Lab instruments: 'Ductible Air Conditioner Test Rig' and 'Experimental Water-Cooling Tower' were demonstrated in the ground floor Engine lab, under the supervision of Dr. Mukesh Kumar.

A 'Clean Campus and Green Campus' drive was organized by the department on 14 July 2025.



Conference/Workshop/Lecture Series

3rd International Conference on Energy Resources and Technology for Sustainable Development (ICERTSD), 2025 has successfully been hosted by the department in association with Chirasree Centre for Sustainable Infrastructure Development (CCSID), IIST Shibpur on 11 – 12 September 2025. The theme of the conference was "Commitment to Sustainability". For further details, interested readers may visit: www.icertsd.org



The faculty members of the thermal specialization of the department, especially Dr. Sudip Ghosh (General Chair), Dr. Mukesh Kumar and Dr. Uttam Rana (Joint Convenor), have taken the major role behind the success of the grand event.

On 10 September 2025, a Pre-conference Research Workshop on "Modelling & Analysis of Energy Systems" was held.



A poster competition was also taken place alongside the conference after opening on 10 September 2025. The event was sponsored and managed by 'M/s Thermal Associate Pvt. Ltd.'.



Results of the Poster Competition during the conference 11-12 September, 2025 are:

First Position: Subhadeep Maji, Dibya Jyoti Das and Debjit Maity (IIST Shibpur)

Second Position: Debrup Sarkar, Sayan Laha, Priyangshu Saha, Sudipta Sarkar (IEM Kolkata)

Third Position: Rupam Paik, Disha Patra, Kiran Hembram, Gunjan Sardar (IIST Shibpur)



The event was concluded with a cultural programme, a gala dinner and a short eco-excursion on a river-cruise

on the river Ganges where participation of our honourable Chairperson laid another dimension.

The department hosted a 'One-day Seminar on COMSOL Software' was organized by Dr. Apurba Das on 12 June 2025 at ME Seminar Hall.



Dr. Apurba Das organized a talk by academic expert and another by industry expert on 23 July 2025.



Dr. Snehashis Pal, Scientific Associate, Faculty of Mechanical Engineering and Faculty of Chemistry and Chemical Engineering, University of Maribor, delivered a talk on 'Insights into Additive Manufacturing and International Funding and Scholarship Opportunities: Strategies for Success'.

Dr. Ananyo Banerjee, Manager of NDE-Metallurgy Group at MxV Rail (formerly TTCI), has delivered a talk on 'Research Areas and Recent Advancements in

the Railway Domain Globally and Career Options in Railway Research'.



The ME Dept and AE&AM have jointly organized a talk by Prof. Debjyoti Banerjee, Professor, ME Dept, Texas A&M University, USA on 25 July 2025 at the ME Dept Seminar Room at 4-15 p.m., hosted by Dr. Apurba Das. Prof. Banerjee discussed on "Nano-Fin Effect (nFE)"

Prof. Partha Pratim Dey organized a technical demonstration of 'CAD & CAM Functionalities in PTC Creo' in the department on 6 August 2025.



Research and Development

The department runs a full-time PhD program, where currently about **44** research scholars are engaged.

Sponsored Projects

Dr. Sudip Ghosh and Dr. Kaustav Pradhan have an R&D Project on 'Development of Solar Assisted Self-Sustained Circular Greenhouse for Protected Floriculture and Horticulture'. Funding Agency: WB DST. Project Value: 24.5 L. Period: 3 yrs

Dr. Aritra Ganguly has submitted a proposal in MNRE

Dr. Bidyut Pal has submitted three proposals in ANRF and DST

Dr. Mukesh Kumar has submitted three proposals in ANRF, DBT and DST

Many other faculties have submitted multiple proposals in ANRF and other funding agencies.

Consultancy Projects

Dr. Aritra Ganguly has one ongoing consultancy project in Top Grip Instruments Ltd. of 3.2 lacs.

Dr. Apurba Das has ten completed and two ongoing consultancy projects. The total value is approx. 52 lacs.

Collaborations

Prof. Subhas Chandra Mondal has instigated a possible MOU between IEST Shibpur and University of Maribor, Slovenia, which is, promisingly, in progress.

