

## **Annual Report on SERB-INAE Collaborative Initiative in Engineering 2023-24**

SERB-INAE Collaborative Initiative in Engineering is an initiative wherein INAE has partnered with Science and Engineering Research Board (SERB). In this regard a Letter of intent was signed by the Secretary, SERB and President, INAE on November 9, 2021. In view of these four initiatives, a total budget of Rs 75 lakhs towards the conduct of above-mentioned activities was approved by SERB including Rs 67.5 Lakhs for the total operational cost of the events and Rs 7.5 Lakhs as Manpower Cost & Administrative Expenses.

As an outcome, the following four initiatives under the umbrella of ‘Collaborative Initiative in Engineering’ were planned to be organized during this year.

- a. SERB-INAE Conclaves on Atmanirbhar Technologies - Engineering Secured Future
- b. SERB-INAE Woman Engineers Program
- c. SERB-INAE Outreach Programs for NE, J&K and Ladakh
- d. SERB-INAE Innovation Hackathon

INAE has progressed well and various events have been organized for the year 2023-24 under all the four initiatives. The events/programs organized under the subject initiative are as mentioned below:

### **(a) SERB-INAE Conclaves on Atmanirbhar Technologies - Engineering Secured Future**

This year, 17<sup>th</sup> National Frontiers of Engineering (NatFOE) was organized under SERB-INAE Conclaves on Atmanirbhar Technologies - Engineering Secured Future during June 24-25, 2023 in collaboration with Birla Institute of Technology Mesra. The main objective of the event was 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. 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. The *list of Experts and Participants of National Frontiers of Engineering* is enclosed as Annexure I.

## **Innovations In Manufacturing Practices (IMP) 2023**

Under the umbrella of SERB-INAE Conclaves on Atmanirbhar Technologies - Engineering Secured Future, Innovation in Manufacturing Processes (IMP) – 2023 was conducted by INAE at BIT Mesra on June 26, 2023. It 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, IEST 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.

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 IEST 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. The total number of participants of Innovation in Manufacturing Processes (IMP) – 2023 were 36.



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



*Participants/Winners with Jury members of IMP 2023*



*Pitching session Undergraduate Category*



*Certificate Distribution ceremony during IMP2023*



*Certificate Distribution ceremony during IMP 2023*

**(b) SERB-INAE Woman Engineers Program**

**i) Symposium for Young Women Engineers on ‘Technologies for sustainable developments in North-Eastern Region’ at Tezpur University, Assam**

The 2-days symposium for Young Women Engineers (<45 years of age) on “Technologies for sustainable developments in North-Eastern Region” was successfully organized at Tezpur University with collaboration with Indian National Academy of Engineering (INAE) and Science and Engineering Research Board (SERB) during Nov 20-21, 2023. The subject event was organized under the aegis of SERB-INAE Woman Engineers Program. The symposium emphasized on the role of engineering in developing technologies for sustainable future for that region. Amongst the invited resource personals, diversity aspect was ensured not only in terms of gender (Female: 4; Male:4), but also region-wise (4 from the North-East region and the remaining 4 from rest of India). Resource persons and participants from each of the North-eastern states are listed below:

| <b>Resource persons: (Ladies: 4, Gentleman: 4)</b>  | <b>Participants: 32</b>                  |
|---|--|
| 1. Dr. Rekha Singhal, Institute of Chemical Technology (ICT), Mumbai                      | Arunachal Pradesh: 4                     |
| 2. Prof. Charulata Mahanta, Tezpur University, Tezpur                                     | Assam: 4                                 |
| 3. Dr. Ng. Iboyaima Singh, College of Food Technology, Lamphelpat, Manipur                | Manipur: 4                               |
| 4. Prof. Saroj Barik, North-Eastern Hill University (NEHU), Shillong, Meghalaya           | Meghalaya: 3                             |
| 5. Dr. Shashi Bhushan, Institute of Himalayan Bioresource Technology (IHBT), Palampur     | Mizoram: 0                               |
| 6. Dr. Virendra Tiwari, National Geophysical Research Institute (NGRI), Hyderabad         | Nagaland: 3                              |
| 7. Dr. Atya Kapley, National Environmental Engineering Research Institute (NEERI), Nagpur | Sikkim: 1                                |
| 8. Dr. Swapnali Hazarika, North East institute of Science & Technology (NEIST), Jorhat    | Tripura: 4                               |
|   | Host-institute in-house participants: 09 |

