Annual Report
2024-25

Indian National Academy of Engineering

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2024-25

Indian National Academy of Engineering

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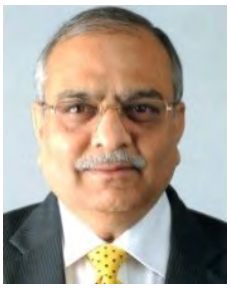


Foreword

As we closed an unforgettable financial year 24-25 in INAE's journey and embarking on full financial and operational autonomy, I take this opportunity to convey my greetings and warm wishes to the former Presidents, Council Members, Fellows, Foreign Fellows, Young Associates, and Officials of INAE for joyful, successful and prosperous times ahead with bright prospects for all. The Indian National Academy of Engineering (INAE), established on April 20, 1987, has played a vital role in engineering policy-making, launching initiatives, forecasting technologies, and mentoring the engineering ecosystem. It represents India's most distinguished engineers from academia, industry, R&D, and strategic sectors and set a Gold Standard in Engineering. Funded by DST since 1995, INAE has just begun its journey forward of financial & operational independence from April 1, 2025, in deference to Government of India Guidelines and mandate for INAE.

The genesis of the above being in response to communications by DST in 2022 intimating cabinet decision recommending that Government should disengage itself from the activities of INAE, leading to the Academy taking several steps to embark on a journey of self-sufficiency and financial autonomy with guidance from DST. INAE leadership initiated immediate and sustained efforts, supported by the INAE Governing Council and the Fellowship at large, expressing solidarity through personal contributions to the INAE Corpus Fund, to strive and achieve financial self-sufficiency by April 1st, 2025 and substantial progress has been accomplished in this endeavour. Towards this, several initiatives were launched, including Individual, Corporate as well as Institutional membership drives, outreach for corporate donations within the engineering domain, and registration under CSR frameworks.

INAE as we all know comprises of India's best talent pool of distinguished engineers and engineering luminaries and anticipatedly proved its mettle in these crisis times, as has always been done in testing times. On behalf of INAE, it is my distinct privilege to express gratitude to the former Presidents of INAE with special mention to my predecessor Prof Indranil Manna for unrelented efforts; Office Bearers and Council Members for unstinting guidance & support; Fellowship and Young Associates and INAE Staff who left no stone unturned to see that the legacy of INAE continues and the Academy marches ahead with firmer resolve to promote the practice of engineering and technology and growth of engineering education, in this ever advancing country of ours which is progressing to a *Viksit Bharat* by 2047.

In spite of the financial crunch in the last one year, it is a matter of pride for all of us in fellowship at large that INAE has remained steadfast and has conducted all its flagship and major events successfully & frugally while maintaining highest standards of technical content, outreach and impact across the nation. The Academy not only continued its endeavours, but also initiated novel programs and opened up new avenues for greater and more profound engagement with the engineering community from India and abroad that are currently being pursued through active participation and mentorship role by the eminent Fellowship as also other Academicians and engineering professionals of repute and standing. I am delighted to inform regarding one such noble, watershed initiative to transform engineering education in India gratefully supported by the Infosys Foundation under CSR funds, a Centre for Engineering Education Excellence has

been instituted wherein INAE in collaboration with most prestigious engineering education institutions will focus on upskilling educators (mentees) from Tier III/IV engineering colleges and institutions. It is envisaged that through a blend of in-person and virtual training, mentees will enhance their technical expertise, classroom management, and student engagement skills. Distinguished teachers from most eminent academic institutions shall mentor over 3,000 teachers from diverse AICTE affiliated engineering colleges and institutions over next three years from the length and breadth of the country in five zones. It is foreseen that this unique centre shall make a deep and profound impact on enhancing the quality of engineering education in the nation in a win-win situation for all stakeholders with active involvement of the eminent Academicians. The Academy acknowledges the support and commitment of Infosys Foundation for funding this novel initiative poised to transform the engineering education landscape in India in years to come.

My heartfelt compliments to INAE Fellowship, leadership and officials from AICTE, IITs Infosys Foundation and eminent Academicians who kindly agreed to spare their valuable time in initiating this noble task which is indeed a National service. I wish to acknowledge Mr NR Narayana Murthy for the embryonic idea and Prof Indranil Manna for evolving the concept of CEEE and detailing by Prof Santanu Chaudhury and the centre coordinators at all the five IITs towards operationalising the CEEE. It is with deep gratitude that I seek the participation of maximum Fellows in this landmark initiative that shall cause a paradigm shift in teaching pedagogy and enhance the quality of engineering education being imparted in engineering colleges and institutions across the country through leveraging the proficiency of Fellows and eminent Academicians from the IITs which are indeed the Institutes of National Importance - in a win-win situation for all participants.

INAE leadership evolved a strategy to generate adequate Corpus Fund to ensure its sustainability with financial and functional autonomy seeking contributions from (i) Corporate Donations / Membership; (ii) Institutional Membership (Academic and R&D institutions); (iii) Individual Donations / Membership; (iv) Corporate Social Responsibility (CSR) contributions; (v) Government / Projects; and (vi) Royalty from INAE's Publications. I appeal to all Fellows to commit to support at least one or more of these initiatives and help facilitate wider reach out of INAE for greater number of Memberships in all three categories – Institutional, Corporate and Individual Memberships. Many of our esteemed Fellows have already contributed in furthering this cause with sincerity and promptness. INAE gratefully acknowledges their contributions as well as that of eminent engineering luminaries in leadership position from INAE Fellowship and many others who lent support to INAE to overcome challenges and emerge stronger and more resolved in its convictions. The timely and generous contributions from L&T; Tata Sons; Google; Microsoft; Google Research India; Excel Industries and other industries as well as memberships from premier educational and research institutions such as the IITs, top private universities, and DRDO laboratories are deeply acknowledged with heartfelt gratitude. We are also extremely grateful to Prof Abhay Karandikar, Secretary, DST for his unstinted support and guidance to the Academy in this transformation to emerge stronger and resolute in furthering the vision of our founding leadership.

It is gratifying to share that as on date corporate donations to INAE corpus fund has reached a collection of about Rs 37 Cr with further commitments of Rs 29.5 Cr scheduled to come over coming 3 years. A CSR contribution of Rs 38 Cr is to be spent over 3 years to upgrade Engineering Education in India. On the membership contributions (Institutional, Corporate and Individual) we have a collected operations fund of Rs 8 Cr. With these we have reached 2/3rd of the corpus fund collection we had targeted.

Let me now recapitulate the important events held during the last one year. INAE celebrated its 38th Foundation Day on 22nd April 2024 in hybrid mode in New Delhi. Dr. Anil Kakodkar, *FNAE*, Chancel-

lor, HBNI, Mumbai; Former President, INAE, and Former Chairman of Atomic Energy Commission and Secretary to Government of India, Department of Atomic Energy Mumbai was the Chief Guest at the said INAE Function who in his address elucidated that the Academy has made its presence felt on the national/ international domain and is making strides on the road to fiscal and functional autonomy in line with directives and concerted efforts are ongoing to see that the Academy continues to make a mark in promoting the growth and cause of engineering and technology by furtherance of meaningful activities in line with the objectives. The function was a grand success which was also graced by former Presidents Dr BN Suresh and Dr Sanak Mishra who delivered enlightening addresses on the way forward for the Academy. The function was followed by a Seminar on "Green Hydrogen" organized jointly by INAE Delhi Chapter and International Solar Alliance (ISA) on the same day at New Delhi in hybrid mode which featured meaningful talks in the context of the envisaged paradigm shift towards a Green Hydrogen Economy.

Engineers Conclave 2024 (EC-2024) was jointly organized by INAE Hyderabad Chapter with Defence Research and Development Organization (DRDO) as major sponsor on September 26-27, 2024 at Defence Research and Development Laboratory in Hyderabad. The themes were "Additive Manufacturing for Defence Applications" and "Defence Manufacturing Technologies". The Hon'ble Raksha Mantri Shri Rajnath Singh sent a Message conveying good wishes for the Conclave which was projected on the screen during the Inaugural Session. The conclave brought together a sizeable gathering of scientific community as also Industry participants in large numbers.

The 18th Symposium on National Frontiers of Engineering (NatFoE) was successfully hosted by the National Institute of Technology (NIT) Warangal in collaboration with the INAE, under the auspices of the ANRF (SERB), DST–INAE Conclave on *Atmanirbhar* Technologies for Engineering a Secured Future, held on November 15-16, 2024 and the themes were Additive Manufacturing and Automation; Smart Grid: Power Electronic Converters, Control, and Protection; Green Hydrogen and Storage Technologies and Quantum Computing, Artificial Intelligence, and Machine Learning. The Youth Conclave 2024 was organized by the Indian Institute of Technology Bhilai during December 12-13, 2024 under the umbrella of erstwhile ANRF (SERB), DST–INAE Innovation Hackathon and the themes of National importance included HealthTech; AgriTech and Sustainability Technology. These events were attended by a record number of students, faculty and scientists and were well appreciated for technical content, presentation and outcome.

INAE Annual Convention 2024 was held on December 19-21, 2024 hosted at Indian Institute of Technology Delhi, New Delhi. The Convention of the Academy was mega event attended by Fellows, Foreign Fellows, Young Associates, Scientists, Faculty and students of IIT Delhi and Invitees. This year's Annual Convention was made even more memorable as the Chief Guest of the Inaugural Session was Shri Rajnath Singh, Hon'ble Raksha Mantri, Ministry of Defence, Government of India who in an inspiring speech highlighted the importance of scientists and engineers to develop high-end technologies for augmenting India's assets in the engineering and technology domain leading to further advancement of the Nation. He also stressed upon the need to preserve the country's heritage and tradition and creation of a synergistic relationship between industry, R&D organisations and academia to achieve greater progress in high – end niche technologies for a better life for the citizens. The Annual Convention featured an important Panel Discussion on "Road Map for *Viksit Bharat*"; a Fireside Chats in the areas of "Manufacturing" and "AI"; Technical Sessions and Presentations and also the Induction Ceremony wherein newly elected Fellows and Young Associates were formally inducted into the rolls of the Academy. A Poster Session and competition was also held under the aegis of "SERB (ANRF), DST - INAE Conclaves on *Atmanirbhar* Technologies - Engineering Secured Future" for Masters' Students and PhD Scholars of IIT Delhi on Dec 19-20, 2024 on

the sidelines of the INAE Annual Convention 2024. This was a golden opportunity for them to showcase their research contributions in ten broad engineering disciplines and the response was astounding.

INAE as per practice conducts several unique activities and programs with the objective of fostering the growth of engineering and technology in the country. INAE also undertook several novel initiatives, noteworthy being the erstwhile SERB (now ANRF), DST - INAE Collaborative Initiative in Engineering. Several events were organized under joint SERB-INAE umbrella viz Conclaves on *Atmanirbhar* Technologies - Engineering Secured Future; Woman Engineers Program; Outreach Programs for North East, Jammu & Kashmir and Ladakh and Innovation Hackathon. These programs were continued during the last year as well and made deeper in-roads especially in remote areas of Jammu and Kashmir and the North East which received encouraging response and appreciation.

INAE had taken an initiative to constitute joint consultative committees with eminent organizations so as to align activities of INAE in the areas of national engineering interest. INAE currently has several Consultative Committees with following departments/establishments of Government of India such as Department of Science & Technology (DST), Defence Research & Development Organisation (DRDO), Indian Space Research Organisation (ISRO), Department of Atomic Energy (DAE), Council of Scientific & Industrial Research (CSIR), SERB (subsumed into ANRF) and All India Council for Technical Education (AICTE) which meet periodically to facilitate interaction and identification of topics on thrust areas of engineering for conduct of technical activities and programmes and to increase the outreach of the Academy accordingly. In the last one year, the ISRO-INAE Consultative Committee meeting was held on May 22, 2024, in hybrid mode at ISRO HQ, Bengaluru and the DRDO-INAE Consultative Committee meeting was held on September 26, 2024, at DRDL, Hyderabad wherein besides technical issues efforts to encourage collaborative activities and increase the number of nominations for INAE Fellowship and Young Associate were discussed.

It is heartening to note that DST has entrusted INAE to implement several important initiatives such as the India-Taiwan Programme of Cooperation in Science & Technology and also a Memorandum of Understanding (MOU) was signed between DST and INAE for implementation of Vaishvik Bharatiya Vaigyanik (VAIBHAV) Fellowship on July 15, 2024 to connect Indian STEMM diaspora with Indian Institutions. DST has also entrusted INAE to undertake the implementation of WINGS program, which aimed to provide opportunities to Indian Women Scientists, Engineers & Technologists to undertake international-level research experience in advanced research labs of relevant institutions of the world, to enhance their scientific research capacities. INAE is deeply grateful to DST for involvement of INAE in these initiatives of National importance in the area of Science and Technology. The Abdul Kalam Technology Innovation National Fellowship, launched in 2017, jointly with SERB, DST recognizes, encourages and supports translational research by engineering professionals in public-funded institutions, however the scheme had been halted and later as per recent directives no further selections are being made. Efforts are ongoing by INAE to re-energize the scheme.