Prof. Subhas Chandra Mondal has collaborative PhD research works with CMERI Durgapur and Jadavpur University

Prof. Partha Pratim Dey has one collaborative Ph.D. research with CSIR-NML Jamshedpur

Dr. Sudip Ghosh has collaborated with Omsk State Technical University (Russian Federation) for Joint Indo-Russian R&D Project Proposal (not succeeded)

Dr. Sudip Ghosh has collaborated with M/S Aditya Udyog for DST Project Proposal on Methane Mitigation (Results awaited)"

Dr. Sudip Ghosh has collaborated with JGEC, Jalpaiguri for WB DST project on Solar Greenhouse

Dr. Aritra Ganguly has collaborated with Indian Coast Guard and with Haldia Institute of Technology, resulting in Joint Publications.

Dr. Bidyut Pal collaborated with Imperial College London (joint paper), IITISM Dhanbad (research student supervision-external), IIT Kharagpur, Delhi, and Guwahati (Co-authored book), and with the

University of Twente (GIAN course proposal submission)

Dr. Apurba Das has collaborated with Institute of Science, Tokyo.

Dr. Snehasish Bhattacharjee has collaborations with Jadavpur University in terms of joint publication.

Patents

Dr. Aritra Ganguly has one published patent

Dr. Apurba Das has one published patent

Dr. Mukesh Kumar has filed two patent applications

Publications

Journal Publication

Gourab Sen and Subhas Chandra Mondal, Synthesis and processing techniques of copper-graphene reinforced metal matrix composites: a review, Vol. 7 (3) DOI 10.1088/2631-8695/adfdad, pp. 1-44, Engineering Research Express, 2025.

Subrata Mondal, Sutanu Misra, Goutam Paul, Koustov Mondol, Subhas Chandra Mondal, Exploring Machinability of Graphene Reinforced Aluminium Metal Matrix Composites: A Machine Learning Approach, accepted for publication 2025, Sadhana,

Biswas K, Datta D. Ballistic impact analysis on the effect of layering and stacking sequence of bi-layer and multi-layer ceramic-composite targets. Proceedings of the Institution of Mechanical Engineers, Part L: Journal of Materials: Design and Applications. 2025;0(0). doi:10.1177/14644207251327920

Sinha Indranil, Datta Ambarish, Mandal Bijan Kumar, Effect of different quaternary blends of diesel-ethanol-methanol-butanol on combustion and spray characteristics of diesel engine, Thermal Science, 2025, Volume 29, Issue 1 Part B, pages 411-425, DOI: 10.2298/TSCI240212190S

Mandal, Saikat and Chakraborty, Shirshendu and Dey, Partha Pratim; 2025; Investigation of machining characteristics and optimization of WEDM parameters for spark plasma sintered ZrB₂-B₄C ceramic composite utilizing RSM, NSGA II, and TOPSIS; Engineering Research Express; 7 (2), 025576. DOI: 10.1088/2631-8695/ade599

Sardar, S., Misra, S. & Dey, P.P. Machine Learning-Based Data Prediction in Friction Stir Spot Welding for AA2018-H2 and C10200 on Fracture Load and Ductility. J. of Materi Eng and Perform (2025). DOI: 10.1007/s11665-025-11673-w

Sardar, S., Dey, P.P. Analysis of intermetallics and oxide formation by plunging action of the tool in bimetallic AA2018-T4 and C10200 friction stir spot welded products. Sādhanā 50, 94 (2025). DOI: 10.1007/s12046-025-02733-x

Surya P. Rao, S. Sivaprasad, H.N. Bar, Partha Pratim Dey, Constitutive modeling and experimental analysis of asynchronous multiaxial fatigue in 304LN stainless steel using Bayesian optimization, International Journal of Fatigue, Volume 202, 2026, 109214, DOI: 10.1016/j.ijfatigue.2025.109214.

Swapnil Mahadev Dhobale, Shyamal Chatterjee, An improved adaptive sliding mode controller for generating periodic motions in mechanical systems – A model-free approach, Communications in Nonlinear Science and Numerical Simulation, Volume 151, 2025, 109128, DOI: 10.1016/j.cnsns.2025.109128.

Prasanjit Kumar Kundu, Swapnil Mahadev Dhobale, Shyamal Chatterjee, Experimental dynamic modelling of a nonlinear cantilever beam using adaptive feedback self-excitation, Mechanical Systems and Signal Processing, Volume 237, 2025, 113131, DOI: 10.1016/j.ymssp.2025.113131.