The inaugural function was graced by Prof. Shambhu Nath Singh, Vice-Chancellor, Tezpur University, who emphasized the role of women in science and technology for the growth of the nation. Dr. Sharmila Mande, FNAE addressed the participants and briefed on the theme of the symposium. She also highlighted that the symposium is a means to provide a platform for young women engineers to explore innovative solutions for sustainable development in the North-Eastern region.

During Day 1, the inaugural session was followed by technical sessions on 'High-value Agri-based products' by the resource personals.

1. Dr. Rekha Singhal, Institute of Chemical Technology (ICT), Mumbai  
Science, Technology and Engineering interventions for valorization of food products
2. Prof. Charulata Mahanta, Tezpur University, Tezpur  
Novel technologies for processing and preservation of fruits cultivated in North -East India
3. Dr. Ng. Iboyaima singh, College of Food Technology, Lamphelpat, Manipur  
Engineering challenges in sustainable food processing
4. Prof. Saroj Barik, North-Eastern Hill University (NEHU), Meghalaya  
Meeting technology challenges for value addition of agricultural products
5. Dr. Shashi Bhushan, Institute of Himalayan Bioresource Technology (IHBT), Palampur  
Technological interventions for value-added crops to boost farm income in North-East region

Lectures by each of the above eminent speakers highlighted their research work which are relevant for that region. Post the first day's session, the participants were divided in four groups, each group consisting of one participant from each state. The participants deliberated for close to two hours on the day's theme on 'High- value Agri-based products. All the resource persons also mentored the participants during their discussion sessions. Each group then presented their overall research plan to solve a particular problem which is relevant to their states. At the end of Day 1, four prospective projects were proposed by the participants.

The resource persons for the second day technical sessions on 'Rejuvenation of natural resources' were:

1. Dr. Virendra Tiwari, National Geophysical Research Institute (NGRI), Hyderabad  
Sustainable Groundwater availability
2. Dr. Atya Kapley, National Environmental Engineering Research Institute (NEERI), Nagpur  
Harnessing microbial community intelligence and engineering them to preserve surface waters
3. Dr. Swapnali Hazarika, North East institute of Science & Technology (NEIST), Jorhat  
Engineering intervention of waste management of oil and petroleum industry

The above-mentioned eminent speakers highlighted their research work which are pertinent for that region. Post the second technical session on Day-2, the same group of participants deliberated on the day's theme on 'Rejuvenation of natural resources' and presented their overall research plan to solve certain problem relevant to their states. At the end Day-2, four prospective projects were proposed by the participants.

The two days symposium enabled the participants in gaining knowledge on advanced technologies for solving problems in their own states. The group-activities during the break-out sessions also helped them in coming up with research proposals which may lead to sustainable solutions, implementation of which can help the North-eastern states of India. The participants were requested to submit brief concept notes with flowchart of work components on all the eight proposed project plans which emerged as a result of the break-out sessions on Day 1 and 2.



During the concluding session, the participants expressed their views on the 2-days symposium. They were happy with the presentations by the speakers who had deliberated in the area of food and water related problems of northeast India. They also found the interactive break-out session to be very interesting and productive. Overall, they felt that the program was well organized, and expressed that more such training be organized in other north-eastern states covering diverse areas of research.



Inauguration ceremony during Day 1



Participants attending the Inaugural session



Breakout sessions



Group photograph of young women researchers

**ii) Workshop for Women Engineers on “Sustainability Environment and Water” at IIT (BHU) Varanasi**

A workshop for Women Engineers of North India was organized at IIT (BHU) Varanasi by Indian National Academy of Engineering (INAE) and Science and Engineering Research Board (SERB) DST, under the aegis of “SERB-INAE Woman Engineers Program” during February 26-27, 2004.