As per last five years, the drive to implement the INAE Digital Platform to facilitate INAE Fellows submitting nominations online for election to Fellowship for improved functioning and coordinating operations of the INAE Office has been successfully deployed and a novel platform is being launched for submission of applications for Membership as well.

INAE being a Member-Academy of the International Council of Academies of Engineering and Technological Sciences (CAETS) actively participates in its programmes and convocations of global concern at national and international levels. INAE undertakes joint initiatives with several CAETS Member Academies. This year the 7th INAE-NAEK Workshop on “Current Status and Cooperation Plan of the Satellites

for Observing the Earth," was held online from August 19-20, 2024 and successfully gathered leading experts from India and South Korea to discuss the latest advancements in satellite technology and explore avenues for international collaboration. INAE delegation participated in the CAETS Annual Meeting held in Helsinki, Finland from July 1-3, 2024. INAE nominated Experts for various Technical Sessions and several esteemed Fellows are Members of various Working Group/ Committees. INAE's contribution in CAETS activities are always appreciated. The contributions of INAE in the CAETS Engineering Education Working Group Co-Chaired by Prof Indranil Manna were acknowledged and the report emanated from the meetings is under finalization.

The "Transactions of Indian National Academy of Engineering – International Journal of Engineering and Technology" has increased in its outreach, diversity and visibility with the onboarding of new editors from CAETS Member Academies of Republic of Korea, Argentina and South Africa. I wish to invite and encourage all INAE Fellows especially newly elected Fellows and Foreign Fellows to submit at least one manuscript each year. INAE released the Inaugural issue of INAE TechFrontier, launched on April 20, 2025, during INAE's 39th Foundation Day celebrations at IIT Delhi and this quarterly e-magazine is envisioned as a platform to showcase the technological accomplishments of newly elected Fellows, Young Associates, and Members and we look forward to your contributions in this unique publication.

The Local Chapters as always have been dedicated in their efforts with the conduct of meaningful technical activities and programs with greater participation of the scientific and engineering community and I laud them for their exemplary contributions.

The Academy shall continue its exponential growth in terms of outcome with conduct of impactful activities and implementation of meaningful programs in line with its noble objectives towards the growth of engineering and technology and enhancement of engineering education and I am sure that with the sustained and incremental participation of Fellows and Young Associates this tradition shall be upheld. The Academy and Nation shall indeed appreciate these contributions which are visible in the success of the events and programs and ever increasing participation each year.

At this juncture I am humbled on behalf of INAE to express sincere gratitude to the former Presidents of INAE for their deep counsel and brilliance in not only being a pillar of strength to help overcome existential challenges but in achievement of greater excellence on all fronts and playing a role in enhancing the presence of the Academy in the National and International engineering arena in taking the technical activities and programs of the Academy to greater heights of excellence.

I fail in words to cherish the exemplary and selfless role played by the Office Bearers, Council Members, and appreciate the support of Fellows, Young Associates and Officials of INAE and I look forward to sustained and dedicated support of all in every facet of the Academy. It shall be my delight to interact in person with all experts in our well spread-out events and programs.

Towards end, I seek your active involvement in wide ranging initiatives of the academy and furtherance of INAE's vision to foster growth of Engineering and Technology in our Nation in the journey to be *Viksit Bharat* by India@100.

Jai Hind!

Mr JD Patil
President, INAE

About the Academy

The Indian National Academy of Engineering (INAE), founded in 1987, comprises India's most distinguished engineers, engineer-scientists and technologists covering the entire spectrum of engineering disciplines. INAE functions as an apex body and promotes the practice of engineering and technology and the related sciences for their application to solving problems of national importance. The Academy provides a forum for futuristic planning for country's development requiring engineering and technological inputs and brings together specialists from related fields as may be necessary for providing comprehensive solutions to the needs of the country.

INAE is the only engineering Academy in India. INAE is a Member of the International Council of Academies of Engineering and Technological Sciences (CAETS). The aims and objects of the Academy are given below.

(a) To promote and advance the practice of engineering and technology and the related sciences and disciplines (hereinafter referred to as 'Engineering') in India and their application to problems of national importance.

(b) To disseminate among its members information on all matters pertaining to 'Engineering' and to encourage, assist and extend knowledge and information connected therewith by publishing such proceedings, journals, memoires, and other publications as may be desirable and hold meetings, lectures, seminars, symposia etc.

(c) To interact, after due and detailed consideration, with professional bodies, engineering and scientific academies etc. already established or as may be established in future in India and abroad.

(d) To promote and safeguard academic and professional interest of persons involved in 'Engineering' (hereinafter referred to as 'Engineer' in India by laying down a code of ethics which shall be an obligation to be signed by all Fellows of the Academy on admission thereto).

(e) To provide an association of eminent 'Engineers' and to present at all academic forums research and developmental activities on 'Engineering' on mutually interactive and cooperative basis, both in India and abroad.

(f) To promote the National Policy on Education of the Government of India as announced from time to time, in all matters of technical education where the Academy is concerned.

(g) To assist the Government of India, the Local Governments, All India Council of Technical Education, and others in analysing, forecasting for the purpose of planning and formulating the policies in respect of education in 'Engineering' and ensuring the appropriate standard thereof.

(h) To offer the Government of India, the Local Governments and others, facilities for conferring with and ascertaining the views of 'Engineers' as regards matters directly or indirectly pertaining to 'Engineering' and to confer with the said Governments and others in cooperation with other fraternal professional bodies in regard to all matters pertaining to 'Engineering'.

(i) To encourage inventions, investigations and research and promote their applications for development of both organised and unorganised sectors of the national economy.

(j) To encourage and promote the pursuit of excellence in the field of 'Engineering'.

(k) To institute and establish Professorships, Fellowships, Studentships, Scholarships, Awards and other benefactions and to grant Certificates of Competency and Charter whether under any Act of Government of India or otherwise howsoever.

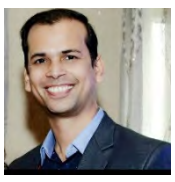
(l) To do all such other acts and things as are incidental or conducive to the attainment of the above objects or any one of them.

INAE Governing Council for the Year 2025

	Title		Affiliation
	**President**	:	Mr. JD Patil, Former Whole Time Director (Defence & Smart Technologies) and Member of Executive Committee of Management Larsen & Toubro Limited; Former Director L&T Semiconductor Technologies Limited Former Chairman L&T MBDA Missile Systems Limited; Member of the Board of IN-SPACe; Chairman Indian Space Association (ISpA); Trustee L&T Employee Trust; Past President and Founder Vice President Society of Indian Defence Manufacturers.
	**Immediate Former President**	:	Prof. Indranil Manna, Vice Chancellor, Birla Institute of Technology (BIT), Mesra, Ranchi, Jharkhand [On lien from I.I.T. Kharagpur, W.B.] and Former Director, Indian Institute of Technology Kanpur, U.P.; Former Director, CSIR-Central Glass & Ceramic Research Institute (CGCRI), Kolkata.
	**Vice-President** *(Finance & Establishment)*	:	Prof. UB Desai, Former Director, Indian Institute of Technology Hyderabad Former Professor, Department of Electrical Engineering, Indian Institute of Technology Bombay.
	**Vice-President** (Projects)	:	Prof. Santanu Chaudhury, Professor, Department of Electrical Engineering, Indian Institute of Technology Delhi and Former Director, IIT Jodhpur.
	**Vice-President** *(Fellowship and Awards)*	:	Prof. Sivaji Chakravorti, Professor, Electrical Engineering Department, Jadavpur University, Kolkata and former Director, NIT Calicut.
	**Vice-President** *(Academic, Professional & International Affairs)*	:	Mr. Pradeep Chaturvedi, Vice-President, World Environment Foundation, New Delhi.

	**Vice-President** *(Publications)*	:	Prof. Amit Agrawal, Institute Chair Professor of Engineering Sciences and Design & J.C. Bose National Fellow and Professor, Department of Mechanical Engineering, Indian Institute of Technology Bombay, Mumbai.
	**Vice-President** *(Resource Generation, Corporate Communications and Membership)*	:	Mr. T Suvarna Raju, Formerly Chairman & Managing Director, Hindustan Aeronautics Ltd., Bangalore.
	**Members** Engg Section-I *(Civil Engineering)*	:	Mr. VN Heggade, Former CEO of STUP & Former ED of Gammon, India, Mumbai.
	Engg Section-II *(Computer Engineering and Information Technology)*	:	Dr. Manish Gupta, Senior Director, Google DeepMind, Bengaluru.
	Engg Section-III *(Mechanical Engineering)*	:	Prof. Suhas S. Joshi, Director, Indian Institute of Technology Indore.
	Engg Section-IV *(Chemical Engineering)*	:	Prof. GD Yadav, Bhatnagar Fellow & National Science Chair & Emeritus Professor Eminence; Former Vice Chancellor & R.T. Mody Distinguished Professor & Tata Chemicals Darbari Seth Distinguished Professor of Leadership & Innovation, Institute of Chemical Technology, Mumbai.
	Engg Section-V *(Electrical Engineering)*	:	Dr. Archana Sharma, Distinguished Professor, Dr. S P Mukherjee International Institute of Information Technology, Naya Raipur (IIIT-NR), Chhattisgarh, and former Outstanding Scientist, Director, Beam Technology Development Group, BARC, Mumbai.

	Engg Section-VI *(Electronics & Communication Engineering)*	:	Dr. Aloknath De, Founder and CEO, TechCrafter.cps; and former CTO & CVP, Samsung, Bangalore.
	Engg Section-VII *(Aerospace Engineering)*	:	Mr. JJ Jadhav, Director General of Aeronautical Development Agency (ADA), Aeronatical Development Agency (Ministry of Defence, Govt. of India).
	Engg Section-VIII *(Mining, Metallurgical and Materials Engineering)*	:	Prof. Amlan J Pal, Director, UGC-DAE Consortium for Scientific Research.
	Engg Section-IX *(Energy Engineering)*	:	Dr. Ajay Mathur, Former Director-General, International Solar Alliance (ISA), Gurgaon.
	Engg Section-X *(Interdisciplinary and Special Engineering Fields and Leadership in Academia, R&D and Industry)*		Prof. T Pradeep, Institute Professor, Department of Chemistry, Indian Institute of Technology Madras.
Representatives of various Organizations			
	Department of Science & Technology (DST), Ministry of Science & Technology	:	Prof. Sandeep Verma, Professor, Department of Chemistry, IIT Kanpur; former Secretary, Science and Engineering Research Board (SERB), Department of Science and Technology.

	Ministry of Education (Erstwhile MHRD)	:	Prof. Manoj Kumar Tiwari, Director, Indian Institute of Management (IIM) Mumbai [formerly known as National Institute of Industrial Engineering (NITIE)].
	Department of Space (DOS)	:	Dr. V Narayanan, Chairman, Space Commission, Chairman, ISRO and Secretary, Department of Space, Bangalore.
	All India Council for Technical Education (AICTE)	:	Prof. (Dr.) TG Sitharam, Chairman, All India Council for Technical Education (AICTE), New Delhi. Former Director, IIT Guwahati.
	Indian National Science Academy (INSA)	:	Prof. Anurag Sharma, Professor, Physics Department, Indian Institute of Technology Delhi.
	Defence Research & Development Organisation (DRDO)	:	Dr. K Rajalakshmi Menon, Distingusihed Scientist & Director General (Aeronautical Systems), DRDO.
	Department of Atomic Energy (DAE)	:	Mr. Ranajit Kumar, Chairman, Atomic Energy Education Society, DAE & Raja Ramanna Fellow, DAE, Atomic Energy Education Society, Mumbai.
	Confederation of Indian Industry (CII)	:	Dr. Ashish Mohan, Executive Director, Technology, R&D, Innovation and Design, Confederation of Indian Industry, New Delhi.

	The National Association of Software and Services Companies (NASSCOM)	:	Mr. Siva Prasad Polimetla, Head- ER&D Initiative, NASSCOM, Hyderabad.
	Federation of Indian Chambers of Commerce & Industry (FICCI)	:	**AWAITED**

INAE Committees

The composition of the ten Sectional Committees is given below.

