

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

INAE-SERB Collaborative Initiative in Engineering is an initiative wherein INAE has partnered with Science and Engineering Research Board (SERB). As an outcome, the following four initiatives under the umbrella of 'Collaborative Initiative in Engineering' were planned to be organized during this year.

- a. 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

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. INAE has progressed well and events have been organized efficiently under all the four initiatives.

The following events/programs are being organized under the umbrella of 'Collaborative Initiative in Engineering':

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

#### **i) "INAE-SERB Youth Conclave on Technology Self Reliance" at IIT Jodhpur during September 17-18, 2022**

IIT Jodhpur organised INAE-SERB Youth Conclave on Technology Self Reliance 2022 under the overarching theme of "SERB-INAE Conclaves on Atmanirbhar Technologies - Engineering Secured Future" in collaboration with Indian National Academy of Engineering (INAE) and Science and Engineering Research Board (SERB) at IIT Jodhpur campus from September 15-18, 2022. The objective of the event is to provide a platform to the country's youth to express their technological creativity and ingenuity and demonstrate their ability to innovate towards finding solutions that impact our collective future.

The inaugural session started with the celebration of Engineers Day marking the birth anniversary of the country's foremost engineer, Bharat Ratna Visvesvaraya. The gathering was addressed by the Chief Guest Prof Devang Khakhar, Former Director, IIT Bombay; Guest of Honour Prof Purnendu Ghosh, Vice-President, INAE; Prof Indranil Manna, President, INAE; Prof R Chidambaram, Chairman, IIT Jodhpur and Prof Santanu Chaudhury, Director, IIT Jodhpur.



*Welcome address Prof Santanu Chaudhury,  
Director IIT Jodhpur*



*Opening Remarks by Prof Purnendu Ghosh,  
Vice-President, INAE*

The theme of INAE-SERB Youth Conclave-2022 was: “**Emerging Technologies for Sustainable Future**”. The specific focus areas identified to anchor the Conclave were (a) *Quantum Technologies*, (b) *Smart Infrastructure*, (c) *Digital Healthcare*, (d) *Materials for Sustainability*, (e) *Experiential Interface*, (f) *Sustainability of Drinking Water*, and (g) *Food: An Emerging Vista of Engineering*

The Technical sessions on the above listed identified domains were organized wherein the experts were invited to deliver lectures. Besides, paper / poster presentation was also organized by participating students. The following speakers delivered their talks on various domains:

**(a) Quantum Technologies:**

- (i) Dr. Anupama Ray, IBM on the topic “Introduction to IBM Quantum Computing”.
- (ii) Mr. Godfrey Mathias, TCS on the topic “Quantum Computing and application”.
- (iii) Prof. Prasanta K. Panigrahi, IISER Kolkata on the “topic Emergence of quantum technology and Quantum computation”.
- (iv) Dr. Subimal Deb, IISER Kolkata on the topic “Self-imaging in dielectric slab waveguides: paraxial and beyond”.

**(b) Smart Infrastructure**

- (i) Dr. Aloknath De, CTO, Samsung R&D Institute India, on the topic “Envisioning 6G enabled cyber physical world”.
- (ii) Mr Vivek Sirohi and Mr. Abhishek Singh, EDS Technologies on the topic “Smart Infrastructure”.
- (iii) Prof Pranab Kumar Mohapatra, IIT Gandhinagar on the topic “Integral water management for Smart cities”.

### **(c) Digital Healthcare**

- (i) Dr. Bala Pesala, IIT Jodhpur on the topic “Future of Digital Health: Living beyond 120 years”.
- (ii) Dr. Rakesh Sarwal, Director, NMDFC on the topic “Digital Health: Opportunities for an efficient health care system in India”.

### **(d) Materials for Sustainability**

- (i) Prof Bhanu Sankara Rao, University of Hyderabad on the topic “Sustainability of Materials at elevated temperature in Energy sector
- (ii) Prof Satyam Suwas, IISC Bangalore – Tryst with materials engineering”.
- (iii) Dr Gerald Tennyson, TCS Research on the topic “Accelerating material design for sustainability through digital technologies”.

### **(e) Experiential Interface**

- (i) Dr Avinash Sharma, IIIT Hyderabad on the topic “Learning based 3D Digitisation of Humans & Terrains”.
- (ii) Dr Lipika Dey, TCS Research on the topic “Conversational Systems Carrying on the conversation”.
- (iii) Dr Rajendra Nagar, IIT Jodhpur on the topic “Introduction to Metaverse”.
- (iv) Prof C V Jawahar, IIIT Hyderabad on the topic “Towards Safe Driving in Unstructured Environments”.

### **(iv) Sustainability of Drinking Water**

- (i) Prof P K Tiwari and Dr Anand Plapally, IIT Jodhpur on the topic “Energy for Pushing Water and Lifting It”
- (j) Prof Sirshendu De, IIT Kharagpur on the topic “Scalable and Sustainable Indigenous Technologies for Treatment of Groundwater and Industrial Wastewater”.

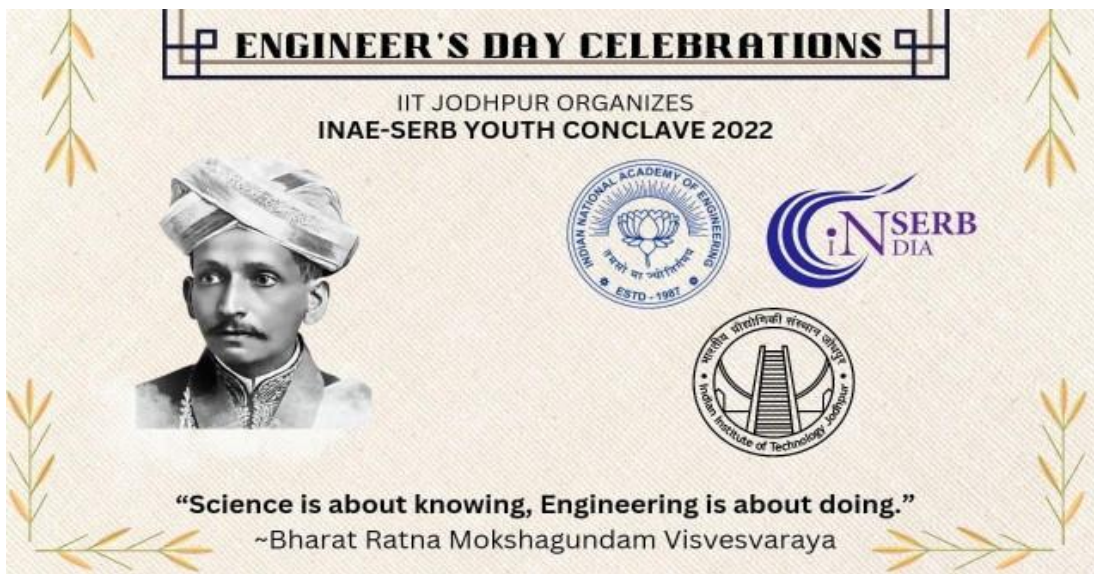
### **(g) Food: An emerging vista of engineering**