The workshop on Sustainability in Water and Environment was planned for young women engineers (<45 years) from engineering and technological institutions/universities from eight states (Uttar Pradesh, Bihar, Uttarakhand, Himachal Pradesh, Jammu & Kashmir, Ladakh, Punjab, Haryana). *30 participants* from Uttar Pradesh, Bihar, Jharkhand, Uttarakhand, New Delhi-NCR, Himachal Pradesh, Haryana and Punjab participated in to this prestigious workshop.

The workshop’s theme was chosen considering the need for developing engineering-based technologies for sustainable future in this region. Keeping in mind the environmental pollution problem due to large footfall of pilgrimages and tourists, sessions on the theme ‘Water and Environment’ were planned. These sessions addressed engineering-based technological solutions to mitigate the problem of pollution (including in the river Ganges) due to various wastes, emission from vehicles, etc. Eminent speakers were invited to deliver lectures highlighting their research work which address the above-mentioned challenges. The participants not only gained knowledge on such advanced technologies, but also were able to carry out similar research in their own institutes. At the end of each session, the participants were divided into smaller group to encourage them discuss the problems and challenges, pertaining to the topic of each session. They made short presentation on the same at the end of the session, based on which detailed deliberations were carried so as to come up with research ideas with the goal of better/improved sustainability solutions for this region.

| Resource persons                             | Participants: 30 |
|--|------------------|
| 1. Prof. Ligy Philip, IIT-Madras             | Uttar Pradesh    |
| 2. Prof. Makarand Ghangrekar, IIT-Kgp        | Bihar            |
| 3. Dr. Swadha Anand, TCS Research, Pune      | Uttarakhand      |
| 4. Prof. Sachchida Nand Tripathi, IIT-Kanpur | Himachal Pradesh |
| 5. Prof. P K Mishra, IIT-BHU                 | Jammu & Kashmir  |
| 6. Dr. Virendra Tiwari, CSIR-NGRI, Hyderabad | Ladakh           |
| 7. Prof. Suparna Mukherji, IIT-Bombay        | Punjab           |
| 8. Prof. Prasenjit Mondal, IIT-Roorkee       | Haryana          |

The workshop was coordinated by Prof Sharmila Mande, FNAE and Prof Pradeep Kumar Mishra was Coordinator on behalf of the host Institute (Indian Institute of Technology, BHU, Varanasi). The workshop was inaugurated by Lt Col (Retd) Shobhit Rai, Deputy Executive Director, INAE. He highlighted the contribution of INAE, various programs, especially for women engineers. Prof Sharmila Mande presented the theme of the workshop and discussed the importance of Sustainability of Environment and Water, especially in reference of Varanasi, being one of the most important pilgrimage centres of the country, where more than lakhs of people are visiting the city from every nook and corner of the country and also from other countries including Buddhist circuit and European Countries. Prof Pradeep Kumar Mishra welcomed the delegates and resource persons to the Institute and Varanasi. Floral tributes were paid to Bharat Ratna Pandit Madan Mohan Malviya, the founder of the Banaras Hindu University. Dr Bhawana Verma, the co-coordinator presented the formal vote of thanks.

The workshop was divided into various technical sessions, covering the following topics:

#### Day 1

- Sustainable waste management adopting circular economy principles - Prof Ligy Philip, IIT-Madras
- Biological and bio-electrochemical wastewater treatment technologies and their efficacy for imparting sustainability to wastewater treatment - Prof Makarand Ghangrekar, Indian Institute of Technology, Kharagpur
- Sustainable Bioremediation: Designing potential microbial consortia for waste management - Dr Swadha Anand from TCS Research, Pune
- Importance of clean air for sustainable cities - Prof Sachchida Nand Tripathi of Indian Institute of Technology Kanpur

#### Day 2

- Water Budgeting of Ganga Basin, Consequences of water depletion and Aquifer mapping and management of groundwater - Dr Viren M Tiwari, Director, CSIR-NGRI
- To develop a treatment system for the removal of Arsenic and Fluoride - Prof Prasenjit Mondal, IIT Roorkee
- The need of advanced treatment prior to disposal or reuse as number of contaminants such as nitrogen and phosphorus and other micro pollutants - Prof Suparna Mukherji, IIT Bombay
- The sustainability of water treatment and role of membrane technologies - Prof. Pradeep Kumar Mishra, IIT BHU (Varanasi)