Sectional Committee-I
(Civil Engineering)

Convener
Prof. CSP Ojha

Members
Prof. B Bhattacharya
Prof. SN Tripathi
Prof. Ligy Philip
Prof. Santosh Kapuria
Prof. R. Sundaravadivelu
Mr. MM Madan
Mr. N Raghavan
Dr. N Subramanian
Dr. Anandavalli Narayanan
Dr. SK Kamra
Dr. Saptarshi Sasmal

Sectional Committee-II
(Computer Engineering and Information Technology)

Convener
Prof. Shalabh Bhatnagar

Members
Prof. Sanghamitra Bandyopadhyay
Prof. AN Rajagopalan
Prof Niloy Ganguly
Prof. PP Chakrabarti
Prof. Rajeev Sangal
Dr. Sriram K. Rajamani
Prof. Naveen Garg
Dr. Suparna Bhattacharya
Dr. Ranjita Bhagwan
Dr. Ramachandran Ramjee
Dr. S Ramesh

Sectional Committee-III
(Mechanical Engineering)

Convener
Dr. NC Murmu

Members
Prof GK Ananthasuresh
Prof. Krishnan Balasubramaniam
Prof. SG Deshmukh
Prof. Amitava Datta
Prof. Atul Sharma
Prof. Anindya Chatterjee
Dr. Dhananjaya Dendukuri
Dr. Sathya Prasad Mangalaramanan
Prof. Sarit K Das
Dr. BK Sreedhar
Dr. P Sivakumar

Sectional Committee-IV
(Chemical Engineering)

Convener
Prof. Viswanathan Shankar

Members
Prof. SC Patwardhan
Dr. PR Gogate
Prof. KK Pant
Dr. US Agarwal
Prof. P Subramaniam
Prof. SN Upadhyay
Mr. KV Subramaniam
Mr. Ajay Narayan Deshpande
Ms. Vartika Shukla
Dr. Amol A Kulkarni
Prof. PK Tewari

Sectional Committee-V
(Electrical Engineering)

Convener
Prof. Saikat Chakrabarti
Members
Prof. SA Khaparde
Prof. Bidyadhar Subudhi
Prof. Anil Kulkarni
Prof. Baylon G Fernandes
Prof. Amitava Chatterjee
Prof. Soumitro Banerjee
Prof. L. Umanand
Dr. M Arunachalam
Dr. Rahul Tongia
Prof. VS Borkar
Mr. Manjit Singh

Sectional Committee – VII
(Aerospace Engineering)
Convener
Prof. G Jagadeesh

Members

Prof. R Padhi
Dr. Jagannath Nayak
Prof. Mira Mitra
Prof. Sudarshan Kumar
Mr Jitendra Jaishingrao Jadhav
Mr. S Chetty
Dr. Tessy Thomas
Dr. PP Mohan Lal
Dr. Samikkanu Raja
Prof. C Venkatesan
Dr. Debasis Chakraborty

Sectional Committee-VI
(Electronics & Communication Engineering)

Convener
Dr. A Chockalingam
Members
Prof. Yogesh Singh Chauhan
Prof. Ashwin Gumaste
Prof. M Shojaei Baghini
Dr. KN Sivarajan
Mr. MV Gowtama
Mr. Raghavan Muralidharan
Dr Dhananjay A Gore
Dr. Lalit Kumar
Dr Rajeev Shorey
Dr. VK Agrawal
Prof. Jayadeva

Sectional Committee – VIII
(Mining, Metallurgical and Materials Engineering)
Convener
Prof. Kantesh Balani
Members

Prof. M Kamaraj
Prof. Vikram Jayaram
Prof. Jyotsna Dutta Majumdar
Dr. Indranil Chattoraj
Dr. Mukesh Kumar
Dr. T Venugopalan
Dr. Satyam Suraj Sahay
Dr. Vikas Kumar
Dr. Sandip Ghosh Chowdhury
Dr. Harish C Barshilia
Prof. S Suwas

Sectional Committee-IX

(Energy Engineering)

Convener

Mr. MS Unnikrishnan

Members

Prof. KS Reddy
Dr. Ram Kumar Singh
Mr. B Prasada Rao
Smt. Smitha Manohar
Mr. Anil V Parab
Mr. A Sanatkumar
Mr. SC Chetal
Mr. AK Balasubrahmanian
Dr. AB Mukherjee
Dr. LM Gantayet
Dr. BK Nashine

Sectional Committee-X

(Interdisciplinary and Special Engineering Fields and Leadership in Academia, R&D and Industry)

Convener

Prof. C Rajendran

Members

Prof. Ambarish Ghosh
Prof. Suparna Mukherji
Prof. M. Sharan
Prof. Sandeep Verma
Prof. S B Krupanidhi
Mr. Ranajit Kumar
Dr. Beena Rai
Prof. Mannepalli Lakshmi Kantam
Dr. AK Behera
Mr. JAR Krishna Moorty
Prof. Rohit Srivastava

Other Committees and Forums

DST-INAE Consultative Committee

Co-Chair

Prof. Abhay Karandikar

Mr. JD Patil

Members from DST

Shri Praveen Roy

Shri Vineet Saini

Members from INAE

Prof. Indranil Manna

Dr. BN Suresh

Dr. SV Kamat

Prof. UB Desai

Prof. Santanu Chaudhury

Prof. Subhasis Chaudhuri

Member-Secretary - Deputy Executive Director/Executive Director, INAE

DRDO-INAE Consultative Committee

Co-Chairs

Dr. SV Kamat

Mr. JD Patil

Members from DRDO

Shri LC Mangal

Dr. N Ranjana

Shri Arun Choudhury

Members from INAE

Prof. Indranil Manna

Dr. BN Suresh

Dr. PS Goel

Prof. Santanu Chaudhury

Mr. T Suvarna Raju

Member-Secretary - Deputy Executive Director/Executive Director, INAE

CSIR-INAE Consultative Committee

Co-Chairs

Dr N Kalaiselvi

Mr. JD Patil

Members from CSIR

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New Initiatives during the Year

INAE- Infosys Foundation CSR Funded Scheme 2024-28
Centre for Engineering Education Excellence (CEEE) Program through CSR Funding from Infosys Foundation

India, despite being one of the fastest-growing economies and currently the fifth largest in the world, faces numerous developmental challenges as it charts its course toward becoming a *Viksit Bharat* (developed nation) by 2047. Critical sectors like energy, environment, infrastructure, transportation, security, defense, and healthcare require innovative engineering solutions to address pressing national needs. Given India's demographic advantage - having the largest and youngest population globally — there lies a tremendous opportunity to harness this human capital by equipping it with the right knowledge, skills, and competencies, especially in engineering and technology.

Currently, over one million seats are available for admission into engineering degree programs every year across more than 3,000 institutions approved by statutory bodies like AICTE, UGC, and the Ministry of Education. However, a persistent concern within this ecosystem is the wide disparity in the quality and competence of engineering graduates. While a small percentage of students emerge as highly capable and industry-ready, a large majority often lack the essential technical skills, professional preparedness, and innovation capacity necessary for meaningful contribution to national projects and industrial growth.

A core reason behind this uneven quality of graduates is the variation in the standard of engineering education delivered, particularly in Tier 3 and 4 institutions. Many of these colleges face infrastructural constraints, limited access to contemporary resources, and significant challenges in attracting and retaining highly qualified faculty. It is well recognized that the quality of an educational system is deeply influenced by the quality of its teachers. Enhancing the teaching capabilities of engineering faculty, especially those in foundational and core subjects, is therefore essential to uplifting the overall standard of engineering education in the country.

In this context, the **Indian National Academy of Engineering (INAE)** — India's premier engineering body comprising nearly 1000 Fellows from academia, industry, and R&D organizations — identified a critical opportunity to intervene by upskilling and mentoring engineering faculty. Recognizing the need for corporate participation in nation-building, INAE registered under CSR (Corporate Social Responsibility) provisions, enabling it to collaborate with the private sector for programs promoting engineering education excellence.

Following extensive discussions and advocacy a proposal to collaborate under CSR provisions was presented to the Founder of Infosys. The proposal received an encouraging response, and the **Infosys Foundation**, the philanthropic arm of Infosys Ltd., agreed to partner with INAE to support strategic educational initiatives.

Indian National Academy of Engineering (INAE) and Infosys Foundation have signed a four-year Memorandum of Understanding (MoU) to transform engineering education in India. Backed by an investment of over INR 38 crore from Infosys Foundation under CSR funds, the initiative named **Center for Engineering Education Excellence** in collaboration with prestigious engineering education institutions will focus on upskilling educators and promoting project-based learning for students. Through a blend of

in-person and virtual training, educators will enhance their technical expertise, classroom management, and student engagement skills. Around 250 mentors from top academic institutions will support over 3,000 teachers. Leaders from both organizations emphasized the initiative's potential to refresh teaching methodologies, and prepare a future-ready engineering workforce in India. The formal press release was released on 19th December 2024 and link for the same is:

https://www.infosys.com/newsroom/press-releases/2024/collaborate-transform-engineering-education-india.html

The initiative, titled the **Centre for Engineering Education Excellence (CEEE)**, is a structured, multi-year program with an outlay of ₹38.35 crores funded by the Infosys Foundation, spanning four years from 2024–2028. The program's central objective is to systematically enhance the academic and pedagogical skills of faculty members from lesser-endowed engineering colleges. By equipping these educators with modern teaching methodologies, updated subject knowledge, and innovative instructional practices, the initiative aims to indirectly improve the learning outcomes and employability of engineering graduates, ultimately strengthening India's technical manpower pool.

The program focuses on faculty engaged in teaching core, fundamental courses during the second, third, and fourth semesters — a critical stage where students acquire essential engineering concepts. The five domains covered under the initiative include:

- **Computer Science and Information Technology** (including Data Science and AI/ML)
- **Electrical, Electronics, and Instrumentation Engineering**
- **Mechanical, Aerospace, and Energy Engineering**
- **Materials, Chemical, and Biomedical Engineering**
- **Civil and Environmental Engineering**

For each domain, six strategically selected core subjects have been identified. The faculty selected for this program (mentees) will undergo a combination of intensive physical mentorship and virtual training annually. The physical mentorship will be a two-week program conducted during the summer months (May-June), followed by a two to three-week virtual mentorship program till December.

The mentorship pool comprises INAE Fellows, domain experts, Young Associates, and experienced faculty members from reputed Tier 1 engineering institutions across five geographic regions: North, East, Central, West, and South. Each region will be coordinated by a designated **Principal Mentor**, responsible for overseeing the mentorship activities and ensuring consistency and quality in content delivery. These mentors will work closely with faculty from Tier 3 and 4 institutions to impart contemporary knowledge, introduce modern teaching aids and assessment practices, and share case studies, practical demonstrations, and new-age learning resources.

The projected reach of the program is ambitious yet achievable. In Year 1 (FY 2024-25), more than 30vmentors will train about 500 mentees. The numbers will progressively increase to over 50 mentors and about 800 mentees in Year 2, about 80 mentors and about 1200 mentees in Year 3, and over 90 mentors and about 1350 mentees in Year 4. By the program's conclusion, a total of about 250 mentors will have guided about 3800 faculty members, creating a ripple effect expected to impact thousands of engineering students across the country.

A comprehensive **governance framework** has been established to ensure effective management and execution of the program. The INAE Governing Council will exercise strategic oversight through an **Advisory Committee**, including industry experts, and a **Board of Management**, with representation from INAE, AICTE, Infosys Foundation, and other stakeholders. Additionally, a **Selection and Evaluation Committee** will supervise the identification of mentors and mentees, monitor program progress, and review outcomes. Operational execution will be managed by a dedicated Project Management Team.

The financial structure of the program ensures competitive honorariums for mentors and stipends for mentees to support their participation. Mentors will receive ₹1,76,000 for each mentorship cycle, covering honorariums for physical and virtual sessions and travel allowances. Mentees will be provided ₹50,000 during the offline mentorship phase, covering travel, accommodation, and related expenses.

This initiative represents a landmark collaboration between academia and industry for national capacity-building in engineering education. By focusing on faculty development, the CEEE program aligns directly with India's educational reforms and employment priorities, contributing to the *Skill India* mission and broader national development goals. It also exemplifies how responsible corporate philanthropy, through CSR initiatives, can make a significant, lasting impact on education quality, workforce readiness, and socio-economic advancement.

As the program progresses, INAE and Infosys Foundation anticipate generating a network of empowered, capable engineering educators who will, in turn, nurture generations of technically proficient, innovation-driven, and industry-ready engineers. This initiative is an essential step towards building a resilient, future-ready technical workforce, playing a pivotal role in realizing the vision of *Viksit Bharat 2047*.