- (i) Dr. C. Anandharamakrishnan, CSIR – CFTRI, Mysore
- (ii) Mr Arun Tangri, Tagtaste Foods Pvt Ltd

Besides above technical sessions, several other events like Hackathon, Ideathon, Game Jam, Start-up Show Case, and 3-Minutes Thesis Presentation were also organized. The 3-minute thesis presentation or 3MT took place where research scholars are challenged to present and state the significance of their research/thesis in 180 seconds, in an engaging manner to an audience with non-research background. 94 students registered in thesis presentation. A hackathon, an intense competition was organized with a time constraint where participants collaborate to develop POCs to address a specific issue. In this competition, a group of participants wrestles with a given a problem statement to come up with a solution and demonstrate it with a POC. The total number of students registered for 3MT were 862.

Ideathon are brainstorming events where people with diverse knowledge backgrounds, skill sets and interests get together to wrestle with predetermined problems, and come up with substantive, innovative and comprehensive solutions. An expected output were the ideas, a roadmap or an actionable plan. Ideathon was organized where 236 teams comprising 907 students registered.

The participation in each event was by nomination of the individual students (Technical Paper and 3 Minute Thesis Presentation) and student groups of 3 – 5 members (for Hackathon, Ideathon and Game Jam) by the Head of respective institutions who accepted the invitation to participate in INAE-SERB Youth Conclave. Shortlisting for each event was done based on evaluation of the preliminary submissions made by aspirants and final invitations were sent to the shortlisted individuals / teams. During the Conclave, final rounds of each of the five competitions were held.



Engineers' day celebration at IIT Jodhpur

Over 200 students collectively attended the above session. Vote of thanks was proposed by Prof S R Vadera, Deputy Director, IIT Jodhpur. Awards were presented to the winning individuals / teams during the Valedictory session on the 18th of September, 2022. In addition, all the participating students were provided a Certificate of Participation. Details of the Winners of INAE-SERB Youth Conclave on Technology Self Reliance at IIT Jodhpur are enclosed as *Annexure I*.

### **(b) “SERB-INAE Conclave” held at IIT Kanpur during November 5-6, 2022**

The SERB-INAE Conclave, under the overarching theme of “SERB-INAE Conclaves on Atmanirbhar Technologies - Engineering Secured Future” organised in association with INAE Kanpur Chapter was held on Nov 5-6, 2022 at IIT Kanpur. The event showcased the technological strength of the country with discussions on (a) Clean energy and carbon capture, (b) Medical technology, implantable devices, and non-invasive imaging (c) Semiconductor technology and the future of electronics. The objective was to motivate the youth to work towards self-reliance technologies in these identified sectors. The conclave provided an excellent platform for interaction between young minds and industry and academics.

Prof Ashutosh Sharma, Former Secretary, Department of Science and Technology (DST) was the Chief Guest. He emphasised on the importance of science and engineering to address the future needs effectively and Prof. Abhay Karandikar, Director, IIT Kanpur, talked about the conclave.

The event comprised of plenary and technical lectures by eminent dignitaries. In addition, a panel discussion session was held on “Driving India forward through Frugal Innovations” to highlight the importance of frugal ideas and the means to take them forward for commercialization on the themes.

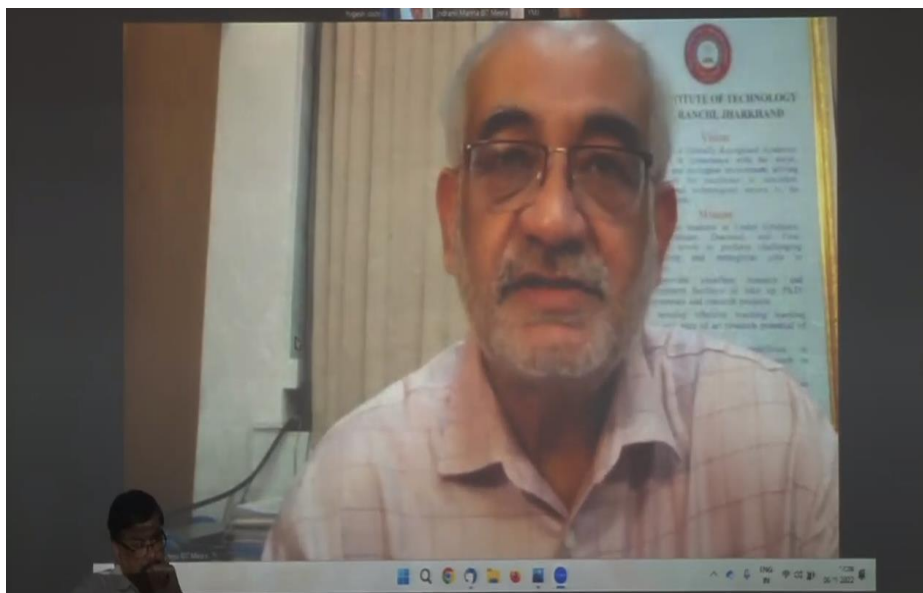
A total of seven invited talks, spread across the two days, oriented towards the conclave’s theme, were made by the following eminent speakers:

- Prof. V. Ramgopal Rao, Department of Electrical Engineering, IIT Delhi, Delhi  
Talk title: Semiconductor Technology
- Prof. Ashutosh Sharma, Department of Chemical Engineering, IIT Kanpur, Kanpur, UP  
Talk title: Being Atmanirbhar from Invention to Innovation: Challenges, Opportunities and Processes of the Brave New World
- Prof. Vishwanath Prasad, University of North Texas Discovery Park, TX, USA  
Talk title: Clean Energy: Is there a choice
- Prof. Milind Atre, Department of Mechanical Engineering, IIT Bombay, Mumbai, Maharashtra  
Talk title: Development of Multistage Pulse Tube Cryocoolers to cool the I-R detector
- Prof. Pramod P Kulkarni, NSB-NTPC School of Business, Noida  
Talk title: Clean Energy and Carbon Capture
- Prof. Neetu Singh, Center or Bio-Medical Engineering, IIT Delhi, Delhi  
Talk title: Medical Technology
- Prof. Niraj Sinha, Mechanical Engineering, IIT Kanpur, Kanpur, UP  
Talk title: Medical technology, implantable devices, and non-invasive imaging





*Prof Ashutosh Sharma, Former Secretary, DST, and Chief Guest of the event addressing the participants*



*Address by Prof Indranil Manna, President, INAE during Valedictory Session*

A panel discussion on Driving India forward through frugal innovations was moderated by Prof. Sameer Khandekar, IIT Kanpur and Prof. Animangsu Ghatak, IIT Kanpur, Prof. Bishakh Bhattacharya, IIT Kanpur, Prof. Ramkumar, IIT Kanpur as the panelists.

To attract the student and startup participation, three competitions were held on the topic Innovative products –prototypes, Grand ideas challenge and Ideation of Startups. A total of 120 team entries were received from which 16 teams were shortlisted to present their work. Prize money of total Rs 48,000 were distributed to the winners.

The conclave ended with the prize distribution and valedictory session, graced by Prof. Amalendu Chandra, Dean of Faculty Affairs IITK and Prof. Indranil Manna, President, INAE who joined online and addressed the gathering.



*Group photograph of the participants at IIT Kanpur*

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

### **i) “Workshop on Writing R&D Grant Proposal for Women Engineers” held at IIT Tirupati during November 10-11, 2022**

The workshop jointly organized under the aegis of “SERB-INAE Woman Engineers Program” by the Indian National Academy of Engineering (INAE) and Science and Engineering Research Board (SERB), DST on November 10-11, 2022 at IIT Tirupati to encourage women engineers in the country to undertake research and seek funding for their research proposals. Women faculty/researchers in engineering from less endowed engineering/technological institutions/universities from Andhra Pradesh, Karnataka, Kerala, Tamil Nadu and Telangana were exposed to research insights, funding of research, evaluation of research grants, and related aspects.

During the inaugural session, Prof. K.N. Satyanarayana Director, IIT Tirupati, in his welcome address briefed about the progress of IIT Tirupati and highlighted the need for organizing workshops like this which enable women researchers to realize their full potential. Prof Sivaji Chakravorti, Vice-President, INAE, Professor, Electrical Engineering Department, Jadavpur University, Kolkata, stressed that teaching and research goes hand in hand and to bridge the heterogeneous gender gap, it is essential to encourage women engineers to undertake research, for which seeking funding is a prime factor. A book on “Research Insights” authored by Dr. Rajiv K

Tayal, Formerly Scientist-G, DST, who was also the resource person for the workshop, was released during the inaugural session

The following sessions were organized to make women engineers aware:

- Session I: Research Insights
- Session II: Funding of Research
- Session III: Evaluation of Research Grants
- Session IV: Writing a Research Grants
- Session V: Group Activity
- Session VI: Group Activity
- Session VII: Ways of Defending a Research Grant



*Prof Sivaji Chakravorti delivering the Inaugural Address*

35 Women faculty/researchers in Engineering disciplines from less endowed Engineering/Technological Institutions/Universities from the states of Andhra Pradesh, Karnataka, Kerala, and Telangana participated during the event participated.



*L to R: Prof Sivaji Chakravorti, Prof KN Satyanarayana, Dr Rajiv K Tayal and Dr DR Prasada Raju during the book release on "Research Insights"*



A special lecture was delivered on Project based learning and specific funding opportunities by Prof Sivaji Chakravorti, Vice President, INAE and Dr DR Prasada Raju, Former Scientist, DST. The participants also visited Amara Raja industrial plant which helped them to gain hands-on experience about various industrial processes and leadership aspects. The Certificate of participation to the candidates was presented by Prof G Ranga Janardhana, Vice Chancellor Jawaharlal Nehru National Technological University (JNTU), Anantpur, Vice Chancellor Jawaharlal Nehru National Technological University (JNTU), Anantpur, Chief Guest for Valedictory Session held on November 11, 2022. On the whole, the workshop comprehensively covered various aspects of research writing aiming to empower women engineers to effectively take up extramural research projects.



*Group photograph of all the participants*

**ii) “Workshop on Writing R&D Grant Proposal for Women Engineers” held at IIT Gandhinagar during February 23-24, 2023**

IIT Gandhinagar organised a Workshop on “Writing R&D Grant Proposal for Women Engineers” under the aegis of “SERB-INAIE Woman Engineers Program” in collaboration with Indian National Academy of Engineering (INAIE) and Science and Engineering Research Board (SERB) on February 23-24, 2023. The workshop was aimed at women faculty and researchers in engineering from less privileged engineering and technological institutions/universities in Goa, Gujarat, Madhya Pradesh, Maharashtra, and Rajasthan. The workshop was organized with the objective of encouraging women engineers across the country to undertake research and pursue funding for their research proposals.

During the inaugural session, Professor Sivaji Chakravorti, Vice-President, INAE, Professor, Electrical Engineering Department at Jadavpur University in Kolkata, emphasized the interconnectedness of teaching and research and highlighted the

importance of encouraging women engineers to conduct research in order to bridge the gender gap. A book called "Research Insights," written by Dr. Rajiv K Tayal, formerly of DST and a resource person for the workshop, was launched.