Swapnil Mahadev Dhobale, Shyamal Chatterjee, Synthesis of a universal second-order limit cycle

oscillator for prescribed phase-plane trajectories – A data-driven approach, Chaos, Solitons & Fractals, Volume 201, Part 2, 2025, 117276, DOI: 10.1016/j.chaos.2025.117276.

Chowdhury, S., Mondal, P. and Ghosh, S., 2025. Integrating solid oxide fuel cell and vapour absorption cooling with MSW gasification: process modelling and exergo-enviro-economic analysis. Journal of the Brazilian Society of Mechanical Sciences and Engineering, 47(1), p.31. (SCIE)

Pranav Kumar Iyer, V.R.Abishraj, Aritra Ganguly and M.P.Maiya, Numerical studies of a compact desiccant-coated M-cycle cooler for attaining sub-dew-point temperatures, Accepted for publication July 2025, Journal of Energy Resources Technology, Part A: Sustainable and Renewable Energy, Transactions of ASME (SCI Journal Impact Factor 2.6), 2025

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Ajay Vishwakarma, Uttam Rana; Exploring serpentine cold-plate designs for efficient cooling of Li-ion pouch cells: A computational analysis, 244 (2025) 126896, International Journal of Heat and Mass Transfer, 2025

Abhik Chaudhuri, Tanmoy Loha, Prashanta Kr Mahato, Andrew A Amis, Bidyut Pal, Preclinical analysis of a novel short hip-stem design: A finite element model-based investigation, Medical Engineering & Physics, Volume 145, 2025, 104415, DOI: 10.1016/j.medengphy.2025.104415.

K. Pradeep, S. M. Dhobale, and B. Pal, "Bone Remodelling in Lumbar Spine: A Comparative Analysis of Ti-Alloy, PEEK and CFR-PEEK Implant Materials," International Journal for Numerical Methods in Biomedical Engineering 41, no. 7 (2025): e70071, <https://doi.org/10.1002/cnm.70071>.

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Majumdar S, Maity P, Das A, Sinha A, Datta P, Nag D. Thermal Treatments on 6061 T6 Aluminum Alloy: Mechanical Property and Laser Machining. Journal of The Institution of Engineers (India): Series D. 2025 Jul 26:1-3.

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Sounak Chakraborty, Santanu Das, Comparative analysis of soft-impact and Gent models used in

dielectric membrane based vibro-impact energy harvesting, 179, 105238, International Journal of Non-Linear Mechanics, 2025 DOI: 10.1016/j.ijnonlinmec.2025.105238

Vaibhav Gangwar, Snehasish Bhattacharjee, Sanjib Kumar Acharyya, Sankar Dhar, Arkadeb Banerjee, Santu Chakraborty. 2025. Evaluating thermoviscoplastic models and failure criteria for rolled homogenous armor steel, Materials Chemistry and Physics, Volume 341, Page 130936, DOI: 10.1016/j.matchemphys.2025.130936.

Satesh Sah, Santanu Sardar, and Debdulal Das, Optimization of W-EDM process for superalloy by different objective weight integrated MCDM - a comparative study of CoCoSo and CoCoFISo methods, (26 Pages), International Journal on Interactive Design and Manufacturing (IJIDeM) (Springer, ESCI, Q2), Accepted on 25th August, 2025 DOI: 10.1007/s12008-025-02397-1

Gaurav Anand, 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, 36, 9432–9461 (30 Pages), Journal of Materials Research and Technology (Elsevier, SCIE, Q1), 2025 <https://doi.org/10.1016/j.jmrt.2025.05.126>

Sanoj Divakar, 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, 10, 100454 (53 Pages), Hybrid Advances (Elsevier, Q2), 2025, 10.1016/j.hybadv.2025.100454

Gaurav Anand, 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, 18, 100467 (28 Pages), Results in Surfaces and Interfaces (Elsevier, Q2), 2025 DOI: 10.1016/j.rsurfi.2025.100467

Conference Proceedings/Presentations

S Chowdhury, S Ghosh, P Mondal, A sustainable multi-output energy system using MSW gasification, reversible solid oxide fuel cells, and solar PV-wind sources: Thermodynamic Study, 3rd ICERTSD 11-12 Sept 2025 (presented).