Joint Activities with ANRF (erstwhile SERB)

(i) ANRF (erstwhile SERB) - INAE Collaborative Initiatives in Engineering:

INAE jointly with SERB had taken a new initiative in the year 2022 to conduct various events under SERB-INAE Collaborative Initiative in Engineering. As an outcome, the following four initiatives under the umbrella of 'Collaborative Initiative in Engineering' were 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 received a tremendous response and the initiative has progressed well with the conduct the above listed events efficiently under all the four verticals. The events/programs organized during the period April 1, 2024 to March 31, 2025 are given below:

A. **ANRF (SERB) - INAE Conclave on *Atmanirbhar* Technologies for Engineering a Secured Future**

(i) **Symposium on National Frontiers of Engineering and IMP at NIT Warangal**

The 18th Symposium on National Frontiers of Engineering (NatFoE) was successfully hosted by the National Institute of Technology (NIT) Warangal in collaboration with the Indian National Academy of Engineering (INAE), under the auspices of the ANRF (SERB)–INAE Conclave on *Atmanirbhar* Technologies for Engineering a Secured Future, held on November 15-16, 2024.

The 18th Symposium on National Frontiers of Engineering (NatFoE), a flagship event organized by the Indian National Academy of Engineering (INAE) since 2006, aims to inspire young engineers (aged approximately 27-45) from industries, universities, and R&D labs to present cutting-edge research in various engineering fields. The 2024 edition saw enthusiastic participation from a large number of young researchers representing academic institutions, research laboratories, and industrial organizations.

The inaugural session, held at the Ambedkar Learning Centre, NIT Warangal, was graced by eminent dignitaries including Prof. Indranil Manna, President, INAE; Prof. Sivaji Chakravorti, Vice President, INAE; Prof. Bidyadhar Subudhi, Director, NIT Warangal; and Prof. Shirish H. Sonawane, Dean (Research and Development), NIT Warangal.

In alignment with the nation's mission on Atmanirbhar Technologies, the symposium was structured around four carefully selected thematic areas, reflecting emerging priorities in engineering and technology. The themes were as follows:

- Additive Manufacturing and Automation
- Smart Grid: Power Electronic Converters, Control, and Protection
- Green Hydrogen and Storage Technologies
- Quantum Computing, Artificial Intelligence, and Machine Learning

Based on these themes, the symposium featured four focused technical sessions, each dedicated to in-depth discussions and presentations by young researchers and professionals at the forefront of these cutting-edge domains.

Session 1: Additive Manufacturing and Automation

a. Human-Centric Manufacturing and Industry 5.0

Prof. S. K. Pal from IIT Kharagpur emphasized the transformative potential of Artificial Intelligence (AI) and automation in the manufacturing sector, particularly within the context of Industry 5.0. Unlike Industry 4.0, which focuses primarily on digitization and automation, Industry 5.0 adopts a human-centric approach, promoting meaningful collaboration between humans and intelligent machines. Prof. Pal underscored that this paradigm shift ensures human creativity, problem-solving abilities, and emotional intelligence remain integral to innovation and decision-making in future manufacturing ecosystems.

AI and automation optimize manufacturing by improving efficiency, enhancing quality, reducing costs, and driving innovation. AI handles repetitive tasks, allowing humans to focus on more complex, creative work. However, the human element remains crucial for addressing challenges that require emotional intelligence and judgment. Prof. Pal also stressed the importance of sustainability in manufacturing, advocating for the integration of green technologies, alternative energy, and scalable automation. This approach can help small-scale industries reduce costs, enhance energy efficiency, and contribute to a greener future.

Cybersecurity risks related to AI and automation were another concern. As industries become more interconnected, robust cybersecurity measures are essential to protect data and operational safety. Looking to the future, Prof. Pal discussed the potential of 6G networks and the Internet of Things (IoT) in enabling real-time communication and self-optimizing factories. Tactile IoT systems will enhance precision and safety, making manufacturing smarter, more efficient, and safer.

b. Additive Manufacturing by Laser Powder Bed Fusion

Dr. Gururaj T, Scientist at ARCI, shared significant advancements in material development for Additive Manufacturing (AM) using Laser Powder Bed Fusion (L-PBF) technology. He emphasized the critical role of alloy chemistry modification in optimizing material properties for high-performance 3D printing. The use of spherical powders was highlighted for their improved flowability and consistency, which contribute to enhanced print quality and reduced defect rates.

Dr. Gururaj also discussed the integration of conformal cooling channels in AM, which significantly improve heat dissipation and extend the service life of manufacturing dies. He further underlined the advantages of topology optimization in designing lightweight structures that maintain structural integrity while minimizing material usage.

Looking ahead, Dr. Gururaj outlined ongoing research into the development of new alloy powders, including those based on non-weldable materials, as well as the transformative potential of Artificial Intelligence (AI) and Machine Learning (ML) in enabling real-time optimization of AM process parameters. These technologies are poised to significantly enhance precision, repeatability, and efficiency in additive manufacturing.

He also stressed the importance of refining powder characteristics, particularly by improving powder sphericity and eliminating satellite particles, to ensure consistent and reliable printing outcomes. In conclusion, Dr. Gururaj's presentation highlighted a promising future for Additive Manufacturing—driven by innovations in materials, AI-enabled process control, and enhanced powder quality—offering immense benefits to sectors such as aerospace, automotive, and healthcare.

c. Qualification and Standards in Additive Manufacturing (AM), especially for aerospace and aviation applications

Mr. Ankit Sahu, from Objectify Technologies Pvt. Ltd., underscored the critical importance of process and material qualification in metal Additive Manufacturing (AM), particularly for high-stakes sectors such as aerospace and aviation. He elaborated on strategic approaches to design planning, ensuring regulatory compliance, and adherence to industry standards such as AWS D20, with a strong focus on dimensional tolerances, acceptance criteria, and Non-Destructive Testing (NDT) qualifications.

Mr. Sahu highlighted the value of integrating online defect monitoring during the Laser Powder Bed Fusion (L-PBF) deposition process, along with comprehensive process validation, to uphold manufacturing reliability and ensure high-quality output.

Looking ahead, he outlined future initiatives aimed at strengthening regulatory frameworks, enhancing defect detection techniques, and refining manufacturing practices—all directed toward enabling the production of advanced, reliable components for applications such as aerospace systems and unmanned aerial vehicles (UAVs).

d. 3D Printing for Energy Devices

Prof. Poonam Sundriyal, IIT Kharagpur presented groundbreaking research on the use of 3D printing technology for developing flexible, wearable supercapacitors integrated with energy-harvesting components. These advanced supercapacitors are engineered to efficiently store and deliver energy while maintaining mechanical resilience, making them ideally suited for wearable electronics. The incorporation of energy-harvesting modules enables the devices to draw power from external stimuli such as motion or environmental conditions, offering a sustainable and self-sufficient energy solution.

Prof. Sundriyal highlighted the impressive performance of these devices under real-world conditions, where flexibility and durability are essential—particularly in applications involving continuous wear and movement. Looking ahead, she emphasized the need to further advance the technology behind cell-powered electronics. Enhancing energy-harvesting capabilities and improving the durability of these supercapacitors will be key to ensuring reliable performance under ongoing mechanical stress. Such innovations are vital for the future of practical, sustainable, and energy-efficient solutions, with potential applications ranging from wearable health monitoring systems to flexible consumer electronics and beyond.

Prof. Sundriyal's research not only pushes the frontier of energy storage technology, but also contributes meaningfully to the development of environmentally friendly, self-powered devices designed to meet the rising demand for efficient and sustainable electronic systems across industries.

Session 2: Smart Grid: Power Electronic Converters, Control and Protection

The plenary session under Theme 2: Smart Grid – Power Electronic Converters, Control, and Protection was delivered by Prof. S. C. Srivastava, a distinguished expert from IIT Kanpur and a pioneer in power system innovations. Prof. Srivastava offered a comprehensive overview of the evolution of smart electric grids, with a particular focus on microgrid systems and advanced technologies for power management.

Drawing from his experience with the microgrid developed at IIT Kanpur, he provided an insightful real-time case study on the challenges and solutions involved in renewable energy–integrated microgrid

operations. His session also delved into the net-zero emissions paradigm, outlining the strides being made in this critical area of energy research. Prof. Srivastava emphasized that the successful deployment of smart grids with deep renewable energy integration is pivotal in addressing the ever-increasing electricity demands of the future.

Invited Talks by Emerging Researchers

As part of the thematic focus on smart grids, three invited lectures were delivered by promising young faculty members from leading institutions:

- Dr. Yashasvi Bansal, Assistant Professor, IIT Delhi, spoke on "The Transformative Role of PMUs for Monitoring and Protection in Smart Grids." She highlighted the importance of Phasor Measurement Units (PMUs) in enhancing real-time monitoring, protection, and control of smart grids, emphasizing their role in ensuring grid reliability and stability.
- Dr. P. Deepak Reddy, Assistant Professor, IIT Kharagpur, presented his work on "Operation and Control of Microgrid Systems." He discussed various operational modes and control strategies for efficient integration of renewable energy sources, showcasing how microgrids can enhance grid flexibility and resilience.
- Dr. Chandrashekhar Perumalla, IIT Bhubaneswar, provided an in-depth exploration of wireless power transfer and its applications in electric vehicle (EV) charging. He emphasized the need for developing a robust EV charging infrastructure to support India's net-zero emission goals, highlighting the transformative potential of innovative charging technologies in creating a sustainable transportation ecosystem.

Key Takeaways:

- Integration of Renewables: Transitioning to smart grids powered by renewable energy is essential for sustainability, necessitating innovative management approaches and advanced technologies.
- Real-Time Monitoring: Devices such as PMUs are indispensable for maintaining grid stability in dynamic, complex power systems.
- Microgrid Flexibility: Modular and adaptive microgrids offer scalable solutions but require sophisticated control mechanisms for effective deployment.
- Investment in EV Infrastructure: Expanding EV charging networks, including wireless solutions, is critical for sustainable mobility and achieving net-zero targets.

These sessions collectively highlighted that the future of smart grids lies in the convergence of technological innovation, renewable energy integration, infrastructure development, and strategic administration, all of which are vital to meeting the country's environmental and energy security goals.

Session 3: Green Hydrogen and Storage Technologies

The second day of the National Frontiers of Engineering Symposium (NatFoE) 2024 commenced with an intellectually stimulating session dedicated to Green Hydrogen and Storage Technologies. The session conveners extended a warm welcome to the esteemed speakers, distinguished guests, enthusiastic participants, and students, setting an inspiring tone for an important discourse at the confluence of innovation, sustainability, and national development.

In the context of global efforts to combat climate change and ensure energy security, green hydrogen has emerged as a pivotal clean energy vector. Its versatility and zero-emission potential position it as a transformative solution across sectors such as industry, transportation, and power generation. Complementarily, advancements in energy storage technologies are crucial to realizing the full promise of renewable energy by enhancing grid stability, reliability, and scalability. Together, green hydrogen and storage solutions form the cornerstone of a sustainable and resilient energy future—both for India and the world.

The session opened with a plenary lecture by Prof. S. Basu of IIT Delhi, a distinguished authority in electrochemical systems. His keynote address, "Electrochemical Engines for Energy Storage and Conversion to Achieve Net Zero Carbon Emission," offered a comprehensive examination of hydrogen's role as a transformative energy carrier. Prof. Basu underscored the technological advancements required to render hydrogen and fuel cell technologies both environmentally sustainable and commercially feasible. Notably, he presented promising research on a membrane-less alkaline micro-electrolyser, an innovation poised to enhance the efficiency and economic viability of hydrogen production.

This foundational lecture was followed by three invited talks, each contributing unique perspectives and cutting-edge developments:

- Dr. Vijay Radhakrishnan from Reliance India Limited, Mumbai, delivered an enlightening lecture on Sodium-ion Batteries as a sustainable and scalable alternative to conventional lithium-ion technologies. He addressed key engineering challenges and elaborated on strategic pathways for their commercialization, underlining the technology's potential to support India's energy transition.
- Dr. Sujit Pillai from the Ministry of New and Renewable Energy (MNRE) provided critical policy insights through his talk on the Indian National Green Hydrogen Mission. He detailed government initiatives and technological progress in electrolyzers, including PEM, AEM, SOEC, and alkaline variants, mapping a comprehensive trajectory for the large-scale adoption of green hydrogen in India.
- Dr. Sreedevi Varam from NIT Warangal presented pioneering research on on-demand hydrogen generation using innovative aluminum-based composite materials. Her talk emphasized aluminum's high energy density and explored the role of metal activators and additives in addressing challenges associated with hydrogen storage and transportation. Her findings highlighted the material's significant promise for clean and efficient hydrogen energy systems.