Dr. Rajiv Tayal gave a comprehensive talk on scientific research and development, classification of research and the importance of research in academics, funding options and extramural research grants, different types of grants and their contents, rebuttal process, presentation, discussion phases of a grant proposal and valuable insights into scientific research and development.

The workshop was divided into 10 technical sessions, covering the following aspects:

- Research insights: Scientific research and development, Classification of research, Importance of research, etc.
- Funding of research: Extramural research grants, Role of funding agencies, Type of grants, etc.
- Evaluation of research grants: Evaluation process, Acceptance criteria, Decision on funding, etc.
- Writing a research grant: Contents of proposal, Key elements, Formulation of proposal, etc.
- Defend a research grant: Rebuttal, Presentation, Discussion, Suggestions by peers, etc.
- Implementation of research grants: Start up activities, Progress reports, Review meetings, financial statements, Subsequent release of funds, Project completion report, Extension and follow-up Grants, etc.
- Group Activities: Identify a research problem and objectives, Writing research grant, Presentation on grant proposal, etc., by participants.
- Visit to an industry or place of interest.

In addition to the technical sessions, the workshop also included several group activities aimed at building confidence among women engineers in crafting compelling R&D grant proposals for government agencies.

An industrial visit to Sahajanand Laser Technology Ltd, Gandhinagar was organized where the participants were provided with a detailed tour of the company's manufacturing unit, research and development facility, and quality control labs. The participants were able to witness the state-of-the-art machines and equipment used by the company for manufacturing laser cutting machines a given a demonstration of the different laser systems used for various industrial applications. The participants were able to interact with the company's experts who explained the technical aspects of the machines and how they work. The details of participants are enclosed at *Annexure II*.



*Dignitaries Lighting the Lamp*

A great gesture of appreciation and recognition to all the participants for their contribution was given by Prof Atul Bhargav, Mechanical Engineering Department, IIT Gandhinagar, Coordinator of the event by distribution of mementos. The workshop was an outstanding success in meeting the laid down objectives.



*Workshop Proceedings in progress*





*Workshop Proceedings in progress*



*Group Photograph of Participants with Dignitaries*

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

**i) Workshop on “Innovation, Entrepreneurship and Start-Up for Young” held at NIT Mizoram during September 26-30, 2022**

A 5-day hybrid workshop organized under the umbrella of “SERB-INAE Outreach Programs for NE, J&K and Ladakh” on “Innovation, Entrepreneurship and Start-Up for Young” jointly organized by the Indian National Academy of Engineering (INAE)



and Science and Engineering Research Board (SERB), DST from September 26-30, 2022 in association with National Institute of Technology, Mizoram. A total of 552 participants in which 512 were online and 40 were offline participants, registered for the workshop from various institutions across the country. The institutions of the participants included NITs from all over the country including North East, Central Universities, State Universities and other affiliated colleges. Prof. Sivaji Chakravorti, Vice-President, INAE graced the occasion as the Chief Guest and expressed his views on the importance of the workshop and key takeaways. At the inaugural ceremony, Prof. Prof. Venkappayya R Desai, Civil Engineering, IIT Kharagpur enlightened the participants about the importance of workshop. Dr. Debasis Chatterjee, Founder & CEO, Cnnfiscore.com graced the occasion as Guest of Honor and shared his thoughts on the theme of the program. Prof. Saibal Chatterjee, Dean (Academics), NIT Mizoram & coordinator of the workshop motivated the participants emphasizing the importance of workshop. The workshop was divided into technical sessions, covering the following aspects:

- Design Thinking for Innovation I by Dr. Debasis Chatterji, Founder & CEO, Confiscore.com
- Role of NABARD for Entrepreneurs & Start-Ups by Mr. KVSSLV Prasada Rao, General Manager/OIC, NABARD Mizoram Regional Office
- Design Thinking for Innovation II by Dr. Debasis Chatterji, Founder & CEO, Confiscore.com
- Intellectual Property Rights by Prof. P. S. Robi, IIT Guwahati
- Social Entrepreneurship by Mr. Riddhinil Roy Serial Entrepreneur & Digital community evangelist | Author, Founder at NE8x
- Design Thinking for Innovation III by Dr. Debasis Chatterji, Founder & CEO, Confiscore.com
- Curriculum Design (Theory and Practical I) by Prof. S Sundar, Director, NIT Mizoram
- Design Thinking for Innovation IV by Dr. Debasis Chatterji,
- Curriculum Design (Theory and Practical II) by Prof. S Sundar, Director, NIT Mizoram
- IPR Laws I by Prof. Viney Kapoor Mehra, Founder Vice- Chancellor of Dr. B.R. Ambedkar National Law University, Sonipat
- Entrepreneurship and Innovators in North East by Dr. Laldinliana, Director, Mizoram University Incubation Centre
- Curriculum Design (Theory and Practical III) by Prof. Sivaji Chakravorti, Vice President, INAE Professor, Jadavpur University, Kolkata and Former Director, NIT Calicut

- IPR Laws II by Prof. Viney Kapoor Mehra, Founder Vice- Chancellor of Dr. B.R. Ambedkar National Law University, Sonipat
- Curriculum Design (Theory and Practical IV) by Prof. Sivaji Chakravorti, Vice President, INAE, Professor, Jadavpur University, Kolkata and Former Director, NIT Calicut

The participants actively participated in all the sessions and interacted with the speakers. The overall response of the workshop was overwhelming.



*Group Photograph of Participants with Dignitaries*

The coordinators extended their invitation to all the participants to visit NIT Mizoram whenever possible and to work in collaboration.

## **ii) “Innovation Contest and Showcasing 2022” in association with NIT Arunachal Pradesh held during November 4-5, 2022**

The Science and Engineering Research Board (SERB) and Indian National Academy of Engineering (INAE) jointly organized “Innovation Contest and Showcasing 2022” organized under the umbrella of “SERB-INAES Outreach Programs for NE, J&K and Ladakh” in association with NIT Arunachal Pradesh during November 4-5, 2022. This event was organized to benefit the participants from all the North Eastern Engineering Institutions, Universities and NITs to further implement their knowledge to set up their own start-ups or develop a business model based on either product innovation or service innovation to make it scalable, replicable and self-reliant in NE region.