All the participants were given opportunity to give their feedback on the content, quality and organization of the workshop. Everyone was unanimous in declaring the event a grand success. One noteworthy

suggestion for the improvement in the current format was to make it a three-day event to give more time to break out sessions and one to one interaction to make the event more meaningful and have positive impact on the research domain of the delegates. Certificate distribution was done to the participants and contribution of organising team was appreciated in the valedictory sessions. The list of the participants who attended the workshop are enclosed at Annexure II.



*Technical session on Sustainable waste management adopting circular economy principles by Prof Ligy Philip, IIT-Madras*



*Felicitation of the Resource Person*



*Participants interacting with Resource Person*



*Group Photograph of Participants with Dignitaries*

### **(c) SERB-INAE Outreach Programs for NE, J&K and Ladakh**

#### **i) Workshop on “Entrepreneurship and Skill Development with Special Reference to Startups” at University of Leh, Ladakh**

With the aim to inculcate an entrepreneurial spirit among the participants and motivate them to become successful entrepreneurs, the University of Ladakh with the support of the Indian National Academy of Engineering (INAE) and Science and Engineering Research board (SERB) organized a two-day workshop on “Entrepreneurship and Skill Development with Special Reference to Start-ups” under the aegis of SERB-INAE Outreach Programs for NE, J&K and Ladakh in the Leh campus of the University of Ladakh during July 17-18, 2023.

The main objectives of the subject workshop were to inculcate the entrepreneurial skills of youth in this region by offering a conducive ecosystem for exploiting their potential, to inculcate entrepreneurial spirit among participants and motivate them to initiate their own start-ups and become successful entrepreneurs, to develop a congenial environment for the promotion of local indigenous technical know-how and motivating aspiring entrepreneurs by sharing the success stories of successful local start-ups and entrepreneurs, to familiarize the participants with the latest developments in the innovation and entrepreneurship areas.

Prof. SK Mehta, Vice-Chancellor University of Ladakh and Prof. Indranil Manna, President INAE were the chief guest during inaugural day of the event. Prof. Sivaji Chakravorti, Vice-President, INAE and Lt. Col. Shobhit Rai (Retd.), officiating Executive Director also graced the occasion. Around 70 students from Elizer Joldan Memorial College, Leh Industrial Training Institute Leh, and the University of Ladakh participated in the workshop. During the inaugural session the coordinator of the event, Prof. Jigmet Stobdan welcomed the dignitaries and the participants and threw light on the objectives and rationale for organizing the workshop and urged the students to make optimum utilization of the workshop. Prof. Indranil Manna in his inaugural address highlighted the need of organizing this workshop and motivated the young participants to come up with new innovative ideas to solve certain gaps prevailing in the market in the subject field. Prof. SK Mehta also advised students to develop entrepreneurial traits to become successful entrepreneurs in the near future.

The first day included talks on following topics:

Talk 1: Role of Science Technology and Innovation Hub, Ladakh in inculcating innovation mindsets

among aspiring innovators in Ladakh

Talk 2: Entrepreneurship and Innovation in Ladakh

Talk 3: Importance of Skilling Local Youth with Locally Relevant Skills

Talk 4: Social Entrepreneurship in Today's Era

Talk 5: Women Entrepreneurship in Ladakh

The above talks acquainted the students with various government incentives and schemes for entrepreneurship development in Ladakh. The host institute invited two talks on Design thinking for Innovation and Community-Based Entrepreneurship and Start-ups in Ladakh during the day 2 of the event. During the Valedictory Session, Prof Sivaji Chakravorti, Vice President, INAE and Prof AK Sharma, Registrar University of Ladakh were invited as chief guests of the session. While addressing the gathering, Prof. Sivaji shared some anecdotes of successful innovators and advised students to become innovators and broaden their horizons and engage in entrepreneurship at early stages of life even during their studies to make themselves self-dependent.