Each lecture was followed by dynamic audience engagement, with thoughtful questions and constructive discussions that further enriched the collaborative atmosphere of the session. The exchange of ideas fostered a spirit of innovation and collective ambition, aligning with the nation's broader vision for a net-zero future. The session concluded with sincere gratitude to the Indian National Academy of Engineering (INAE) and ANRF for providing this esteemed platform, enabling thought leaders and young researchers to converge, collaborate, and contribute meaningfully to the advancement of sustainable energy technologies.

Session 4: Quantum Computing and AI ML

Five talks on state-of-the-art technologies were organized as a part of second day of NaTFoE 2024. The main frontiers of each talk are listed below:

- Quantum Technologies in the National Quantum Mission: The National Quantum Mission

(NQM) has created four technology verticals in quantum computing, communication, sensing and metrology, and materials and devices. These four verticals aim to translate quantum science into applicable technologies that benefit Indian industry and society. The main challenges discussed were Scaling Quantum Systems, efficient Quantum Algorithms, Quantum Materials and Hardware, Quantum Networking and Communication, Error Mitigation and Noise Management, and Standardization and Accessibility.

- Importance of Remote Photoplethysmography in AI: Remote photoplethysmography (rPPG) is a contactless technology that estimates physiological parameters such as heart rate, respiratory rate, and blood oxygen saturation using video-based analysis. Coupled with AI, rPPG has become a transformative tool across various domains, emphasizing its significance in modern healthcare, wellness, and beyond. The critical points discussed are AI integration with contactless health monitoring, development of AI algorithms for robust signal interpretation, leveraging federated learning for privacy-preserving data analysis, and Integration of rPPG into interoperable AI-powered health systems.
- Quantum Simulators and Accelerators: Harnessing PARAM for Quantum Computing Acceleration: Quantum simulators and accelerators are crucial in advancing quantum computing, offering the capability to model quantum systems and execute quantum algorithms faster. PARAM, India's Indigenous supercomputing series, plays a vital role in fostering the development of quantum computing acceleration. By integrating quantum simulators and accelerators into its architecture, PARAM can lead India's efforts in quantum research, supporting applications in science, engineering, and beyond. This synergy positions PARAM as a cornerstone in the quantum computing revolution.
- Symbiotic Relationship Between Artificial Intelligence and Computing Systems Design: There is a symbiotic relationship between artificial intelligence, primarily machine learning and deep learning, and computing systems design, emphasizing how they have come to influence the progress of each other. Traditionally, we believe in providing more computing power to the ever-increasing complex ML/DL models. The symbiotic relationship between AI and computing systems design reshapes the technological landscape. This interplay drives innovation in AI applications and enhances computing platforms, paving the way for more intelligent, efficient, and sustainable systems. By harnessing this synergy, industries can address emerging challenges in energy, scalability, and real-world AI deployment.
- AI Infrastructure: Optimizing LLM Inference for Efficiency and Scalability: Large Language Models (LLMs) are revolutionizing AI applications with their unprecedented language understanding and generation capabilities. However, training and deploying these models at scale can be computationally expensive and resource-intensive. To unlock the full potential of LLMs, it is crucial to optimize their inference process. Optimizing LLM inference for efficiency and scalability is at the frontier of AI infrastructure development. Through innovations in model compression, hardware acceleration, memory optimization, and scalable frameworks, the field is moving toward sustainable, real-time, and accessible LLM deployment. These advancements enable broader adoption of LLMs and ensure their role in shaping transformative applications across industries.

Around 70 faculty and researchers from various engineering institutions participated in the two-day program. 28 posters were presented during the event and in addition a National Level Competition, Innovations in manufacturing practices was dovetailed with the 18th National Frontiers of Engineering (NatFoE-24) Symposium on the second day where students across India presented their innovative ideas.

Inauguration of NaTFoE at NIT Warangal by Prof Sivaji Chakravorti, Vice President INAE

Group Photo of participants of NaTFoE 2024

Presidential address by Prof Indranil Manna, President INAE

Release of NatFoE Souvenir during Inaugural as part of the Inaugural Function

Innovation in Manufacturing Practices (IMP)

The Innovation in Manufacturing Processes (IMP) – 2024, organized by INAE in collaboration with the National Institute of Technology Warangal under the aegis of the ANRF (SERB) - INAE Conclave on *Atmanirbhar* Technologies- Engineering Secured Future, took place on November 16, 2024. This event brought together a diverse group of participants, including undergraduate and postgraduate (Master's students) as well as start-ups, all presenting innovative ideas and projects related to advancements in the manufacturing sector.

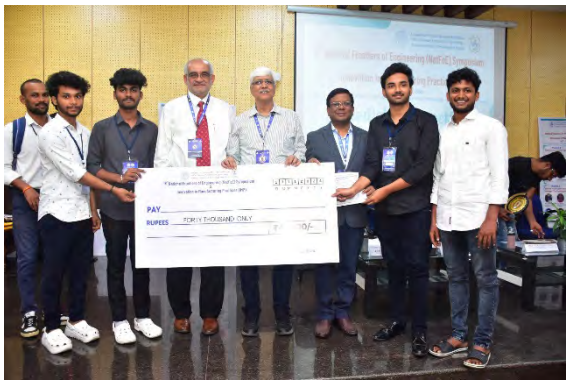
A total of 24 teams participated, pitching their cutting-edge ideas and demonstrating how they could revolutionize manufacturing processes. The event highlighted a broad spectrum of topics, from new manufacturing techniques to sustainability innovations, all aimed at driving progress within the industry.

At the conclusion of the event, cash awards were presented by eminent guests in three distinct categories, recognizing the most outstanding projects. In addition, certificates were distributed to the best poster presentations across four themes, further encouraging participants to engage in deep research and innovative thinking. The event not only provided valuable exposure to the participants but also fostered collaborations, ideas exchange, and inspiration, contributing to the larger goal of fostering an Atmanirbhar (self-reliant) manufacturing ecosystem in India.

Highlights:

- Over 28 posters were presented at the symposium, each reviewed by Prof. Sivaji Chakravorti, Prof. Subudhi, and an evaluation committee for each theme. Best poster certificates were awarded to the top presentations.
- The event featured 18 plenary and keynote talks, with a focus on diversity in the topics covered.
- A total of 67 participants from across the country attended the two-day symposium, with *64* participants from IMP presenting their ideas.
- 24 innovative ideas were pitched in the IMP session, out of the 67 submitted.
- Prof. Indranil Manna and Prof. Sivaji Chakravorti engaged with the IMP participants, offering valuable insights and feedback while also reviewing the prototypes.
- An MoU was signed between NIT Warangal and Agastya Hydrogen, marking a significant step in advancing collaboration in hydrogen technologies.

Participants, especially students, expressed that the symposium provided an excellent learning opportunity. They were highly motivated and inspired by the posters and exhibits showcased during IMP, which fuelled their enthusiasm for innovation and research in the manufacturing sector.



Prize Distribution to the winner of Innovation in Manufacturing Practices (IMP) 2024 by INAE leadership

Prize Distribution to the winner of Innovation in Manufacturing Practices (IMP) 2024 by INAE leadership

Memento presented to Prof Indranil Manna, President INAE by Prof Bidyadhar Subudhi, Director NIT Warangal

Memento presented to Prof Sivaji Chakravorti, Vice-President INAE by Prof Bidyadhar Subudhi, Director NIT Warangal

(ii) Poster Session organized under the aegis of "SERB (ANRF)-INAE Conclaves on Atmanir bhar Technologies - Engineering Secured Future" at IIT Delhi

A Poster Session and competition was held under the aegis of "SERB (ANRF)-INAE Conclaves on *Atmanirbhar* Technologies - Engineering Secured Future" for Masters' Students and PhD Scholars of IIT Delhi on Dec 19-20, 2024 on the sidelines of the INAE Annual Convention 2024. This was a golden opportunity for them to showcase their research contributions in ten broad engineering disciplines. The Posters were judged by a panel of expert jury members from INAE Fellowship and Faculty of IIT Delhi who also interacted with the students and asked pertinent questions. The prize distribution of the Poster Session and competition, was held on December 20, 2024. The students appreciated the Poster Competition and also appreciated the lectures on both days and gained insightful knowledge through the conduct of the Poster Session and participation in the convention.

Prof SM Ishtiaque Judging the Posters

Judging by Prof Mahesh Tandon, FNAE & Mr VN Heggade, FNAE

Prof Sushmita Mitra, FNAE & Dr Lipika Dey, Judging Posters

Prof Maithili Sharan, FNAE in Judging Process

Pictorial Delight of Prize Distribution for Poster Session

Prof Sivaji Chakravorti, Vice-President, INAE (Extreme left) and Prof. Naresh Bhatnagar, FNAE, Dean (R & D), IIT Delhi (Extreme Right) presenting Prizes to the Winners of the Poster Session.

(iii) Conclave on "*Atmanirbhar* Technologies: Engineering a Secure Future" at IIT Dharwad

The Indian Institute of Technology Dharwad (IITDh) successfully organized a one-day national conclave titled "*Atmanirbhar* Technologies: Engineering a Secure Future" on March 21, 2025. This prestigious event was conducted under the aegis of ANRF (SERB) – INAE Conclave on *Atmanirbhar* Technologies: Engineering a Secure Future. It served as a significant initiative in alignment with the national visions of Atmanirbhar Bharat and *Viksit Bharat*, aimed at fortifying the country's self-reliance in indigenous technology and engineering for a secure and sustainable future.

The conclave brought together a dynamic mix of participants from academia, research institutions, and industry. It served as a platform to foster dialogue, promote collaborative research, and showcase technological innovation across a range of critical sectors. The agenda was meticulously designed to bridge the gap between academic research and industrial application, thereby reinforcing the national objective of technological sovereignty.

The day commenced at 9:30 a.m. with an inaugural ceremony, marked by the traditional lighting of the lamp, symbolizing the illumination of knowledge and innovation. Eminent guests included Dr. Anushree Ramanath, Schneider Electric, USA; Mr Mahalingam Koushik, Founder, Chara Technologies, Bangalore; Dr. Ravi Guttal, CTO, Aequs Pvt. Ltd.; Dr. Karthik Sankaran, Bangalore-based entrepreneur and semiconductor expert; and Mr Ram Subramaniam, Hubli-based entrepreneur working in the strategic sectors of the economy. They were joined by senior faculty members of IIT Dharwad including Prof. Somashekara M A (Head of the MMAE Department), Prof. Dileep A D (Dean of Administration and officiating Director of the Institute), Prof. Dhiraj V Patil (Dean of Faculty Welfare), Prof. Ramjee Repaka (Dean of Student Welfare), and Prof. Pratyasa Bhui (Dean of Research and Development).

The inaugural address was delivered by Prof. Amar Gaonkar, Associate Professor at IIT Dharwad, who emphasized the importance of nurturing indigenous engineering solutions and the critical role academic institutions play in this transformation. Following this, Prof. Dileep A D, serving as the officiating Director, presented the keynote address. He spoke on the importance of collaborative research and innovation, stressing the need for partnerships across academia, industry, and government sectors to realize the goals of a self-reliant India.

The conclave focused on four core thematic areas, each chosen for their relevance to India's strategic technological roadmap: Circular Manufacturing, Secure and Sustainable Electric Power, Indigenous Technology for Strategic Sectors, and Electronics, Semiconductors, and Chip Manufacturing. These themes formed the backbone of the technical sessions and discussions that unfolded throughout the day.

Lamp Lighting Ceremony

The morning session featured a series of thought-provoking technical talks. The first talk of the day, delivered by Dr. Anushree Ramanath, was titled "AI for Renewables: Enabling Smart, Scalable, and Sustainable Energy Solutions". In her address, Dr. Ramanath discussed the transformative potential of artificial intelligence in the renewable energy landscape. Drawing from her international experience, she provided deep insights into how smart systems and predictive analytics are revolutionizing energy

generation and management. Her talk inspired young researchers to adopt AI-driven approaches to address real-world challenges in energy sustainability.

Following this, Mr Ram Subramaniam presented a compelling session on “Indigenous Technology Development for Strategic Sectors in the Indian Economy”. His talk underscored the pressing need for innovation-led self-reliance in areas such as defense, energy, and critical infrastructure. The morning session culminated in a panel discussion, moderated by Prof. Abhijit Kshirsagar. This interactive session brought together experts from academia and industry to deliberate on key challenges, emerging trends, and future prospects in the development of self-reliant technologies. Topics such as artificial intelligence in education, sustainable industrial practices, and reforms in technology-enhanced learning were explored in depth.

All the Attendees gathered at the Event Hall

The conclave then transitioned into a lunch and poster presentation session where the students and researchers showcased their innovations and ongoing projects through detailed poster presentations. The exhibits reflected creativity, technical rigor, and a deep commitment to solving national challenges using indigenous resources and solutions. The afternoon session featured three more technical talks. The first, delivered by Dr. Ravi Guttal, was titled “Reliable Manufacturing Ecosystems”. In his session, Dr. Guttal outlined the systemic requirements and challenges associated with building dependable and scalable manufacturing frameworks within India. Drawing on his industrial experience, he provided actionable insights into supply chain dynamics, quality assurance, and process innovation.