P.Mondal, M.Kumar and A.Ganguly, Thermo-environmental Performance Analyses of a Domestic Cook-stove Burner Fuelled with H₂ Blended LPG, Paper ID 205, 3rd International Conference on Energy Resources and Technologies for Sustainable Development (ICERTSD) 11-12 September, 2025

Rana U.; Optimizing Cell Insert Structure for Enhanced Thermal Management in Air-Cooled Battery Packs (Paper Id: 429).

Rana U.; Numerical Investigation of Coolant Inlet Configurations for Thermal Homogeneity in 20Ah Prismatic Li-ion Batteries at High Discharge Rates (Paper Id: 430)

Nath Soumyadeep, Pal Bidyut, Finite Element Analysis Of An Auxetic Porous Knee Implant Design Incom 2026: Proceedings of the 3rd International Conference on Mechanical Engineering, Jadavpur University, Kolkata, India: January 08 - 10, 2026 (Submitted on 31 August 2025).

Majumdar S, Maity P, Das A, Sinha A, Datta P, Nag D. Evaluation of Elastic Constants of Artificially Aged 6061-T6 Aluminum Alloy using Ultrasonic Testing, INCOM 2026 (Accepted)

Pradhan, K., Ghosh, S., Das, D., Support vector and K-nearest neighbour-based modeling of hydrogen production, 3rd International Conference on Energy

Resources & Technologies for Sustainable Development (ICERTSD), IEST Shibpur, Howrah, West Bengal - 711103, India, 11-12 September, 2025.

Pradhan, K., Ghosh, S., Das, D., Support vector and K-nearest neighbour-based modeling of hydrogen production, 3rd International Conference on Energy Resources & Technologies for Sustainable Development (ICERTSD), IEST Shibpur, Howrah, West Bengal - 711103, India, 11-12 September, 2025.

Sarkar, T.K., Ghosh, S., Pradhan, K., "Solar Chimney for Augmented Natural Ventilation in Greenhouses" 40th NCME-RAME 2025 IEI Durgapur Local Centre and NIT Durgapur, 23-24 Aug 2025.

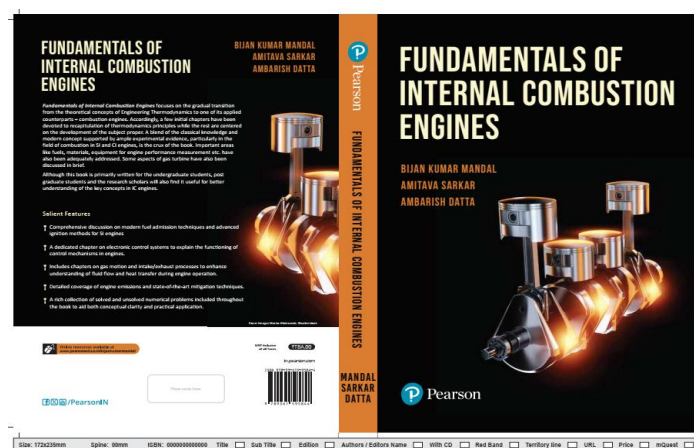
Book Chapters

Ghosh S, Waste heat recovery from fuel cells, in Waste Heat Recovery, Its Utilization and Performance Assessment, Elsevier (2025, in press)

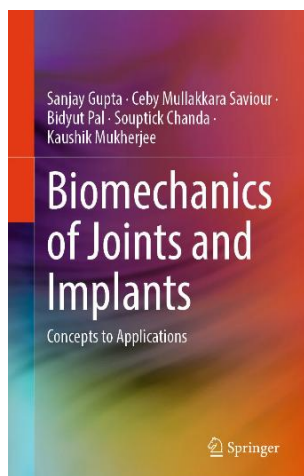
Gautam K, Ghosh S, Concentrated Solar Assisted Biomass Gasification and Hydrogen Enrichment System, Lecture Notes in Mechanical Engineering, Springer Nature (2025, in press).

Books

Prof. Bijan Kumar Mandal, along with Prof. Amitava Sarkar and Prof. Ambarish Datta, have authored a textbook on internal combustion engines named '*Fundamentals of Internal Combustion Engines*' published by Pearson India bearing ISBN: 9789361595844.