*Participants attending the Workshop during the Day 2*



*Felicitation of Prof Sivaji Chakravorti, Chief Guest during Valedictory Session*



*Participants during the Day 1 of the Workshop at Leh*

**ii) Workshop on “Self-Employment through Entrepreneurship – The Path for Self-Reliant India” at NIT Silchar**

Under the umbrella of SERB-INAE Outreach Programs for NE, J&K and Ladakh, Indian National Academy of Engineering (INAE) in association with National Institute of Technology Silchar successfully organized a three-day national workshop on "Self-employment through Entrepreneurship – The Path for Self-Reliant India" from July 26th to July 28th, 2023, at NIT Silchar.

The primary objectives of the workshop were to make the participants aware of recent trends and future aspects of being an entrepreneur. To identify the possible sectors for becoming an entrepreneur and to motivate young people (Men and Women) representing different sections of society, including SC, ST, EWS, women, the differently abled, and Ex-servicemen to consider entrepreneurship or self-employment as one of their career options in the light of NEP 2020 to making India self-reliant – Atmanirbhar Bharat.

Additionally, to enable the target group to think and act in an entrepreneurial way by imparting technical and business skills at an early stage in their career, so that it not only encourages them to consider entrepreneurship as a career opportunity but also helps them become successful in any profession. The program got wide circulation, and a total of 89 participants registered and 52 attended the program from different institutes like Polytechnique College, Government Engineering College, Private College from West Bengal, NERIST, NIT Silchar and also from Assam Pollution Control Board. Out of 52 participants in which 8 were girl students, 19 were OBC students, and 2 were ST students. The event included eight lecture sessions and four hands-on training sessions. Resource Persons for the program were from NIT Silchar, other institutes, industrialists, and entrepreneurs. The lecture sessions were related to recent trends in entrepreneurship and product development, the future of entrepreneurship, and funding schemes provided by the government and other funding agencies.

The lectures were on the following topics:

- Entrepreneurship and NEP 2020 by Prof. Rajat Gupta, Professor, NIT Silchar
- Soft skill development for Engineering Profession by Prof Sivaji Chakravorti, Vice President,

INAE, Professor, Jadavpur University

- Design and Innovation: One Step toward Entrepreneurship by Prof Raja P Pappu, GITAM University
- Building a Market fit product in the field water purification by Mr Harjeet Nath, Assistant Professor, Tripura University
- Innovation and Start-up by Dr. Wasim Arif, Associate Professor, NIT Silchar
- Government Scheme and Product development by Dr Sumit Bhowmik, Associate Professor, NIT Silchar

In addition to these, expert talks and lectures were conducted on sustainable product development and innovation possibilities for setting up start-ups, the utilization of natural resources for the development of sustainable products, funding opportunities for entrepreneurs, and the patenting of products. The hands-on training sessions were conducted to familiarize participants with the utilization of the different types of equipment and develop sustainable products for the local region and entrepreneurship. The participants conducted experiments on the wind turbine, 3-D printing, product development using natural resource-based composite materials, and solar photovoltaic.

The coordinator of the event was Prof. Rajat Gupta, Professor, Department of Mechanical Engineering, National Institute of Technology Silchar and Dr. Sumit Bhowmik, Associate Professor, Department of Mechanical Engineering, National Institute of Technology Silchar.



*Inaugural pictures of the Program*



*Hands-on training in different laboratories*





*Group Photograph of Participants with Dignitaries*

**iii) Workshop on "Skilling, Reskilling and Upskilling - Need of The Hour for Self-Reliant India" at NIT Srinagar**

A two days' workshop on "Skilling, Reskilling and Upskilling - Need of The Hour for Self-Reliant India" was jointly organized by the Indian National Academy of Engineering (INAE) and Science and Engineering Research Board (SERB), DST at NIT Srinagar during March 4-5, 2024. The workshop was organized under the umbrella of SERB-INAE Outreach Program for NE, J&K and Ladakh.

