

17th National Frontiers of Engineering (NatFoE) Symposium

The Symposium on National Frontiers of Engineering (NatFoE) is one of the flagship events of INAE since 2006. The main objective of the event is to encourage Young Engineers (ages ~27-45) from industry, universities, and R&D labs to discuss leading-edge research and technical work across a range of engineering fields. The 17th National Frontiers of Engineering (NatFoE-23) symposium was organized by Indian National Academy of Engineering (INAE) in collaboration with Birla Institute of Technology Mesra under the aegis of INAE-SERB conclave on *Atmanirbhar* Technologies- Engineering Secured Future during June 24-25, 2023. This annual flagship event of INAE was attended by young researchers across various academic institutions, R & D laboratories and industries as speakers and participants.

The inaugural program was presided over by Prof Indranil Manna, President, INAE. During the inaugural session, Prof C Jeganathan, Co-ordinator, NatFoE-23 & Dean RIE, BIT Mesra delivered the Welcome address and explained the objectives of the symposium. Shri Jayant Sinha, Member of Parliament, Lok Sabha graced the occasion as the Chief Guest. He enthused and motivated the august audience of young engineers for achieving great heights in their endeavours. He also delivered a talk on “Getting to the Green Frontier: A Net-Zero Development Model for India” wherein he interacted with the students on the Green Frontier Model and laid down the challenges that might occur in the near future due to climate change. Lt Col Shobhit Rai (Retd), Deputy Executive Director, INAE expressed his heartfelt gratitude and regards to all the dignitaries, coordinators of the event and SERB.

There were technical sessions on four thematic areas in the symposium and each session had one plenary talk and three keynote talks by experts from the relevant disciplines. All the technical sessions were conducted by the respective theme conveners. Four themes covered during the event were (i) Mining Technology -Mastering Depth & Exploration (ii) AI, GPT & Robotics - Technology of Future (iii) Smart Water Harvesting & Cleaning - Engineering Water (iv) Embracing Futuristic Technologies to make Engineering Education Alluring. In addition, a special session on *Azadi ka Amrit Mahotsav* was organized to commemorate the seventy-fifth year of Indian independence and the achievements of the country during this period. There was total 20 presentations by domain experts in the thematic areas and Plenary Talks by eminent speakers during the Symposium.

The Plenary talk of the first session on Mining Technology -Mastering Depth & Exploration was given by Prof. Arvind Kumar Mishra, Director of CSIR-Central Institute of Mining and Fuel Research, Dhanbad (CIMFR). His talk was on “Emerging Trends of Exploration and Extraction Technologies for Deep-Seated Coal Deposits.” Dr Debasis Bandhopadhyay, CMPDI (HQ), Ranchi, Dr PS Paul, IIT (ISM), Dr Siddhartha Roy, CMPDIL (HQ), Ranchi were the invited speakers of this session. The *Azadi* talk was delivered by Prof. Jayanta Bhattacharya, IIT Kharagpur.

The second session on AI, GPT & Robotics - Technology of Future was graced by Dr Manish Gupta, Director, Google Research as plenary speaker. The topic of his talk was “What an Amazing Time to be an AI Researcher. Dr. Swagatam Das, Indian Statistical Institute, Kolkata, Dr Anuj Kumar Sharma, AKTU Lucknow, Mr Gopi Krishna Nuti, Autodesk, Bangalore were the invited speakers of this session. The *Azadi* talk in this session was delivered by Mr Joy Mustafi, MUST Research, Hyderabad.

The plenary talk on Smart Water Harvesting & Cleaning - Engineering Water was delivered by Prof T. Pradeep, IIT Madras as a plenary speaker. The topic of his talk was “Affordable Clean Water Using Advanced Materials.” Prof VC Srivastava, IIT Roorkee, Dr J Rajesh Banu, Central University of Tamil Nadu, Dr Pradip P Kalbar, IIT Bombay delivered the invited talks in this session. The *Azadi* talk was given by Dr (Mrs) Indira Khurana, Director at the Safai Karmachari Andolan, NGO Tarun Bharat Sangh.

The Plenary talk of the session on Embracing Futuristic Technologies to make Engineering Education Alluring was given by Dr Rajeev Shorey, IIT Delhi as a plenary speaker. Dr Shorey spoke about about “Recent Investigations in the Intersection of Machine Learning and Edge Computing.” Dr. Tapan K. Gandhi, IIT Delhi, Dr. Kaushal Kumar Bhagat, IIT Kharagpur and Dr. Manjira Sinha IIT Kharagpur were the invited speakers of this session. The *Azadi* talk was given by Dr. T V Bharat, IIT Guwahati.



Dignitaries at the Inaugural Ceremony of NatFoE 2023 held during June 24, 2023 at BIT Mesra



Dr Manish Gupta, Director, Google Research delivering his plenary talk



Participants attending the second plenary talk



Prof T. Pradeep, IIT Madras presenting a memento to a speaker

A large number of Research Scholars and Faculty Members of BIT Mesra also attended the Symposium and helped towards the organization of the symposium. Through this symposium, participants got the opportunity to form connections and opportunity to engage with successful alumni, faculty, and professionals with vast experience and professional standing. The symposium provided participants and students alike access to knowledge and insights that helped them in their professional journeys as engineering professionals and students.