Dr. Bidyut Pal, along with Prof. Sanjay Gupta, Prof. Ceby Mullakkara Saviour, Prof. Souptick Chanda and Prof. Kaushik Mukherjee, have authored a text book on biomechanics named '*Biomechanics of Joints and Implants – Concepts to Applications*', published by Springer Nature Singapore.



Outreach Activities

Industry/Academia Visit

Prof. Subhas Chandra Mondal, HoD, ME Dept. visited the University of Maribor, Slovenia for possible research and academic collaboration, in April, 2025



Dr. Aritra Ganguly visited CESC B. Garden Station on 18 September 2025.

Dr. Apurba Das visited Brand and Alloy as Experts for Casting defects.

Invited Talks

Prof. Bijan Kumar Mandal delivered an Invited talk on 'Numerical Simulation Of Soot Formation In Diffusion Flame' in the FDP on Recent Advances in Computational Fluid Dynamics (CFD) and Its

Applications FDP, organized by The Electronics and ICT Academy at PDPM IITDM Jabalpur, 16 August – 21 August, 2025

Prof. Bijan Kumar Mandal delivered keynote talk on 'Biodiesel as Alternative Fuel for Compression Ignition Engine' in Online FDP on Future Prospects of Green Technologies with AI and ML Applications, under the aegis of Electronics and ICT Academy, NIT Patna, 14 - 25 July 2025

Prof. Bijan Kumar Mandal delivered an Invited talk on 'Heat Exchanger: Types, Design and Analysis' in 5-day STTP entitled 'Advancements in Mechanical Engineering', 01 - 05 July 2025

Dr. Sudip Ghosh delivered two talks at the Malaviya Mission Teacher Training Program on High-Efficiency, Low-Emissions Clean Coal and Carbon Capture, Utilization and Storage Technologies, IIT ISM Dhanbad, 23 - 28 September, 2024.

Dr. Sudip Ghosh attended the 'International Conference on Agriculture (ICAG) 2025', Dhanbad, 25 June 2025.

Dr. Bidyut Pal was the Session Chair for a Technical Session in the '4th International Conference on Industrial Engineering and Mechanical Power (IEMPOWER), 2025', Institute of Engineering and Management, Kolkata, 18-20 July 2025.

Dr. Apurba Das delivered an ATAL FDP Lecture as a keynote speaker on 5 September 2025 at the AICTE Training and Learning (ATAL) Academy Sponsored on-line FDP on "Next-Generation Materials: Innovations, Challenges & Applications" from 1 – 6 September, 2025. His topic was: '*Aluminum Alloy for Aerospace, Railway, and Biomedical applications*'.

Dr. Mukesh Kumar attended (online) the 'Five Days Workshop on Sustainable Hydrogen Production and Integration of Hydrogen Technologies' at IIITM Jabalpur, from 12-16 May 2025.

Dr. Mukesh Kumar was the Session Chair for a Technical Session in the '4th International Conference

on Industrial Engineering and Mechanical Power (IEMPOWER), 2025', Institute of Engineering and Management, Kolkata, 18-20 July 2025.

Dr. Mukesh Kumar was the Session chair (online mode) for a Technical Session in the 'International Conference on Recent Trends on Innovation in materials & processing Techniques (RTIMPT), 2025' Organized by TMU Moradabad, 22-23 August 2025.

Dr. Kaustav Pradhan delivered a talk at Mechtronica 2025 at IEM Kolkata organized by SAE IEM Collegiate Chapter on 19 Sept 2025

Achievements

Faculty Achievements

Dr. Sudip Ghosh was the Nominated Expert to Working Groups 1 and 7 of the ISO Technical Committee on Solid Biofuels (ISO TC 238)

Dr. Sudip Ghosh was the External Expert on the PhD Research Committee of Jadavpur University (Power Engineering Department)

Dr. Sudip Ghosh was the Nominated Expert to Solid Biofuels Sub-Committee (PCD7:6) of Bureau of Indian Standards

Dr. Sudip Ghosh was the Member of the Editorial Board of Journal of Electrochemical Materials & Technology

Dr. Aritra Ganguly was Nominated as Assessment Committee Member at NCSM, Ministry of Culture GOI at NCSM HQ, Kolkata.

Dr. Aritra Ganguly was awarded National Reviewer of the ARAI Journal of Mobility Technology published quarterly by the Automotive Research Association of India (ARAI) under Government of India, Ministry of Heavy Industry.