This was followed by a session by Dr. Karthik Sankaran on “Electronics, Semiconductors, and Chip Manufacturing in India”. As a technologist and entrepreneur, Dr. Sankaran presented an in-depth overview of India’s position in the global semiconductor landscape. He addressed current capabilities, strategic gaps, and the immense potential for India to emerge as a global hub for semiconductor design and manufacturing.

The final technical talk of the day was presented by Mr Mahalingam Koushik. His talk, titled “Rare-earth Free Solutions: Machines and Drives for Sustainable Transportation and Industrial Applications”, focused on innovations in electric motor design that reduce dependency on rare-earth elements. His discussion highlighted the role of deep-tech startups in fostering environmentally sustainable industrial applications, paving the way for more self-reliant and ecologically conscious engineering.

The event concluded with a valedictory function in the presence of the organizing team, faculty members, and guest speakers. Prof. Somashekara M A felicitated all invited speakers with mementos as a token of appreciation. Awards were also announced for the best student poster presentations, acknowledging the creativity and effort put forth by the student researchers. The vote of thanks was delivered by Prof. Amar Gaonkar, who expressed his gratitude to the speakers, participants, sponsors, and organizing volunteers for their enthusiastic participation and valuable contributions.

The conclave on "*Atmanirbhar* Technologies: Engineering a Secure Future" proved to be a milestone event that not only provided a platform for knowledge sharing and collaboration but also reaffirmed the vital role of technology and innovation in building a secure, self-reliant India. It was a day marked by insightful discussions, inspiring presentations, and a shared commitment to national progress through indigenous technological development.

First Technical Talk by Dr. Anushree Ramanath

Second Technical Talk by Mr M Ram Subramaniam

Prof. Abhijit Kshirsagar moderating the Panel Discussion

Dr. Ravi Guttal delivering the Technical Talk

(iv) Conclave on ANRF(SERB)-INAE Conclaves on *Atmanirbhar* Technologies - Engineering Secured Future at NAIMT Ranchi

The ANRF (SERB) – INAE Conclave 2025 on *Atmanirbhar* Technologies – Engineering Secure Future was organized with great fervour at the National Institute of Advanced Manufacturing Technology

(NIAMT), Ranchi during March 22-23, 2025 bringing together thought leaders, researchers, policymakers, academicians, and innovators from across the country. The two-day conclave focused on the vision of a self-reliant India through engineering innovation, technological growth, and strategic collaboration.

The conclave commenced with an inspiring inauguration ceremony, graced by distinguished dignitaries and a gathering of over 120 participants from various academic, research, and industrial domains. The event was formally inaugurated by Professor G. Satheesh Reddy, President of the Aeronautical Society of India and Distinguished Senior Professor at BITS Pilani. His presence as the Chief Guest added immense value to the occasion.

The Guests of Honor included Mr Rajesh Singh, Joint Secretary and Financial Adviser, Ministry of Electronics and Information Technology, Government of India, and Professor Sumit Kumar Ray, Professor at IIT Kharagpur. The ceremony was presided over by Mr Arun Kumar Jha, Chancellor of NIAMT. The event began with a warm welcome address delivered by Professor Partha Protim Chattopadhyay, Director of NIAMT Ranchi. He expressed his gratitude to the dignitaries and participants for their presence and emphasized the relevance of the conclave in today's rapidly evolving technological landscape.

In his keynote address, Professor G. Satheesh Reddy shed light on the importance of Atmanirbhar Bharat (Self-Reliant India), aligning it with the broader national vision of *Viksit Bharat* 2047. He urged the audience, especially the youth and innovators, to channel their expertise and energy towards indigenous technological advancements that would strengthen the country's strategic autonomy. Following this, Mr Arun Kumar Jha spoke passionately about entrepreneurship as a viable and essential career path for students. He noted with concern the relatively low contribution of the manufacturing sector to India's GDP compared to other leading economies and encouraged academic institutions like NIAMT to play a transformative role in addressing this gap.

Mr Rajesh Singh delivered an insightful talk on the rapid pace of innovation and the burgeoning startup ecosystem in India. He emphasized the need for supportive policies and institutional collaboration to sustain this growth. Professor Sumit Kumar Ray contributed to the discussions by speaking on two key national missions—Semiconductors and Clean Energy. His talk underscored the vital need for research-driven solutions in these sectors to ensure energy security and technological independence.

The inaugural session concluded with a formal vote of thanks proposed by Professor Debdas Roy, Convener of the conclave, who acknowledged the contributions of the guests and expressed optimism about the deliberations to follow in the subsequent sessions.

The second day of the conclave culminated in a grand prize distribution ceremony. The occasion was honored by the presence of Mr Sanjay Seth, Hon'ble Minister of State for Defense, Government of India, who served as the Chief Guest. His presence marked a significant moment for the institution and the participants.

The Guest of Honor for the ceremony was Ms. Mohua Dutta, Director of MDS IndoCan Inc., Canada. The event was further enriched by the presence of several notable figures, including Mr Arun Kumar Jha, Chancellor of NIAMT, Professor Goutam Sutradhar, Director of NIT Jamshedpur, Dr. Suvrokamal Dutta, an international conservative political-economic and foreign policy expert, and Professor Sukumar Mishra, Director of IIT(ISM) Dhanbad.

The ceremony began with a welcome address by Professor Partha Protim Chattopadhyay, Director of NIAMT, who set the tone for the event by highlighting the institute's ongoing efforts in fostering innovation and self-reliance.

Professor Sukumar Mishra delivered a thought-provoking speech on the concepts of Technovate and Atmanirbhar. He encouraged the young generation to go beyond academic excellence and work towards converting knowledge and scientific research into viable engineering solutions that can drive India's journey toward self-reliance.

Following this, Dr. Suvrokamal Dutta presented a compelling vision of India's future as a global economic power. He outlined five core pillars essential for the realization of *Viksit Bharat*: Yuva (Youth), Nari Shakti (Women Empowerment), Gyan (Knowledge), Industry, and the combined strength of Kisan and Mazdoor (Farmers and Workers). His address provided both inspiration and direction for the gathered audience.

Professor Goutam Sutradhar emphasized the crucial role played by engineers, professors, and researchers in nation-building. He called for a united effort towards achieving independence in key sectors such as semiconductors and manufacturing, underlining the importance of academic-industry-government collaboration.

Ms. Mohua Dutta's address was particularly noteworthy for highlighting the collaborative potential between India and Canada. She shared insights into international partnerships and announced the signing of a Memorandum of Understanding (MoU) between MDS IndoCan Inc. and NIAMT to pursue joint futuristic innovation projects.

Mr Arun Kumar Jha once again reiterated NIAMT's critical role in furthering the vision of Atmanirbhar Bharat, stressing the importance of academic institutions acting as catalysts in the transformation of the Indian economy.

The highlight of the event was the rousing speech by Mr Sanjay Seth, Hon'ble Minister of State for Defense. His words resonated deeply with the gathering as he spoke of the government's progressive policies and developmental efforts aimed at strengthening India's global standing. He urged students to cultivate a sense of patriotism and commitment towards building a strong, self-reliant nation. As part of the ceremony, he also conducted the Bhoomi Pooja (groundbreaking ceremony) for the upcoming Central Workshop Facility at NIAMT, marking a significant milestone in the institute's infrastructure development.

The prize distribution ceremony celebrated the winners of various competitions organized during the conclave, including Innovative Product Prototypes, Grand Ideas Challenge, and Start-up Ideation. Awardees received mementos and cash prizes in recognition of their creativity and technological ingenuity. The event concluded with a heartfelt vote of thanks by Dr. Vaishali S. Poddar, who acknowledged the support and contributions of all dignitaries, participants, organizing team members, and collaborators.

The ANRF (SERB) – INAE Conclave 2025 successfully served as a platform to deliberate, ideate, and celebrate technological self-reliance. It reinforced the critical role of academic institutions in national development and fostered a spirit of innovation, entrepreneurship, and patriotic dedication among the future torchbearers of the nation.

Faculty members, dignitaries and participants gracing the event

Lighting of auspicious lamp by distinguished dignitaries on the dais during the Inauguration ceremony

B. SERB-INAE Woman Engineers Program

(i) Workshop on Women Leaders in a Tech-Driven World: A Transformative Workshop at MNIT Jaipur

In an era where technology is rapidly reshaping industries, empowering women in the tech sector is crucial for fostering innovation and inclusivity. Recognizing this need, Malaviya National Institute of Technology (MNIT) Jaipur organized a two-day workshop titled "Women Leaders in a Tech-Driven World" under the aegis of SERB-INAE Woman Engineers Program on February 7-8, 2025. The event brought together leading academicians, entrepreneurs, researchers, and professionals to discuss challenges, share insights, and inspire the next generation of women in technology.

The workshop aimed to identify the roadblocks at every stage of the professional career of women technologists, more so as they rise the ladder towards the top. Eventually, this aims to chalk out pathways for women professional towards the echelons of the technology world, so that they can have their fair share of recognition and growth.

The workshop was a pioneering initiative with an aim to inspire, empower, and connect women in technology and research fields. This two-day workshop provided a platform for women faculty, students, researchers, and professionals to explore current trends in technology, engage in thought-provoking discussions, and gain insights from industry and academic leaders to lead the developing Tech-powered India. The event also included state-of-the-art keynote lectures, interactive panel discussions, and activity-based sessions that focus on fostering leadership, promoting gender equality, and enhancing skills to thrive in the tech industry.

Targeted Audience:

- Female students from engineering, computer science, and other technology spectrums.
- Early-career researchers and academicians interested in technology and innovation.
- Professionals from the tech industry focused on research and development, innovation, and gender diversity.
- Faculty members and policymakers interested in gender inclusion.

The workshop began with a dignified inaugural ceremony, where the traditional lamp-lighting was led by the Director of MNIT Jaipur and the Chief Guest, Dr. Chandrika Kaushik, Director General (PC & SI), DRDO. Other esteemed guests included Mrs. Prabha Goyal, Executive Director, Bharat Electronics Ltd., and Mr. Rohit Bhakar, Registrar of MNIT Jaipur. Under the leadership of Dr. Swati Sharma, Metallurgy Department, MNIT Jaipur, the event was carefully structured to ensure meaningful conversations and valuable takeaways.

Dignitaries on the dais

The first day of the workshop focused on leadership, innovation, and entrepreneurship in the tech industry. Dr. Chandrika Kaushik, Director General (Production Coordination & Services Interaction (PC & SI), DRDO in her keynote lecture titled "Trailblazers of Technology: Women Leaders Shaping the Future," highlighted the transformative role women play in technology and emphasized the importance of fostering leadership and resilience among aspiring female technologists. A panel discussion explored the evolving landscape of women in technology, addressing key industry trends, challenges, and the need for a more supportive ecosystem.

The discussions on the first day also addressed critical issues, with Dr. Vibha Tripathi leading a session on overcoming barriers faced by women in technology, including gender bias, lack of mentorship, and work-life balance challenges. Another dynamic panel featuring Dr. Vibha Tripathi, Founder, Boon, Ms. Anushree Srivastava, Director Grey Matterz, Managing Partner GOFI and Prof. D. Boolchandani, ECE Department, MNIT Jaipur explored how women entrepreneurs can leverage innovation to launch and sustain successful tech ventures. The day concluded with an insightful session on soft skills development by Prof. Sivaji Chakravorti, Vice President, INAE who underscored the significance of communication, leadership, and teamwork in advancing women's careers.

Participants attending session during the workshop

The second day of the workshop shifted focus to holistic growth, mental well-being, and strategies for encouraging young women to pursue STEM careers. Dr. Aarti Chitkaria Chopra and Dr. Nidhi Bansal led a crucial discussion on stress management, burnout prevention, and maintaining a healthy work-life balance, acknowledging the pressures women often face in the fast-paced tech industry. This was followed by an engaging panel discussion on fostering diversity, equity, and inclusion in the workplace. Speakers including Prof. Hemlata Manglani, Dr. Aarti Chitkaria Chopra, Associate Professor, Poornima University; Dr. Swati Soni, Professor, Jaipuria Institute of Management; Prof. Rohit Bhakar, Professor, MNIT Jaipur emphasized the importance of workplace policies that actively support gender inclusivity.