The objective of this two-day skill development workshop was to create an eco-system and importance of skilling and upskilling. The aim was to create ecosystem of employability initiatives of youths with special target towards youths and of J&K. The two-day workshop aimed to address these issues and impart knowledge and skill in CNC Milling, CNC Turning, Welding operations (Developing AR-VR-XR based welding training program), 3D printing, EDM (Electric Discharge Machining). This workshop would aim to equip interested students, faculty, professionals, and industrial workers with essential knowledge in advanced machining and welding techniques which is contributing to both academic and industrial excellence as well as enhancing employability. The objective of the workshop was to give basic information of skill development initiatives in these areas which include inculcating competencies such as positive attitude, innovative and entrepreneurial mind set, knowledge enhancement, networking, collaborations etc and to understand the advancements in industrial technology with focus of industry 4.0 and 5.0.

In the inaugural session, dignitaries from various sectors converged to underscore the significance of skill development landscape in Jammu and Kashmir. Government officials, educational leaders, and industry experts shared their insights and perspectives on the importance of enhancing employability through specialized initiatives. The session commenced with welcoming remarks, highlighting the collaborative efforts to impart essential skills to the youth and professionals of the region. Keynote speakers emphasized the need for skill-based training in CNC technologies, welding, and allied fields to meet the evolving demands of the job market. Government representatives reaffirmed their commitment to supporting skill development initiatives and fostering an entrepreneurship mindset among participants. The inaugural session set the tone for the training program, inspiring a sense of purpose and determination among attendees to acquire new skills and pursue job opportunities in emerging industries. Following eminent speakers attended the inaugural session Prof. Sivaji Chakravorti, Vice President, INAE, Prof. A. Ravinder Nath, Director, NIT Srinagar, Mr Saurabh Bhagat, Commissioner/Secretary to Govt., Science &

Technology Department, Prof. Atikur Rehman, Registrar, NIT Srinagar, Prof. Adnan Qayoom, Head of Department of Mechanical Engineering, NIT Srinagar, Dr. Saad Parvez, Head, IIED Centre, NIT Srinagar. These dignitaries provided valuable insights and expertise, contributing to the comprehensive discussions and sessions held throughout the workshop.

On the culminating day of the workshop, participants and organizers gathered for the valedictory session, marking the conclusion of two days filled with insightful discussions and hands-on learning experiences. The session commenced with words of gratitude and appreciation extended to all stakeholders, including participants, organizers, resource persons, and experts, for their invaluable contributions towards making the workshop a resounding success. As a symbol of recognition and appreciation, tokens of appreciation and certificates were distributed to acknowledge the dedication and effort invested by each individual in enriching the workshop with their insights, expertise, and active participation



*Participants attending the detailed lecture during the workshop*

Amidst an atmosphere of camaraderie and accomplishment, recipients received their certificates and tokens of appreciation, signifying not only their individual achievements but also their collective commitment to advancing skill development and fostering innovation. The distribution of certificates served as a poignant reminder of the knowledge gained, skills honed, and connections forged throughout the workshop, empowering participants to embark on their professional journeys with renewed confidence and enthusiasm. Additionally, the ceremony provided an opportunity for reflection on the collective achievements and the enduring impact of collaborative efforts in nurturing talent, driving progress, and shaping a brighter future for the nation.



*Certificate distribution during Valedictory Session*

### iii) Workshop on “Pedagogy Training for Teaching and Research Excellence” held at IIT Guwahati

Indian National Academy of Engineering (INAE) in association Science and Engineering Research Board organized a two days’ workshop on “Pedagogy Training for Teaching and Research Excellence” held at Indian Institute of Technology Guwahati during March 15-16, 2024. The workshop was organized under the umbrella of SERB-INAE Outreach Program for NE, J&K and Ladakh.

It was a focused workshop for faculties of different institutes to equip them with pedagogy and teaching paradigms for better teaching and communication. Conventional forms of teaching and assessment techniques are not sufficient to cope up with ever changing modern education. Faculty needs to be equipped with new challenges associated with modern teaching and learning. Faculty training and pedagogy sessions provides a platform for improving teaching learning outcomes. Technology-based teaching and discussion forums are essential tools that can improve student-to-teacher interaction. This workshop aimed to bring faculty teaching in various technical institutes in North East India under one umbrella and share the best practices in teaching and learning.