The objectives of the events were (a) to create a common interface for collaboration and showcase the best innovation and Startup activities through exhibition from all Engineering Institutes, Universities and NITs across the North-East India (b) to create an environment conducive to the development of local indigenous technologies and innovations, creating the scope and laying the foundation for the promotion of Translational Research and entrepreneurship (c) to help the country achieve the goals of Startup platform for academia and to showcase their expertise, products and technology innovations on mission mode.



*Participants from all-over North-East region*

120 participants from all-over North-East region took part in the contest organized at NIT Arunachal Pradesh in offline mode. The first day included two parallel sessions on idea demonstration and a brainstorming session and four expert talks on the following topics:

- “Innovation” by Mr. Riddhinil Roy, Entrepreneur, Assam.
- “Future of Energy” by Mr. Prakash Kr. Singh, Director, North East Renewable Energy Research Lab, Jorhat.
- “Indian's Start-up Policy/Challenges and Opportunities Panel” by Prof. Sukhomay Pal, Department of Mechanical Engineering and Coordinator of TOCIC IIT Guwahati (online mode)
- “Indian's Start-up Policy/Challenges and Opportunities Panel” by Mr. Akash Jyoti Gogoi, Entrepreneur from Assam.

A talk on the topic “Fundamentals of intellectual property rights (online mode)” was delivered by Dr. Sandeep Singh, an associate professor at NERIST in Nirjuli, Arunachal Pradesh on the second day of the event. A total 150 students participated from which 18 teams showed their prototypes and justifications to the jury members and audience.

The host institute invited talks on Indian Innovation, startup policy/challenges and opportunities, IPR by eminent dignitaries. In addition, Student competitions such as

design thinking, poster presentations, brain storming sessions, debate sessions, essay competitions and quiz were held and the winners were awarded. The list of participants and winners for Showcasing and Brainstorming events are enclosed as *Annexure III*.



*Certificate Distribution to the winners*

**iii) Workshop on “Skill Development for an Idea to Prototype” in association with NIT Nagaland on November 26-30, 2022**

The Science and Engineering Research Board (SERB) and Indian National Academy of Engineering (INAE) jointly organized a workshop on “Skill Development for an Idea to Prototype” under the umbrella of “SERB-INAE Outreach Programs for NE, J&K and Ladakh” in association with NIT Nagaland on November 26-30, 2022. The workshop focused on the students at the level of UG, PG and PhD from all NITs in North Eastern Region of India and Institutes/Colleges/Universities.

The objective of the event was to develop various skills such as to convert idea into a prototype, for market survey, for manufacturing and for marketing. A total of 95 participants registered for the workshop from NIT Nagaland; NIT Manipur; St. Joseph University, Nagaland and some other Universities from North East region of India. The workshop was inaugurated by Mr. Suparno Moitra, Guest of Honour, Founder & CEO, Indian Public Policy Foundation & Immediate, Former Chairman of the Board of Governors, NIT Nagaland, Mr. Taliwati Longchar, Guest of Honour, Director, Ministry of Micro, Small & Medium Enterprises and Prof. Indranil Manna, President INAE as the Chief Guest. Prof. Manna addressed the gathering and gave a brief on activities of Indian National Academy of Engineering (INAE). He encouraged young minds for entrepreneurship and start-ups which will further lead the country into the biggest economy.





*Students inaugurating the event*

The event continued for five days wherein fourteen experts from industry and academia delivered their expertise on entrepreneurship and start-ups and inspire the participants. The workshop was divided into various technical sessions, covering the following aspects:

- “MSME Innovative Scheme” by Mr. Taliwati Longchar, Director MSME
- “Entrepreneurship and career opportunities” by Prof. R. Murugesan, Professor, NIT Tirchy
- “Reality of Entrepreneurship and startup Journey” by Mr. Limanungsang Jamir, President of Chamber of Commerce, Nagaland
- “Entrepreneurship, Innovation and start-ups” by Prof. R. Murugesan, Professor, NIT Tirchy
- “Entrepreneurship in Materials Engineering: Challenges and Opportunities” by Prof. Ravi Kumar N.V, Professor, Metallurgical and Materials Engineering, IIT Madras
- “Entrepreneurship, Cooperative Institution, Technology Law benefits to students and State of Nagaland” by Mr. Thavamaniraj
- “Entrepreneurship in Materials Engineering: Challenges and Opportunities” by Prof. Ravi Kumar N.V, Professor, Metallurgical and Materials Engineering, IIT Madras
- “Industry 4.0 digital transformation for future digital factory” by Prof. Deepak Shrivastava
- “Entrepreneurship and startups opportunity in India” by Prof. V. Ramachandra
- “Start-up: Opportunity in Nagaland” by Dr. Ditalak Mpanme Assistant Professor, Department of Management, Nagaland University

Prof. D. Viswanathan, Former Vice Chancellor, Anna University presided as Chief guest during the valedictory ceremony and inspired the students to be the part of

design and manufacturing, such that our country could lead in both. Prof. Sivaji Chakravorti, Vice-President, INAE presided as Guest of Honor and addressed the gathering to go for frugal innovation.

#### **iv) Workshop on “Science and Technology Exhibition” in association with NIT Manipur during February 1-2, 2022**

The Science and Engineering Research Board (SERB) and Indian National Academy of Engineering (INAE) jointly organized a two-day “Science and Technology Exhibition” under the shelter of “SERB-INAE Outreach Programs for NE, J&K and Ladakh” in association with National Institute of Technology, Manipur on February 1-2, 2023. This workshop focused on the Prototype model display and discussion from all the students at the level of UG, PG and PhD from all NITs in North Eastern Region of India and Institutes/Colleges/Universities in Manipur State.

The objectives of the event were (a) to promote the innovative ideas of the students in UG, PG and PhD (b) to encourage the students for developing the prototype models (c) to develop the scientific and technological knowledge of the participants.