A particularly impactful session focused on encouraging young girls from rural backgrounds to explore STEM careers. Experts Ms. Pallavi Tak, Vice President, Seed & Acceleration; Prof. Lava Bhargava, ECE

Department, MNIT Jaipur; Ms. Alka Singh, Head of Policy and Strategic Partnerships; and Dr. Vartika Arora, Principal, Kanoria School of Law for Women, Jaipur shared insights on bridging the urban-rural divide in STEM education, addressing societal and infrastructural challenges that often deter young girls from pursuing opportunities in science and technology.

The workshop concluded with a valedictory session led by Dr. Shweta Sharma, MNIT Jaipur where certificates were distributed and closing remarks were shared. The event ended on a high note, leaving participants feeling empowered, inspired, and motivated to break barriers in the tech industry. The "Women Leaders in a Tech-Driven World" workshop at MNIT Jaipur was more than just an event—it was a step toward meaningful change. By fostering dialogue, mentorship, and collaboration, it encouraged women to embrace leadership roles, drive innovation, and contribute to a more inclusive technological future. Initiatives like these continue to pave the way for greater representation of women in STEM, ensuring that diversity remains a driving force behind technological progress.

To summarize, the workshop provided numerous benefits, both immediate and long-term, to its participants and the broader community.

Empowerment and Inspiration: Keynote lectures by accomplished leaders like Ms. Prabha Goyal, Dr. Vibha Tripathi, and Ms. Anushree provided real-world success stories and inspiration.

Networking Opportunities: Enabled connections with peers, mentors, and professionals from academia, industry, and entrepreneurship, fostering collaborations and mentorship opportunities.

Skill Development: Panel discussions on themes like entrepreneurship, innovation, mental health, and leadership offered practical tips and strategies for career advancement in STEM.

Awareness of Trends: Insights into current technological advancements and challenges for women in tech professions helped participants align their careers with future industry demands.

Mental Health Focus: Discussion on mental health and wellbeing addressed the unique pressures faced by women in STEM, encouraging resilience and balance. Session by Dr. Aarti Chitkaria was focused on the metal wellbeing.

Group photographs of the participants with Resource Person

(ii) Workshop on Empowering Women Professionals in STEM (EWPS-2025) at NIT Hamirpur

The two-day workshop on "Empowering Women Professionals in STEM (EWPS-2025)" was held from February 21-22, 2025, at NIT Hamirpur, under the aegis of the ANRF (SERB) - INAE Women Engineers Program. The workshop aimed to address the specific needs of women faculty in engineering education by enhancing their pedagogical skills, fostering leadership capabilities, building legal awareness, and supporting their academic growth and research initiatives. The workshop brought together 40 women faculty members and professionals from NIT Hamirpur and IIIT Una, focusing on equipping them with practical tools to advance their careers and contribute more effectively to academia and research.
The workshop commenced on February 21, 2025, with a registration session followed by a formal inaugural ceremony. The Chief Guest, Prof. H. M. Suryawanshi, Director, NIT Hamirpur, graced the occasion alongside Prof. Anoop Kumar, Dean Faculty Welfare, and Dr. Archana S. Nanoty, Registrar, NIT Hamirpur. Dr. Veena Sharma welcomed the participants and introduced the vision of the workshop, highlighting the roles of INAE and ANRF in supporting academic excellence and gender equity. The opening addresses by the Dean FW and Registrar reflected the administration's strong support for such faculty development initiatives. Director Prof. Suryawanshi's motivating speech emphasized the importance of fostering a supportive environment for women educators. The session concluded with remarks by Dr. Gargi Khanna, the Workshop Coordinator, who outlined the schedule and goals of the event.

Over the course of two days, the workshop featured expert-led sessions covering a diverse range of themes including pedagogy, leadership, legal frameworks, soft skills, research development, and policy awareness. The key sessions are outlined below:

Pedagogical Proficiency for Women Engineers

Dr. Archana S. Nanoty discussed innovative, interactive, and technology-enabled teaching methodologies to improve student engagement and academic outcomes, especially in the context of engineering disciplines.

Strategic Lesson Planning and Classroom Management

Prof. Rajeevan Chandel focused on effective lesson planning, structuring curriculum, and managing diverse classroom environments, with actionable strategies tailored for engineering faculty.

Legal Frameworks and Policy Awareness

Dr. Seema Kashyap covered key legal frameworks impacting women in academia, with particular emphasis on the Prevention of Sexual Harassment (PoSH) Act, creating awareness to promote safer, more inclusive academic environments.

Empowering Women Engineers through Effective Teaching Techniques

Dr. Meenakshi Sood introduced practical teaching strategies and shared inspiring examples of women engineers excelling in academia and leadership roles.

Soft Skills as the Backbone of Sustainable Human Capital

Prof. Sivaji Chakravorti, Vice President, INAE highlighting the importance of communication, adaptability, and critical thinking, shared real-life examples of soft skills being essential to career sustainability and leadership.

Leadership and Team Engagement

Dr. Gargi Khanna, NIT Hamirpur focused on cultivating leadership traits among women professionals, the session included hands-on team engagement activities facilitated by Dr. Veena Sharma and Dr. Bharti Koul.

Life Skills Development

Dr. Sunder Kala Negi and Dr. Rinshu through experiential activities helped participants develop interpersonal, cognitive, and stress management skills crucial for personal and professional well-being.

Advancing Research and Innovation in the Contemporary Landscape

Prof Sivaji Chakravorti, Vice President, INAE helped participants explore methodologies, innovation ecosystems, and funding avenues to promote active engagement in research.

Work-Life Balance for Women Engineers

Dr. Meenakshi Sood addressed challenges women faculty face in balancing career and family, with practical suggestions for achieving harmony through institutional and personal strategies.

Project Proposal Writing Skills

Dr. Anju Batta Sehga designed a session to help participants draft effective project proposals, understand funding agency requirements, and articulate research objectives clearly.

Implementation and Perspective of NEP 2020

Dr. Ravinder Nath Sharma, concluded technical session explored the opportunities and challenges introduced by the New Education Policy (NEP) 2020, particularly its implications for women educators and researchers.

The workshop concluded with a valedictory session presided over by Prof. Sivaji Chakravorti, Vice President, INAE, with the presence of Prof. H. M. Suryawanshi, Director, NIT Hamirpur, and Dr. Archana S. Nanoty. The workshop outcomes were presented, and the official proceedings of the workshop were released during the session. The EWPS-2025 workshop achieved its primary goals of building pedagogical capacity and promoting leadership among women in engineering education.

Major outcomes included:

- Enhanced awareness and adoption of student-centric teaching methodologies
- Improved leadership and team management skills among women faculty
- Increased understanding of legal protections and institutional policies
- Practical insights into writing competitive research proposals
- Development of soft skills and life management tools
- Strengthened academic networking and peer collaboration’

Receiving the Chief Guest and others for Inaugural Ceramony at NIT Hamirpur

Inaugural Session in progress

Group Photograph of the Women Participants at NIT Hamirpur

C. SERB-INAE Outreach Programs for NE, J&K and Ladakh

(i) Workshop on Skill Development of Women at NIT Mizoram

The National Institute of Technology Mizoram, under the aegis SERB-INAE Outreach Programs for NE, J&K and Ladakh, successfully hosted a three-day workshop on "Skill Development of Women" from February 19 to 21, 2025. This workshop was a significant outreach initiative targeting women from the North-East region, Jammu & Kashmir, and Ladakh, with the objective of enhancing professional skills, leadership qualities, and entrepreneurial mindset among women through expert sessions, discussions, and a Women's Empowerment Hackathon.

The workshop commenced with a formal inaugural ceremony held at the Conference Hall, Administrative Building. The ceremony was graced by Prof. Sivaji Chakravorti, Vice President, INAE, who delivered an enlightening address on the importance of skill development and women's emowerment. Prof. Saibal Chatterjee, Dean R&C and the Coordinator of the Workshop, welcomed participants and emphasized the importance of the sessions, encouraging attendees to make the most of the learning opportunities.

DAY 1

Session I: "Cultivating Essential Soft Skills to Thrive in a World of Constant Change – Part I"
Prof. Chakravorti, Vice President, INAE emphasized the relevance of soft skills such as communication, patience, adaptability, and teamwork for women navigating professional environments. He discussed techniques like the Pareto Principle and STAR method for effective problem-solving and highlighted the role of observation, time management, and confidence in professional growth.

Session II Topic: "Cultivating Essential Soft Skills to Thrive in a World of Constant Change – Part II"
This session focused on Magnetic Resonance Imaging (MRI) as an example of scientific principles leading to engineering applications. Prof. Chakravorti elaborated on MRI's relevance to women's health and stressed the importance of encouraging more women to participate in STEM disciplines to foster inclusive technological advancement.

Hackathon Preparation Session Led by: Dr. Vijay Mandal, Assistant Professor, Dept. of ME, NIT Mizoram

The session included discussions on hackathon guidelines, prototype development, team finalization, poster presentations, and group dynamics.

DAY 2

Keynote Address: "Law and Women's Rights"
Prof. Dilip Ukey, Vice Chancellor, National Law University, Mumbai highlighted vital legal protections for women, including laws addressing workplace harassment, domestic abuse, and inheritance rights. He emphasized that legal literacy empowers women to make informed decisions and advocate for their rights in both personal and professional domains.

Session: Women Entrepreneurs of Mizoram
Speakers:

- Ms. Zosangzeli Chhakchhuak – Coffee Entrepreneur

- Ms. Lalhlupull Ralte – Perfume Entrepreneur
- Ms. Esther Laltanpull Khiangte – Software Professional

These women leaders shared real-world insights on entrepreneurship, financial support systems like the Mizoram Start-Up Policy, and the importance of innovation, product quality, and digital proficiency. They collectively emphasized mentorship, financial literacy, and strategic thinking for sustained success in the business and tech sectors.

Participants at the end of Day 2 toured NIT Mizoram's state-of-the-art 5G Laboratory, led by Dr. Anumoy Ghosh, Assistant Professor, ECE Department, who provided a comprehensive overview of cutting-edge wireless communication technologies. The session was attended by the entrepreneurs as well, showcasing the intersection of technical innovation and business potential.

DAY 3

Keynote Lecture by: Lieutenant Commander Aishwarya Boddapati, decorated naval officer and member of the *Navika Sagar Parikrama* – India's first all-women global sailing expedition. Her session focused on resilience, leadership, strategic thinking, and mental fortitude. She urged participants to step into leadership roles and embrace challenges as opportunities for growth. Her inspirational journey deeply resonated with the audience.

Group Discussions: A Women's Empowerment Hackathon was held, featuring six teams engaging in group discussions on various women empowerment topics assigned by the organizers. The session was highly productive, with participants showcasing insightful perspectives and innovative solutions. The discussions highlighted key issues like gender equality, financial independence, and leadership. The session was carefully monitored and evaluated by Prof. K. G. Singh and Dr. Shuchi of NIT Mizoram. The hackathon fostered teamwork, critical thinking, and confidence among participants, reinforcing the importance of empowering women through collaborative problem-solving and strategic thinkingSix teams discussed critical themes around women's empowerment, including gender equity, leadership, financial independence, and digital inclusion.

Team Presentations and Poster

Display: Eight teams presented innovative, tech-driven solutions addressing societal challenges faced by women. Proposals ranged from digital education platforms to financial management apps for women in rural areas. Judges evaluated teams based on creativity, feasibility, and societal impact.

Chief Guest Prof. S. Sundar, Director, NIT Mizoram, along with Lt. Cdr. Boddapati and Prof. Saibal Chatterjee, felicitated the winners and distributed prizes for Group Discussions, Poster Presentations, and the Hackathon.

Prof. Saibal Chatterjee, Dean R&C and Workshop Convenor, offered the closing remarks by highlighting the enhancement of soft skills, legal awareness, technical know-how, and entrepreneurial capability among participants and the success of the Women's Empowerment Hackathon in driving collaboration and innovation. The Skill Development Workshop for Women was a landmark event that brought together academia, industry, entrepreneurs, and defence personnel to inspire, train, and empower women from diverse backgrounds. Through a blend of technical sessions, leadership insights, and collaborative hackathons,

the workshop reinforced the transformative potential of women in engineering, entrepreneurship, and leadership. It concluded as a resounding success, aligning with national goals of inclusive innovation and skill development.

Prof. S Sundar, Director,felicitating Prof Sivaji Chakravorti during Inaugural Ceremony

Winners at Hackathon Presesntation

Participants at NIT Mizoram

(ii) Workshop on "Skill Enhancement Workshop in Teaching and Research" at IIT Guwahati

IIT Guwahati under the aegis SERB-INAE Outreach Programs for NE, J&K and Ladakh successfully organized a two days' Workshop on Skill Enhancement Workshop in Teaching and Research during Feb 28, 2025 and March 1, 2025.