Dr. Apurba Das was awarded National Reviewer of the ARAI Journal of Mobility Technology published

quarterly by the Automotive Research Association of India (ARAI) under Government of India, Ministry of Heavy Industry.

Dr. Santanu Das was selected as Associate Member of IMechE, London, United Kingdom

Dr. Debasish Das has applied for the membership at The Indian Institute of Welding (IIW), verification awaited.

Students Achievements

Komal Sharma (UG, 2023-27) under the guidance of Prof. Bijan Kumar Mandal, has secured 3rd global rank in ASME Technical Digital Poster competition. She made her presentation on AI-Powered Exoskeleton.

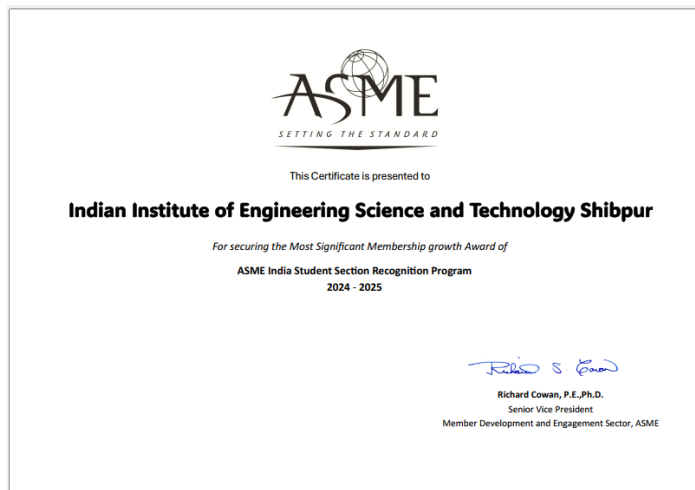


Ishita Chaudhary along with Soham Banerjee and Pabitra Bhuyan (UG, 2021-25) under the guidance of Prof. Bijan Kumar Mandal received the 'Best Paper' award at the 1st International Conference on Energy, Environment and Green Energy (ICEEGT 2025), organised by NITTTR Kolkata on 3 – 4 April 2025.

Soham Banerjee (UG, 2021-25) received the 'BEC1984 Change-Maker' award on 18 July 2025. A cheque of Rs. 80000.00 was awarded by the BE College Alumni, 1984 batch.



The department is delighted for achieving the 'Most Significant Membership Growth' award by the student members of the ASME IESTS Chapter and the PIC, Dr. Uttam Rana.



Ayush Dutta, a 3rd year UG student of the department, has been awarded a stipend of ₹10,000 per month for a period of 10 months under the TEXMiN–IIEST Shibpur Mining CPS Centre (CoE) Programme, under the supervision of Dr. Mukesh Kumar, Assistant Professor, Department of Mechanical Engineering.

Higher Studies:

The 2021-25 batch recently passed out with about 80% opted for job (though about 90% students got placement opportunities) and already placed in reputable industries, with maximum salary of 20.31 lacs (at EIL) and average 7.5 lacs in India.

12 students went for higher studies in India (7) and abroad (5), opting opportunities of MS, M. Tech and Direct Ph. D.

The PG students have decided to opt for Ph. D. in the premium institutes of the country. Sayan Ghosh has secured Institute Fellowship for Ph. D.

GATE Rank:

Anabil Maity secured 45th rank in Gate 2025.

17 out of 64 of the students have secured commendable scores/ranks in GATE (ME and XE), CAT and TOEFL.

Students Corner



Dr. Bidyut Pal and Dr. Apurba Das have guided the students when the department and IMechE students' chapter has organized an Industry Visit at RVNL Kolkata Metro site on 2 August 2025.

The department has organized a orientation programme for PG first year students of 2025-26 admission batch at the department seminar room on 13 August 2025.



The department has organized a 'Freshers Welcome and Orientation' programme for the UG 2025-26 admission batch in the department conference hall on 25 August 2025. Dr. Aritra Ganguly, Convenor, DUGC had conducted the programme.

Society Activity



Farewell (Batch of '25)

The Society of Mechanical Engineers (SME), IIST Shibpur, organized a heartfelt farewell for the graduating batch of 2025. The event celebrated the memories, achievements, and experiences shared by

the students over the years. With emotional speeches, moments of laughter, and warm wishes, the farewell marked a meaningful end to one chapter and the beginning of another.