The function was graced by Prof. Sivaji Chakravorti, Vice President, INAE as Chief Guest, Prof. S Venugopal Director, NIT Nagaland as the Guest of Honour, and Prof. Goutam Sutradhar, Director of NIT Manipur as the President of the inaugural function to deliver Presidential Address. A total of eighteen models and prototypes were presented by eighteen teams comprising 66 participants and 16 mentors in the diverse domains of Artificial Intelligence, Geographical Information System, Hydro-power, Environmental Impact Assessment etc. Various colleges or universities from Manipur, NIT Arunachal, and NIT Nagaland participated in the exhibition. The ideas and the models were focused on feasibility and market demand. The demonstrated ideas and models were highly appreciated by the dignitaries and the judges. The first and the second prizes were bagged by NIT Manipur and, Kamakhya Pemton College of Manipur won the third prize. Ten achievement prizes were awarded to the teams from various institutions participated for their innovative ideas.



*Prof Sivaji Chakravorti, Chief Guest addressing the audience on the occasion of “Science and Technology Exhibition” at NIT Manipur*



*Group photograph of the prize winners for their innovative ideas at NIT Manipur*

**d) SERB-INAE Innovation Hackathon**

**i) SERB-INAE Hackathon 2022 held at Jadavpur University, Kolkata during September 3-4, 2022**

The SERB-INAE Hackathon 2022 was organized under the shelter of “SERB-INAE Innovation Hackathon” jointly by SERB, INAE and Jadavpur University during September 3-4, 2022 at Jadavpur University, Kolkata. The objective of the event was to bring out the innovation and creative mindset amongst the undergraduate and postgraduate students from different engineering and science institutions of the country through their participation in this national-level, theme-based hackathon. The hackathon was a 30-hour non-stop event on four thematic areas and was housed in the School of Mobile Computing and IT Department in the SMCC Building of the Salt Lake Campus of Jadavpur University, which is located in a serene and quieter part of the city of Kolkata.

Participants were assigned cutting-edge problems related to four thematic areas:

- a) Artificial Intelligence and Machine Learning (AI/ML)
- b) Big Data Computation
- c) Cyber Security
- d) Data Driven Finance

Each session was continuously monitored and mentored by a panel of jury and their associates.





*Inauguration of the program on 3rd Sep, 2022*

In total 75 applications received from all over India, 37 teams were shortlisted for participation on the basis of Innovativeness, Social relevance, Implementability. After finalization of teams, Jury members for the physical hackathon contest were assigned as per the thematic areas. Prof Samiran Chattopadhyay, Former Head, Department of Information Technology, Jadavpur University, was the Technical Coordinator for the event and coordinated with the jury members for problem statement formulation, adjudication process, technical content and related database management. The shortlisted teams were invited to participate in-person for the event at Jadavpur University, Kolkata. Technical problems pertaining to above mentioned themes were given during the Hackathon and the shortlisted teams worked for 30 hours continuously on the assigned problem and were evaluated after every 6 hours by the experts from various pioneering Engineering Institutes/Organizations across India. Prof Sivaji Chakravorti, Vice-President, INAE steered this entire activity. Prof Rajib Bandyopadhyay, Jadavpur University was the Co-ordinator, SERB-INAE Hackathon 2022.

Prof Indranil Manna, President, INAE was the Chairman of the Valedictory Session and Prof Sandeep Verma, Secretary, SERB was the Chief Guest of the Valedictory Session joined online. Prof Sandeep Verma, Secretary, SERB thanked the organising team and INAE and appreciated all for conducting this event successfully and introduced Digital gaming initiatives to young students.





*Group photograph of the Participants*

A total of six Prizes were announced by Prof Sandeep Verma, Secretary, SERB. First and second prizes were awarded pertaining to themes Artificial Intelligence & Machine Learning and Cyber Security. Only second prizes were awarded pertaining to the themes Big Data Computation and Data Driven Finance. Cash Prize of Rs 75,000 for winning team and Rs 50,000 for first runner up was awarded.

This Hackathon was attended physically by 100 participants and Valedictory session was attended in hybrid mode by various participants, INAE Fellows and dignitaries. The list of winners is enclosed at Annexure IV.

## **ii) Gaming JAM during Sep 15-18, 2022 at IIT Jodhpur**

IIT Jodhpur organised INAE-SERB Youth Conclave on Technology Self Reliance 2022 under the umbrella of “SERB-INAE Innovation Hackathon” in collaboration with Indian National Academy of Engineering (INAE) and Science and Engineering Research Board (SERB) at IIT Jodhpur campus from September 15-18, 2022. Game Jam an important event was organized during the INAE-SERB Youth Conclave and was committed for developing the Animation, Visual Effects, Gaming, and Comics (AVGC) Industry through skilling, training and mentoring professionals.

A game jam is an accelerated opportunistic game creation event where a game is created in a relatively short time frame exploring given design constraint(s) and end results are shared publicly. Interactive Simulation Developers (InSiDe), IIT Jodhpur and Technology Innovation Hub (i-Hub Drishti) present Game Jam that invites game developers to develop innovative games on the themes aligned with the theme of INAE Youth Conclave-2022 “Emerging Technologies for Sustainable Future”.

Game Jam aimed to give budding game developers a platform to showcase their talent. Teams of up to 5 members can register and work on one of the five themes-

- (1) Indian Culture and Ethos,
- (2) Alternate Physics
- (3) Save the Green Planet
- (4) Biosphere in Metaverse
- (5) Theory of Mind.

The evaluation happened in two stages. The first stage is the pre-event stage, where teams will have to submit a video showcasing the proof of concept. After the initial evaluation, successful teams were invited to the IIT Jodhpur campus to participate in the Youth Conclave 2022. There, they had 48 hours to develop the actual game. An expert panel evaluated the performance across multiple dimensions (e.g., aesthetics, music, consistency with the theme, etc.) and decide the winners. The results were announced on the event's final date of the Conclave. The event carried ₹ 50000 worth of prizes. The teams were provided accommodation on campus. Winners and other promising participants were considered for incubation and other entrepreneurship development programmes offered by Technology Innovation Hub (i-hub Drishti) at IIT Jodhpur. The list of winners is enclosed as Annexure V.