INNOVATIONS IN MANUFACTURING PRACTICES (IMP) 2023

Innovation in Manufacturing Processes (IMP) – 2023 conducted by INAE and BIT Mesra under the aegis of INAE-SERB conclave on *Atmanirbhar* Technologies- Engineering Secured Future on June 26, 2023, is a national level project competition open to all engineering students and practitioners with the endeavour to engage with the engineering youth of the country. The Innovation in Manufacturing Processes (IMP) – 2023 was dovetailed with the 17th National Frontiers of Engineering (NatFoE-23) Symposium. In addition to undergraduate and postgraduates (Master's students) categories, start-ups were also invited scholars to showcase their project work related to innovations in manufacturing sector. The students participated from various eminent institutions such as NIT Rourkela, NIT Patna, NIT Jamshedpur, IIT (ISM), Dhanbad, IIST Shibpur, IIT Guwahati, RCC Institute of Technology, Kolkata, Rai University, Sido Kanhu Murmu University, Dumka, BIT Polytechnic and BIT Mesra.

The competition received an overwhelming response with a registration of total 62 teams. Entries were invited in the form of three-minute video (mp4) of the functioning model process, operations and a description of 250 words write-up document. Out of all these entries, 16 entries were shortlisted for the final pitching in front of the Jury members. The Pitching session included many innovative ideas in areas such as Drilling Technology, Sustainable E.V. development, and Sustainable biodegradable paper packaging from waste material. A total of six prizes, three winners and three runner-up prizes of Rs 40,000 and Rs 20,000 respectively in the undergraduate, postgraduate and Start-ups/PhD categories were conferred.

The Chief Guest at the Inaugural ceremony of IMP-2023 was Prof Sivaji Chakravorti, Vice President, INAE, and the Guest of Honour cum Jury members were Dr. Hariharan, Former General Manager, HRD - MTI SAIL Ranchi, Dr. P.K. Chatterjee Former Chief General Manager, MECON Ltd., Ranchi and Mr. M.K. Gupta, Principal, Jharkhand Tool Room, Govt of Jharkhand. The session began with the Welcome Address by Dr. C. Jeganathan, Coordinator of IMP-23 & Dean of Research, Innovation and Entrepreneurship, BIT Mesra. He welcomed the dignitaries and briefed about the competition and about the details of various participating institutions. The jury members of IMP-2023 addressed the gatherings and stressed about the need for Innovation in India's Manufacturing Industry. The Chief Guest Prof Sivaji Chakravorti highlighted the importance of IMP as an opportunity for young engineers and entrepreneurs in this national level project competition. Prof Indranil Manna, President, INAE & Vice Chancellor, BIT Mesra also addressed the audience with pertinent information about India's glorious past in the field of manufacturing, and emphasized the need for sustaining the GDP through manufacturing industry since it can serve to strengthen national security, provide job opportunities, and stimulate the growth of a sustainable economy. Prof Indranil Manna, Vice Chancellor, BIT Mesra presented Memento as a token of gratitude to Chief Guest and jury members. Dr. Richa Pandey, Assistant Professor, Mechanical Department, BIT Mesra proposed the vote of thanks.



Prof Sivaji, Chakravorti, Chief Guest of Inaugural Session of IMP 2023



Pitching session Undergraduate Category



Participants/Winners with Jury members of IMP 2023

Shri N. C. Agrawal, CEO of Meditron, Ranchi, was the Chief guest of this valedictory function. Shri N.C Agarwal addressed the gathering with his experience in the entrepreneurial journey, and motivated and congratulated all the participants. In the Undergraduate category, first prize was awarded to Ankit Niraj Pandey and Team from Parul University, Gujarat for their Project on “Drilling Technology”, and the second prize was awarded to Bogi Manish Kumar and Team from IIT(ISM) Dhanbad for their project on “AI Chat/GPT and Robotics”. In the Post-Graduate Category, the first prize was awarded to Pranjal Pandey and Team from BIT Mesra for his project on 'AI, Chat/GPT and Robotics', and the second prize was awarded to Ms. Nistha Mukhopadhyay and Team from BIT Mesra for their project on “Biodegradable Packaging Paper from Waste Material.” In the final category comprising of Start-ups/PhD the first prize was awarded to Piyali Mukherjee and Team from IIST Shibpur, Kolkata for their project on “Healthcare Diagnostics”, and the joint-second prize was shared between Akanksha Kumari and Team, BIT Mesra and Sweta Satpathy and Team BIT Mesra for their projects on “Key Intervention to Solve Micronutrient Deficiencies” and “High-Speed Non-Invasive, Biomechanical Profiling for Medical Purposes” respectively.

Photos from Award Ceremony