Teacher's Day Celebration:

The Teacher's Day Celebration, organized by SME IIST, is a heartfelt event dedicated to honour the contributions of the faculty members. This celebration includes a series of activities, performances, and tributes by students, expressing their gratitude and appreciation. The event fosters a sense of respect and camaraderie between students and teachers, creating a joyful and memorable occasion that strengthens the bond within the academic community.



Students Talk

Smart Materials

Smart materials are intelligently engineered materials that are responsive to external stimuli like temperature change, stress, etc., or electric fields. In mechanical engineering, such materials are increasingly deployed for designing machines that are intelligent, efficient, and adaptable. Smart materials are of three types, viz., shape memory alloys, piezoelectric materials, and advanced composites that bring their respective value addition and machine designing issues.

Shape memory alloys are those metallic materials that are able to undergo reversible changes of shape by the application of thermal or mechanical stimuli. Nickel-Titanium alloys are widely used because of their consistent shape memory effect and super elastic character. When deformed at room temperature, these alloys recover their initial shape upon exposure to heat. This property allows engineers to develop compact actuators, sensors, and vibration-damping devices that play very important roles in components of aircraft and robots. However, the use of shape memory alloys in machines requires careful consideration of thermal fatigue, cyclic loading, and controlled activation processes. Precise temperature control systems are also essential for realizing their capability of transforming their shape, while repeated exploitation causes their efficiency to decrease over time.

Piezoelectric materials characterise the production of electrical charge with the application of mechanical stress and experience morphological change upon exposure to an electric field. This unique property finds widespread application in the construction of micro-actuators, fine positioning systems, and energy harvesters. In industrial automation, piezoelectric actuators are valued for their fast movement and high positional accuracy while energy harvesters made of these materials convert ambient vibrations into usable electrical energy. The two biggest issues that need to be overcome relate to their brittle nature, susceptibility to failure at harsh mechanical regimes, as well as the need for sophisticated electronic control systems. It is also essential that piezoelectric devices be coupled with circuits to be able to handle their nonlinear dynamics for consistent and dependable operation.

Smart composites are a family of materials that combine the inherent strength of standard composites while also providing self-repairing and shape-changing properties. Self-healing materials can autonomously heal cracks which means real-world applications would generate significant reduction in maintenance costs in areas such as aerospace, automotive, and civil infrastructure. Shape-changing composites lead to structures that can change shape and permit elements such as wings or surfaces to respond to aerodynamic or load conditions. These design improvements will allow machines to perform better or more efficiently given varying working conditions.

The integration of machine learning and artificial intelligence has greatly aided the use of smart materials in mechanical systems. Neural network-based models are used to predict the outcome of shape memory alloys in different operational situations. Engineers are using predictive algorithms to optimize material performance, select suitable smart materials for different requirements, and optimize the development cycle. Their blending of data analytics and materials science reduces reliance on trial-and-error approaches and shortens innovation cycles.

Despite their probable benefits, smart materials face an array of challenges upon implementation. Ongoing issues are their nonlinear behaviours against dynamically changing loading cases, high-fidelity manufacturing processes, and higher prices than conventional materials. Commercial-scale production from lab-scale prototype versions could face barriers to standardized production technologies while ensuring consistent performance of components. Compatibility with already installed mechanical, electronic, and control systems creates an added requirement for integrated engineering approaches that could complicate systems.

In the future, the development of machine design will accordingly witness the ever-ongoing effect of smart materials. Bio-inspired systems that can mimic the adaptive and self-healing properties of nature will expedite the finding of materials with higher resilience, durability, and energy performance. Multifunctional intelligent systems will pack sensing, actuation, and self-maintenance into one device, leading to smaller,

lighter, and more durable machines. Finally, the continued evolution of artificial intelligence will accelerate the discovery of new smart materials so that there will be an increasing number of applications for it across industries.



Supratim Bandyopadhyay

M. Tech. (Machine Design), 1st Year

Alumni Speaks

As I, a 1971 batch alumnus from the then BE College, start writing this column, my first thought is how utterly different India was in the 1960s and how to share our experience from that very different era with the 18-21 years old bright-eyed young students of today.