*Game JAM at IIT Jodhpur*

**Details of the Winners of INAE-SERB Youth Conclave on Technology Self Reliance at IIT Jodhpur**

**1. Topic: Quantum Technology Seminar**

Registrations for competition: 20 students (IIT Jodhpur: 7 students; Other institutions: 13 students)

- Shortlisted for Technical Paper Presentation: 10 students  
IIT Jodhpur: 2 students; Other institutions: 8 students  
**Winner: Tomis from IIT Jodhpur**
- Shortlisted for Poster Presentation: 3 students all from Outside IIT J  
**Winner: Ayan Kumar Nai from IIT Madras**

**2. Topic: Smart Infrastructure Seminar**

- Shortlisted for Technical Paper Presentation: 5 students  
IIT Jodhpur: 2 students; Other institutions: 3 students  
**Winner: Mohit Singh from IIT Jodhpur**
- Shortlisted for Poster Presentation: 2 students  
IIT Jodhpur: 1 student; Other institutions: 1 student  
**Winner: Aparna Singh from IIT Jodhpur**

**3. Topic: Digital Healthcare Seminar**

- Shortlisted for Technical Paper Presentation: 5 students all from IIT Jodhpur  
**Winner: Dipro Mukherjee from IIT Jodhpur**
- Shortlisted for Poster Presentation: 4 students  
IIT Jodhpur: 1 student, other institutions: 3 students  
**Winner: Arvinpreet Kaur from Birla Institute of Scientific Research, Jaipur**

**4. Topic: Materials for Sustainability Seminar**

- Shortlisted for Technical Paper Presentation: 5 students  
IIT Jodhpur: 3 students, other institutions: 2 students  
**Winner: Adarsh Bharti from IIT Jodhpur**
- Shortlisted for Poster Presentation: 15 students  
IIT Jodhpur: 6 students, other institutions: 9 students  
**Winner: Subburayalu S from IIT Jodhpur**

**5. Topic: Experiential Interface Seminar**

- Shortlisted for Technical Paper Presentation: 5 students  
IIT Jodhpur: 4 students, other institutions: 1 student  
**Winner: Abhirama Subramanyam from IIT Jodhpur**



- Shortlisted for Poster Presentation: 2 students from IIT Jodhpur  
**Winner:** Jayesh Khandelwal from IIT Jodhpur

#### 6. Topic: Sustainability of Drinking Water Seminar

- Shortlisted for Technical Paper Presentation: 5 students from Outside IIT Jodhpur  
**Winner:** Deshbhushan Patil from BITS Pilani

#### 7. Topic: Food-An emerging vista of engineering Seminar

- Shortlisted for Technical Paper Presentation: 5 students  
IIT Jodhpur: 3 students, other institutions: 2 students  
**Winner:** Vishnu Kumar from IIT Jodhpur

#### Details of the Winners of Hackathon at IIT Jodhpur

Position	Team Name	Institute	Problem Statement
First	Dynamatrix	Indian Institute of Technology, JAMMU	Use mobile diagnostic devices for lung diseases.
Second	Unstoppables	Government Women's Engineering College, Ajmer	Make an Alexa like device which can tell stories for a given collection of Indian toys
Third	Enigma	IIT Jodhpur	Extract energy from exhaust of a car.

#### Details of the Winners of Ideathon at IIT Jodhpur

Position	Team Name	Institute	Problem Statement
First	Reality Rewired	Birla Institute of Technology and Science, Pilani Campus	Can mixed reality systems bring real world engineering experience to engineering students in the class
Second	Nutro Health	Indian Institute of Technology Jodhpur	Is personalized food possible ? How ?
Third	Eternal	Jamia Millia Islamia	Digital currency: What should be a transparent and green solution?

**Details of Participants at INAE-SERB Writing R&D Grant Proposals, IIT Gandhinagar**

SN.	First Name	Last Name	Current Position	Affiliation	Department
1	Vyjayanthi	Chintamani	Associate Professor	National Institute of Technology Goa	Electrical and Electronics Engineering
2	Santhi	B	Associate Professor	BITS Pilani K. K. Birla Goa Campus	Mechanical Engineering
3	Shubhangi	Gawali	Associate Professor	BITS Pilani K. K. Birla Goa Campus	CS and IS
4	Parwathi	Pillai	Assistant Professor	Swarnim startup & Innovation University	Chemical Engineering
5	Jharna	Gupta	Temp. Assistant Professor	The Maharaja Sayajirao University of Baroda	Chemical Engineering
6	Jitali Dineshkumar	Patel	Assistant Professor	Nirma University	Computer Science and Engineering
7	Aparna	Kumari	Assistant Professor	Nirma University	Computer Science and Engineering
8	Pooja	Shah	Assistant Professor	Pandit Deendayal Energy University	Computer Science and Engineering
9	Bhakti Narayanbhai	Patel	Assistant Professor	Parul University	Mechanical Engineering
10	Payal	Desai	Associate Professor	Navrachana University	Civil Engineering
11	Prakruti	Shah	Assistant Professor	Navrachana University	Electrical and Electronics Engineering
12	Seema B.	Joshi	Assistant Professor	GTU - GSET, Ahmedabad	Cyber Security
13	Komal	Borisagar	Associate Professor	GTU - GSET, Ahmedabad	Electronics and Communication
14	Geetali	Saha	Assistant Professor	G H Patel College of Engineering & Technology, CVM University	Electronics and Communication
15	Kajal Shambhubhai	Patel	Associate Professor	Vishwakarma Govt Engg College Chandkheda	Computer Science and Engineering
16	Yamini Jayantibhai	Patel	Assistant Professor	VGEC, Gandhinagar	Applied Mechanics
17	Purvi Niraj	Ramanuj	Assistant Professor	L. D.College of Engineering	Information Technology
18	Shilpa	Pandey	Assistant Professor	Pandit Deendayal Energy University	Computer Science and Engineering