The following topics were covered during the subject workshop were:

- Effective classroom management techniques and innovative assessment techniques.
- Need for coexistence of teaching as well as research for achieving academic excellence.
- Social skills necessary for collaboration, professional growth, personnel management.
- Tips for research paper writing, paper reviewing, project proposal writing.
- Use of ICT systems and technologies for effective teaching.
- Tips for introducing Problem Based Learning and Outcome Based Learning.
- Psychological aspects of teaching.

The resource persons of the workshop were Prof. Sivaji Chakravorti, Vice-President, INAE, Prof. Sukumar Nandi, IIT Guwahati, Prof. T. Venkatesh, IIT Guwahati, Dr. Antony Franklin, IIT Hyderabad, Dr. Samit Bhattacharya, IIT Guwahati, Dr. John Jose, IIT Guwahati, Dr. Moumita Patra, Assistant Professor at IIT Guwahati, Dr. Abraham Cyril Issac, IIT Guwahati, Dr. B. Spoorthi, NIT Warangal, Dr. Ruchika Gupta, Chandigarh University.

During the inaugural session held on March 15, 2024, the coordinator of the event, Dr. John Jose welcomed the dignitaries and the participants and threw light on the objectives and rationale for organizing the workshop and urged the participants to make optimum utilization of the workshop. The Chief Guest of the Inaugural session was Prof. Sivaji Chakravorti, Vice-President, INAE. Prof. Chakravorti also gave a session on Useful Pointers and Ethics in Writing a Good Technical Paper. Dr. B. Spoorthi gave a talk on Pedagogy in Flux: Navigating Change, Prof. Ruchika Gupta gave a talk on Crafting Effective Connection with Students by Right Communication, Dr. Moumita Patra on Problem based Learning: Ideas for a Self-reflective and Planned Teacher and Prof. Antony Franklin on How to Write Good Project Proposals for Research Funding. On day-two, Dr. Abraham Cyril Issac gave a talk on Authenticity at Work: the precursor to Human Potential Realization and Dr. Samit Bhattacharya's talk was on Channelizing Curiosity to Novelty – Learning to do Empirical Research. Dr. John Jose gave two talks titled Teaching as a Profession - Challenges and Opportunities and How Can You Become and Infectiously Inspiring Teacher. Prof. T. Venkatesh gave the final talk on Good Teaching Practices to Prepare Students for Higher Education Entrance Exams. The workshop was concluded with the valedictory session wherein the participation certificates were distributed and feedback was collected from the participants.



*Group Photograph of all the Resource Persons, Participants and the organizers*



*Dignitaries during the Inaugural session held on March 15, 2024*

The feedback from all the participants were highly positive. The sessions and hospitality were highly appreciated. Most participants demonstrated enthusiasm to attend such workshops for the future and looked forward towards them.



*Participants attending the detailed lecture on Day 2*

#### **d) SERB-INAE Innovation Hackathon**

##### **INAE Youth Conclave 2023 organized under the aegis of SERB-INAE Innovation Hackathon at GITAM University, Visakhapatnam during November 3-4, 2023**

In collaboration with Science and Engineering Research Board (SERB) and Indian National Academy of Engineering (INAE), GITAM University Visakhapatnam successfully organized INAE Youth Conclave 2023 during November 3-4, 2023. INAE Youth Conclave 2023 was organized under the umbrella of SERB-INAE Innovation Hackathon. The goal of Youth Conclave was to give young people a voice and showcase their creative problem-solving skills in an effort to improve our future as a whole. INAE also extends student membership to bright and young budding engineers, thereby endorsing their talent and advocating their ability to contribute meaningfully to the development of the country. The theme of this sixth edition of Youth Conclave-2023 was: “Innovation and Technology for Global Challenges”.

