



Prof Shravan Kumar



From HoD's Desk

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Dear Readers,

The sixth edition of our department's monthly newsletter marks a significant milestone as our department's research endeavors are intricately expanding focusing on the installing of high end processing equipments, and spreading knowledge base by invited talks and workshops on emerging topics. The faculties of the department have also earned recognition for outstanding contributions by getting involved in getting highly competitive PM ECRG projects showcasing the exceptional research output.

Projects



Prof. Shubhi Gupta

Prof Shubhi Gupta has contributed to the chapter of a book on the upgradation of bio-oil and crude oil to synthetic transportation fuels, published by Woodhead publishing.

Prof Shubhi Gupta is currently working as Principal Investigator on the project which is titled as "Development of a closed loop approach for enhanced conversion of agro-residues to liquid hydrocarbons using multifunctional pyrolysis derived porous graphitic carbon catalyst" which is funded by the Prime Minister's Early Career Research Grant (ECRG). The budget of this project is 57.63 lakhs.

Prof. Kasturi Sala

Her work spans various topics including laser welding, oxidation behaviour of alloys, microstructural evolution, and mechanical properties of advanced materials. Prof. Sala's research contributes significantly to the fields of metallurgy and materials science, with a focus on developing materials for energy applications.

PM ECRG Project Title: Development of Vanadium-Based Metal Membranes with Enhanced Permeation and Diffusion Dynamics for Next-Generation Sustainable Energy and Process Optimization.

Funding Agency: (ANRF - PM ECRG - Ongoing).

Budget (52 Lakhs Approx.).

Role: Principal Investigator



100 Tonne Laboratory Rolling Mill

Department of Fuel, Mineral and Metallurgical Engineering (FMME) has got a 100 Tonne Laboratory Rolling Mill facility provided by NewField, funded by IIT(ISM) Dhanbad, installed and commissioned by Prof. Madhumanti Bhattacharya (Assistant Professor), the Faculty-in-Charge of this facility. The mill is installed in the alloy development facility situated at the backside of the ECMU office, IIT(ISM) Dhanbad. The final installation was completed on Monday, 3rd March, 2025.



The mill is capable of performing both hot & cold rolling of Alloy Steel, stainless steel, Al-alloys, Cu-alloys, Ti-alloys followed by both air and water cooling facility. A final thickness of 2mm can be achieved by hot rolling while minimum thickness that can be achieved in cold rolling is 0.75mm.

It requires a minimum of 4 people to operate the machine. The Machine has a front loading furnace that is used for the reheating operations. It also constitutes of a load-cell indicator that indicates the maximum load applied on the sample.

The machine has two main parts:

- Mechanical System
- Computerised System



1.PLC Controlled System: The computerized control system uses the SCADA software provided by NewField. It has several mechanical keys that control the rolling operation by increasing/decreasing the roller gap(Drum); Controlling the water supply operation etc. The system also shows the graph between the load v/s time and also provides Temperature v/s time graph for easier understanding.

2.Furnace: The furnace installed is capable of achieving maximum temperature of 1200 deg C. It takes 18KW power with 475V. It also consists of a dead-weight chain-pulley mechanism for opening and closing the door.

3.Crane: It has a Wire Rope Hoisting(WRH) crane that can lift upto 2 tonnes of weight at a height of 15 feet, requires 415V to operate, is used for roller changing operation.

Seminars

MOU signed in February 2025:

Prof. Avanish Kumar signed an MOU with Bradken Resources Pty Ltd. Australia on 19th Feb 2025. Bradken is a leading wear solutions provider to the global mining and resources market, is a wholly owned subsidiary of Hitachi Construction Machinery (HCM) group. Bradken is one of the world's largest combined foundry and engineering groups, specialized in manufacturing Ground engaging tools (GET), Crawler systems, Mining buckets, Mill liners, Crusher liners, Products for processing plants, Products for sugar industry and Speciality products for Defence and Energy. Bradken is currently also serving as an industry partner in a sponsored research project funded by the Ministry of Mines, Govt to Prof. Kumar. The objective this MOU is to have mutual intentions to jointly work on research projects related to alloy development for mining industry.



Students corner:

Mr. Tanay Biswas recently had the honour of representing our department at the National Symposium of Research Scholars (NSRS) on Metallurgy and Material Science 2025, held at the prestigious Indian Institute of Technology Kanpur from February 28th to March 2nd 2025.

Under the expert guidance of **Dr. Avanish Kumar**, Tanay presented his research titled “A Wear Study on Pearlitic and Bainitic Steel: A Comparative Approach”. The work delved into the intricate wear properties of these two steel microstructures, offering a nuanced understanding of their performance under varying conditions and contributed to the advancement of knowledge in materials science, providing valuable insights into the comparative wear properties of pearlitic and bainitic steel. This also serves as an inspiration for fellow students to pursue their research interests and actively engage with the wider academic community.



Guest talk on Green Steel Making

Prof. Raj Kumar Dishwar, assistant professor in the Fuel, Mineral, and Metallurgy Department of IIT (ISM) Dhanbad, was invited as the guest speaker in the five-day Short-Term Course (SCT) on Green Steel, which was held at the National Institute of Technology Durgapur from 14th to 18th February 2025. It was organised by the India-Australia Mineral Scholar Network (IAMSAN) program.

The IAMSAN is a joint program of the Indian and Australian governments. Its goal is to enhance the overall bilateral involvement in several areas, including trade, investment, Green Steel, and critical minerals. The objective of the program was to equip researchers, industry professionals, and policymakers with insights to drive a sustainable, low-carbon future in steel production.



The program focused on technologies like decarbonizing the steel industry through hydrogen-based processes, energy efficiency, and renewable energy integration, with a focus on environmentally friendly production methods such as Direct Reduced Iron (DRI) processes and Electrolytic Routes. These innovations are crucial in the development of "green" steel, representing a significant shift in manufacturing practices to reduce carbon emissions. Its exploration of these technologies extends beyond Australia, offering valuable perspectives for the global steel industry as it adapts to meet environmental standards while maintaining productivity. By examining these advancements, the program provides a comprehensive view of the transition towards sustainable steel production.



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