19	Anamika	Maurya	Assistant Professor	Ahmedabad University	Chemical Engineering
20	Sheetal Atul	Phatangare	Assistant Professor	Vishwakarma Institute of Technology, Pune	Computer Science and Engineering
21	Pranita Narayan	Balve	Assistant Professor	MVPS's KBT College of Engineering	Civil Engineering
22	Ashwini Khemchand	Patil	Assistant Professor	MVPS's K. B. T. College of Engineering, Nashik	Instrumentation and Control
23	Aarti Milind	Karande	Assistant Professor	Bharatiya Vidya Bhavan's Sardar Patel Institute of Technology,	Master of Computer Application
24	Ashwini	Sapkal	Associate Professor	Army Institute of Technology Pune	Information Technology
25	Sangita Maheshwar	Jaybhaye	Associate Professor	Vishwakarma Institute of Technology , Bibewadi , Pune	Computer Engineering
26	Princy	Randhawa	Assistant Professor	Manipal University Jaipur	Mechatronics Engineering
27	Deepika	Bansal	Assistant Professor	Manipal University Jaipur	Electronics and Communication
28	Juhi	Singh	Assistant Professor	Manipal University Jaipur	Computer Science and Engineering
29	Shivangi	Surati	Assistant Professor	Pandit Deendayal Energy University	Computer Science and Engineering
30	Rupal A.	Kapdi	Assistant Professor	Nirma University	Computer Science and Engineering



**Details of Participants for Showcasing and Brainstorming events at NIT Arunachal Pradesh**

<b>Sl. No.</b>	<b>Innovation Title</b>	<b>Institute/Organization</b>	<b>Category</b>	<b>Members</b>
01	Molecular Geometry in Chemical Compound	NIT Silchar, Assam	Technology	Four
02	A platform for online help to promote mental health	NIT Arunachal Pradesh	Process	Four
03	Slipper Manufacturing Unit	NECTAR DB Enterprise, Assam	Product	One
04	Unmanned Ground Vehicle (UGV) for	IIIT Guwahati, Assam	Technology	Two
05	Airavat	NIT Arunachal Pradesh	Product	
06	Solar Dryer with desalination	NIT Meghalaya	Technology	Four
07	Home Made Pickle Manufacturing Unit	NECTAR Seuji Fresh, Assam	Product	Four
08	SmartV (1st Prize winner)	NIT Agartala, Tripura	Product	Four
09	Traffic Congestion Prognosis and Alternate Route Planning through Scenario-Based, Look-Ahead Visualization (SB-LA-Vis)	NIT Meghalaya	Technology	Four
10	Automatic Solar PV Panel Cooling-cum-Cleaning System	NIT Arunachal Pradesh	Technology	Three
11	Swastha-Sakashay -An Initiative to Revolutionize HealthCare Industries	IIIT Guwahati, Assam	Technology	Four
12	Particulate Matter Immaculate System(PMIS) (2nd Prize Winner)	NIT Manipur	Product	Three
13	SMARTDEL	NIT Arunachal Pradesh	Product	Three
14	Intelligent water sprinler and soil monitoring system	IIIT Guwahati, Assam	Product	Two
15	E-Carrier to Transport Goods in Rural Hilly Area	NIT Meghalaya	Product	Three
16	Autonomous car with future enhancement	NIT Arunachal Pradesh	Technology	Three
17	Sustainable Super Food Farming	NIT Manipur	Product	One
18	Organic Fertilizer Manufacturing Unit	NECTAR Grean Organics, Assam	Product	One
19	Solar P.V. Assisted portable solar dryer with integrated thermal storage materials	NIT Manipur	Product	Four
20	H2O Generator (3rd Prize winner)	Dibrugarh Polytechnic, Assam	Technology	Four
21	Smart Automated Zebra Crossing	NIT Sikkim	Technology	Four
22	Fibre Extract from Banana Stem	NIT Arunachal Pradesh	Product	Four
23	Smart Prosthetic hand with hybrid technologies	IIIT Guwahati, Assam	Technology	Three

24	Rocket Bandh	Dibrugarh, Assam	Technology	Three
25	Development of eco-friendly straw	NIT Arunachal Pradesh	Product	Four
26	Medifio	NECTAR Getthills, Assam	Product	Two
27	Anti-suicide Fan	NIT Arunachal Pradesh	Process	Four
28	Knowledge Transfer	NIT Manipur	Technology	Two
29	Query Optimization using Genetic Algorithm	NIT Silchar, Assam	Process	Four

**Annexure IV**

**Details of the Winners of SERB-INAE Hackathon at  
Jadavpur University, Kolkata**

Theme	Prize	Name	Payment details
AI/ML	First	Dibyanayan Bandyopadhyay dibyanayan@gmail.com Phone No. - 9475039929 Institute - IIT Patna	Prize Money of Rs 75,000
	Second	Sohel Aman Khan sohelamankhan6308@gmail.com Phone No.- 7718175497 Institute- Vidyasagar University	Prize Money of Rs 50,000
Cyber Security	First	Dinesh Yadav dineshydv003@gmail.com Phone No.- 7827278321 Institute- J C Bose University of Science and Tech., Haryana	Prize Money of Rs 75,000
	Second	Ashutosh Dubey dashutosh404@gmail.com Phone No.- 7991177095 Institute- Vellore Institute of Technology Bhopal	Prize Money of Rs 50,000
Big Data	Second	Nikhil kumar Rajnikant Panchal ch20s008@smail.iitm.ac.in Phone No.- 9898331616 Institute- IIT Madras	Prize Money of Rs 50,000
Data Driven Finance	Second	Anubhab Das anubhabdas33@gmail.com Phone No.- 7003488782 Institute- Jadavpur University	Prize Money of Rs 50,000



***Annexure V***

**Details of the Winners of Game Jam at IIT Jodhpur**

<b>Position</b>	<b>Team Name</b>	<b>Institute</b>	<b>Problem Statement</b>
First	Kamand Helix	IIT Mandi	Theory of mind
Second	KAMAND HOAX	IIT Mandi	Save the green planet
Third	Hipsters	IIT Jodhpur	Save the green Planet
Consolation Prize	Game Developer's Community, SRM	SRM University Tamilnadu	Indian Culture and Ethos