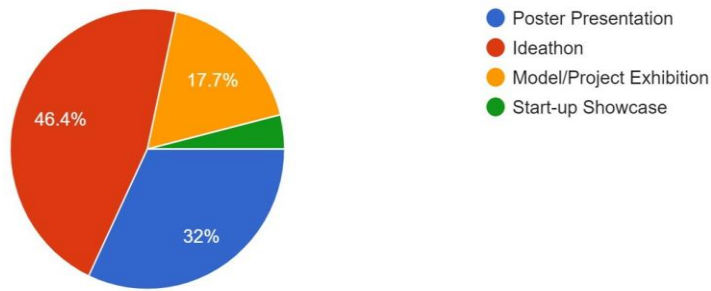
The specific focus areas of the Conclave were as follows:

- AI in Healthcare
- Space & Robotics
- Green Energy and Storage
- Circular manufacturing
- Biomedical Engineering and Devices
- Smart City & Urban Planning

Apart from the Technical Sessions which involved Invited talks and Paper / Poster presentations in the above identified focus areas, several other events like Ideathon, Start-up Show Case, Poster Presentation and Model/Project Exhibition were conceptualized, planned and implemented. To encourage participants, cash prizes were given to all the best performers in the above competitions as Rs 25,000 (1st Prize), Rs 15,000 (2nd Prize), and Rs 10,000 (3rd Prize). In addition to these prizes, an all-women team from each of the above events were awarded a cash prize of Rs 10,000. The Industry and R&D Exhibition was conducted to serve as a forum for diverse participants to exhibit, investigate, and advocate for technological and industrial advancements.

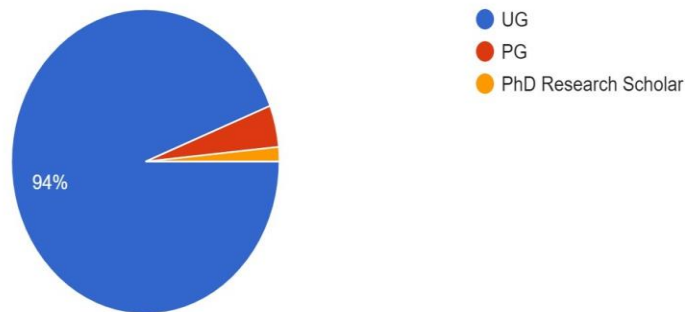
### Select the Event

837 responses



### Present Education

837 responses



A large number of students Nationwide (a total of 837 participants registered) contributed to the success of this event, making it a resounding triumph. The inaugural session commenced on November 3, 2023 with the ceremonial lamp lighting ceremony by the Chief guest and other dignitaries. The gathering was addressed by the Chief Guest of the Inaugural day Shri Atul Bhatt, Chairman & Managing Director of Vizag Steel Plant, Distinguished Guest, Prof Indranil Manna, President INAE, Dr KN Satyanarayana, Director IIT Tirupati and Prof BS Murty, Director IIT Hyderabad.



*Lamp lighting ceremony by esteemed guests*



*Prof. Indranil Manna, President INAE, Distinguished guest addressing the gathering virtually*

The inaugural session was followed by the technical sessions involving invited lectures and Masterclasses by external guests and INAE Fellows, in the focus areas as per the theme. The technical sessions were followed by the paper/poster presentation, Model Presentation, Ideation and Start-up showcase by participating students. The second day of the conclave started with Keynote address delivered by Prof M Chandrasekhar, Director, IIM Visakhapatnam followed by masterclasses by the dignitaries followed by the Industrial Exhibition which served as a platform for various companies to showcase their work and engage with students. The conclave concluded with valedictory session where Prof. Sivaji Chakravorti, Vice-President INAE provided a formal and reflective conclusion to the event, offering closing remarks that summarized the key takeaways and expressed gratitude to participants, organizers, and contributors. The event's conclusion was marked by prize distribution ceremony recognizing and rewarding students for their notable contributions, achievements, or excellence during the event. The students got a unique opportunity to network with INAE fellows and other professionals who have made significant contributions to engineering research and development, industry, and education. The awardees of INAE Youth Conclave are inducted as INAE Student Members for a period of 5 years and encouraged their involvement in INAE activities. The list of Awardees is enclosed as Annexure III.



*Shri Atul Bhatt, Chairman & Managing Director of Vizag Steel Plant, Chief Guest of the event delivering the welcome address*



*Dynamic Duo Group, GM Institute of Technology*



*Team Accumitt, VIT Bhopal University*