There were very few really good engineering colleges in India at that time other than Roorkee, BE College, Benares Hindu University (BHU), Guindy Engineering College (Now Anna University) at Chennai and a few new IITs that had come up in the preceding few years. Since communication across India was not easy, Roorkee, B.E. College, BHU, or Guindy attracted the best Regional Talents. BE College tapping the very best young minds from West Bengal and Eastern India.

To put things in context, our batch had two top ten rankers from the West Bengal Higher Secondary Exam of 1966, about 20 overall from the top 50, and several other top ten rankers from the ICSE board. And of course, there were those unpolished gems from smaller towns from nondescript schools who scored near perfect marks in the science subjects, but just had passing marks in literature (Bengali and English).

So, how did a 16year old feel when thrown into this mix of bright, energetic teenagers? It was simply brutal for the first few months. There was 35 hours of class

and lab work every week. Weekly Home works and exams piled on top of one another with merciless monotony and on top of that we had 4 hours of compulsory NCC parades (after the '62 war with China) each week.

Life really looked bleak, one may say. I was not at all certain that I would ever be able to survive this brutal routine and graduate at the end of 5 years. As it happened, out of 500 or so students less than 10 passed all the 7 subjects in the first exam (we had exams every three months and then a final exam at the end of the academic year) - a great equalizing experience for everyone including the All-India Rankers, one may philosophize.

There was only one “redeeming” feature though – the lack of any distraction. There was no phone (the whole campus had only one phone, waiting list for a new phone connection was 10-12 years), no social media, no TV, no internet and only five young ladies in a batch of 500+. No wonder, some of us turned out to be decent students.

Coming back to the equalizing experience, that was a unique feature of the BEC Culture in those days and I hope it has remained so even today. Students came from very diverse backgrounds. Some came from wealthy, well known families. Some came from families of well-known scholars. Some had parents in very high positions. And some came from the family of subsistence farmers, first in their family ever to go to a high school. Some spoke and wrote perfect English, some could hardly write a sentence, leave alone speak with a BBC accent. Some came from conservative brahmin families, some, like my first-year roommate and friend, were Muslims.

It did not matter, everyone was equal, everyone treated everyone else equally and with respect. And for me that was one of the most defining experiences of my life.

As we survived the brutal first year (one in every 4 students failed the final and had to repeat the year), we gradually grew in confidence. Regarding academic standard, I would say, we had a very solid grounding in many of the theoretical subjects, amongst the very best in India. Some of the labs like the Electrical Machineries or Hydraulic Labs were quite good. However, some other lab facilities like the electronics

or machine shops were not up to par and could have been better.

We were lucky to have some exceptional teachers who pushed us to the limit and would expect nothing less than the best from us. I remember our Fluid Mechanics professor and the afternoon 4-hour lab we had once a week. We had to work through the evening and late night to complete the report and submit it by 7 AM the next morning – no exceptions were allowed, ever.

Those professors encouraged us to question, to explore, to challenge, to come up with new ideas and new ways of looking at things. On occasions, when we were right, they would encourage us to explore further. On occasions, when we were wrong, they would be patient and still encourage our questioning.

They taught us that we were not there to be “taught”, but to “learn” and their role as teachers was to facilitate that learning and inculcate in us a lifelong desire to learn, not spoon feed us and help us score high marks in exams. I will remain ever grateful for that lesson.

At the end, BEC of those years produced well rounded engineers who could take on challenging problems, solve those problems, and who played an important part in building the industrial foundation of modern India. Quite a few went outside and made their mark in the most advanced fields. I have personally known the person who built ISRO's first launch pad, another person who is in the Hall of Fame for consumer electronics in the USA, a 3rd one who built the foundation of modern microelectronics and is one of world's most prolific inventors. A class mate who became a National Research Council Fellow in the USA and built the first mathematical model of atmospheric dispersion of pollutant from coal-based power plants.

I will conclude by telling my young friends at IEST – you are part of a very proud heritage. Many of you represent the best and brightest of India's young minds. Never be afraid to dream the impossible and to believe

that you can change India. Of course, dreams and beliefs must be grounded in long term and unwavering commitment - remember that you are young and time is on your side.



Tapas Kumar Som

Retired IBM Distinguished Engineer / CTO
B.E. (Mech), 1967-71



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