The Workshop was a dynamic and impactful two-day initiative dedicated to strengthening the academic capabilities of faculty members and research scholars. Recognizing that faculty are the cornerstone of any higher education institution, the workshop aimed to equip them with the pedagogical, research, and professional tools necessary to inspire students and advance scholarly output in their respective fields. The modern academic environment demands that educators go beyond traditional methods and embrace innovative strategies and technologies that make teaching more interactive, inclusive, and impactful.

This workshop was designed to meet those evolving needs—blending practical learning with thought-provoking discussions and expert-led sessions. Focused on both teaching excellence and research innovation, the program provided an enriched platform for participants to explore cutting-edge methodologies, research tools, grant-writing techniques, and best practices in industry collaboration. By addressing both theoretical and practical elements of academic work, the event contributed meaningfully to participants' professional growth.

The primary goal of the workshop was to empower educators and researchers with the skills needed to thrive in a fast-evolving academic landscape. The specific objectives included:

1. **Enhancing Teaching Methodologies and Pedagogy:** The workshop introduced participants to learner-centric approaches, such as outcome-based education (OBE) and problem-based learning (PBL), helping educators make teaching more interactive and aligned with real-world applications.
2. **Developing Research Proficiency:** Sessions were held on formulating research questions, conducting literature reviews, designing research methodologies, and academic writing, enabling participants to produce more impactful scholarly work.
3. **Grant Proposal Writing and Funding Opportunities:** Participants were trained on how to identify funding agencies, write compelling proposals, and comply with submission guidelines—key steps in securing research grants.
4. **Improving Research Communication Skills:** Techniques for effective research presentations and public speaking were emphasized, with a focus on tailoring communication for academic conferences, journals, and interdisciplinary audiences.
5. **Fostering Industry-Academia Collaboration:** The workshop emphasized the importance of establishing partnerships with industry to align research with societal and market needs, bridging the gap between theoretical knowledge and practical application.
6. **Implementing Innovative Teaching Tools:** Sessions included the use of technology-driven tools like Learning Management Systems (LMS), digital assessment platforms, and classroom engagement apps to enhance student-teacher interaction.
7. **Promoting Wellness and Resilience in Academia:** Recognizing the challenges of academic life, a special session focused on maintaining mental well-being, building resilience, and creating supportive learning environments.

Key Themes Covered

- Effective classroom strategies and student engagement models
- Research ethics and academic integrity
- Collaboration with industry: pathways and best practices
- Emerging trends in engineering education and research
- Scholarly communication and peer-reviewed publishing
- Stress management and faculty wellness
- Strategies for continuous professional development

Outcomes

By the conclusion of the workshop, participants were expected to:

- Gain deeper insights into modern teaching methods and tools
- Enhance their research design and writing capabilities
- Build awareness of funding opportunities and proposal drafting techniques
- Improve their academic presentation and communication skills
- Establish initial links for cross-institutional and industry collaborations
- Be more resilient and aware of personal wellness strategies to sustain academic excellence

The Skill Enhancement Workshop in Teaching and Research served as a crucial platform for capacity building among faculty and scholars. With a well-rounded curriculum addressing both pedagogical and research-oriented competencies, the program successfully met its goal of preparing educators for the future of higher education. The event fostered collaboration, encouraged innovation, and reinforced the importance of continuous learning in academic careers. Participants left the workshop better equipped to engage students, contribute to research advancements, and take proactive steps in their own professional journeys.

Participants attending the session during the workshop

Group Picture of the Attendees with the Resource Persons

(iii) Workshop on "Modern Pedagogical Techniques for Student-Centric Learning in Engineering Education" at IIT Jammu

In response to the growing need for transforming engineering education through student-centric learning approaches, the Centre for Essential Skills (CES), IIT Jammu, organized a two-day workshop titled "Modern Pedagogical Techniques for Student-Centric Learning in Engineering Education" from February 24 to 25, 2025. The workshop was conducted under the aegis of ANRF (SERB) - INAE Outreach Programs aimed at empowering educators and aspiring faculty from the Northeast, Jammu & Kashmir, and Ladakh regions.

Rooted in the principles of the National Education Policy (NEP) 2020, the program aimed to enhance pedagogical effectiveness by equipping participants with modern teaching methodologies, digital integration strategies, and a comprehensive understanding of student learning processes. It particularly addressed the lack of formal pedagogical training among Ph.D. scholars and early-career faculty, providing a structured platform for collaborative learning, knowledge exchange, and practical skill development.

The workshop welcomed 35 participants, including faculty members and research scholars from Government Degree Colleges (GDCs) of Srinagar, Sopore, Pulwama, Doda, Ramnagar, and Jammu, alongside representatives from the Islamic University of Science & Technology (IUST), Kashmir, and IIT Jammu. This diverse representation laid the groundwork for a regional pedagogical network that promotes best practices, collaboration, and sustainable growth in engineering education across the region.

The inaugural ceremony was graced by a distinguished panel of academicians and leaders, including Prof. Sivaji Chakravorti, Vice-President, Indian National Academy of Engineering (INAE), Prof. Manoj Singh Gaur, Director, IIT Jammu, Prof. C. S. Upadhyay, IIT Kanpur, Prof. Shyam Narayan Lal, Visiting Professor at IIT Jammu, and Prof. Abhay Sharma, Dean of Education and Outreach at IIT Jammu.

The workshop was structured into expert-led sessions, breakout discussions, and group presentations, all of which were aimed at enhancing both theoretical understanding and practical application of teaching strategies. The first day commenced with an enlightening session by Prof. C. S. Upadhyay, IIT Kanpur who introduced the concept of various teaching-learning styles and how recognizing different learner types can help educators tailor their instruction to maximize engagement and retention. His session laid the foundation for exploring how flexible and adaptive teaching can significantly improve learning outcomes.

Following this, Prof. Sivaji Chakravorti delivered an inspiring talk on the role of soft skills in education and professional life. His session highlighted essential interpersonal and communication skills that every educator must cultivate, such as empathy, active listening, adaptability, and clarity in delivery. This was followed by a thought-provoking lecture by Dr. Sanchita Srivastava, IIT Jammu on learners' development and educational psychology, where she emphasized the need to understand the cognitive and emotional development of students to foster inclusive and psychologically safe learning environments.

Later in the day, Dr. Gaurav Ashok Bhaduri, IIT Jammu conducted a session on the effective use of teaching aids. His interactive approach allowed participants to explore the strategic use of digital and visual tools to enhance clarity and engagement in classroom instruction. The most interactive component of Day 1 was the breakout session, where participants were divided into groups to discuss practical teaching issues, including student assessment methods, hybrid learning challenges, maintaining student attention, and the cognitive underpinnings of effective pedagogy. These sessions, moderated by faculty from IIT

Jammu, encouraged peer learning and experience sharing, creating a collaborative platform for solving real classroom challenges.

Day 2 of the workshop began with an engaging session on leadership in pedagogy, delivered by Prof. Bijoy Boruah, IIT Jammu. This session encouraged participants to view educators not only as transmitters of knowledge but as mentors and leaders capable of shaping students' aspirations and academic trajectories. Following this, Prof. Shyam Narayan Lal, IIT Jammu addressed the topic of inclusive and equitable education. His session focused on overcoming regional, cultural, and socioeconomic barriers that hinder student participation and performance, especially in underserved and marginalized communities. He stressed the need for equity-driven curriculum planning and culturally responsive teaching.

The concluding segment of the workshop was designed to reinforce the knowledge gained by participants. It included a group presentation session, during which attendees synthesized their insights from the various discussions and expert lectures. Each group shared actionable strategies for improving pedagogy in their respective institutions, covering aspects such as curriculum design, classroom management, use of educational technology, and fostering inclusive environments. By the end of the two days, the workshop had made a significant impact on all participants. It not only increased awareness of student-centric and active learning strategies but also provided a rare opportunity for educators from geographically diverse institutions to collaborate, reflect, and grow together. Importantly, the workshop aligned with NEP 2020's recommendation that all future faculty, including Ph.D. scholars, should undergo formal training in pedagogy.

Looking ahead, the workshop highlighted the urgent need for continued faculty development. Participants expressed a strong desire for follow-up programs that delve deeper into specific teaching tools and digital platforms, as well as opportunities for hands-on teaching simulations. There was also a consensus on the importance of establishing a regional pedagogical network, which could serve as a hub for sharing best practices, mentoring young faculty, and driving innovation in curriculum design and delivery. In conclusion, the workshop on "Modern Pedagogical Techniques for Student-Centric Learning in Engineering Education" was a major success. It addressed key gaps in engineering pedagogy, empowered faculty with actionable tools, and created a strong foundation for regional collaboration in higher education. Hosted by IIT Jammu and supported by INAE and SERB, the event reinforced the critical role that effective teaching plays in shaping the future of technical education in India.

Lamp lighting ceremony at Inaugural function

Prof Sivaji Chakravorti delivering talk

Group Photographs of the participants with the resource persons

Engaging session on leadership in pedagogy

Group Photographs of the participants

D. **SERB-INAE Innovation Hackathon**

(i) Youth Conclave 2024

The Youth Conclave 2024 organized by the Indian Institute of Technology Bhilai (IIT Bhilai), under the umbrella of SERB-INAE Innovation Hackathon during Dec 12-13, 2024 unfolded as a vibrant celebration of student innovation, entrepreneurial spirit, and technological creativity. Drawing participation from engineering students across Chhattisgarh and beyond, the conclave served as a significant platform for emerging innovators to showcase their ideas and interact with leading experts from academia and industry.

The inauguration ceremony of the conclave was held in the presence of distinguished dignitaries, who joined virtually and in person. The event commenced with welcome remarks and was graced by the esteemed presence of Prof. N. V. Ramana Rao, Director, NIT Raipur; Prof. Sivaji Chakravorti, Vice President, Indian National Academy of Engineering (INAE); Prof. Rajiv Prakash, Director, IIT Bhilai; and Dr. Nagesh D. Patil, Associate Professor, IIT Bhilai and the Coordinator of Youth Conclave 2024.

Prof. Indranil Manna, President, INAE inaugurated the conclave with a presidential speech that set the tone for the day. His address was both inspiring and forward-looking, emphasizing the importance of youth-led innovation in tackling the pressing challenges of modern society.

During the inaugural session, Prof. Rajiv Prakash urged the students to think beyond conventional approaches and come up with practical, amicable solutions to real-world problems. His words resonated with the spirit of the event, which was to empower young minds to become changemakers in society. Prof. Sivaji Chakravorti, drawing upon his extensive experience in both academia and industry, spoke about the

concept of frugal innovation—the art of developing cost-effective and resource-efficient solutions without compromising on impact. He stressed that such innovations are crucial for a country like India, where affordability and sustainability often define the success of a technological solution.

Adding further depth to the discussion, Prof. N. V. Ramana Rao spoke about the emerging importance of innovation in sectors such as Agritech, Healthtech, Fintech, and Sustainable Technologies. He illustrated how advancements in these areas are not only transforming industries but are also essential for societal progress and national development.

The core of Youth Conclave 2024 featured a series of keynote lectures delivered by highly accomplished professionals, each offering a wealth of knowledge and personal insights. Among the keynote speakers was Prof. N. V. Ramana Rao, who elaborated on the convergence of technology with Agritech, Healthtech, Fintech, and sustainability, highlighting successful models and future opportunities in these sectors. Prof. Sivaji Chakravorti followed with a thought-provoking session on "The Backbone of Sustainable Human Capital", discussing the human element in innovation ecosystems and the role of education in nurturing problem-solvers. Prof. P. Chakrabarti, Former Director of IIEST Shibpur and NIT Allahabad, as well as a former faculty member at IIT BHU, delivered a captivating lecture on the "Impact of Disruptive Innovations on Industries". He charted the trajectory of technological disruptions and their implications for business and society. Rounding off the keynote series, Mr. Prashant Mathur, CEO of the Innovation and Technology Foundation (IBITF) under NM-ICPS – DST, gave a highly motivational talk titled "Innovations and Entrepreneurship", inspiring students to not just ideate but to commercialize and scale their solutions through entrepreneurship.

Apart from the keynote addresses, the conclave hosted a variety of interactive and competitive events designed to engage participants and stimulate innovation. These included oral presentations, poster sessions, and a highly anticipated Innovation Hackathon. These platforms allowed students to present their technological ideas, prototypes, and research in front of a technical jury.

The response to Youth Conclave 2024 was overwhelming, with nearly 220 engineering students from universities and technical institutions across Chhattisgarh participating actively. Students showcased their work on a wide range of themes that reflected national and global relevance—particularly in Agritech, Healthtech, Fintech, and sustainability. These ideas were evaluated rigorously by a dedicated technical committee from IIT Bhilai, which also offered valuable suggestions for further development and potential real-world application.

The event culminated in a grand valedictory session, where reflections on the conclave's outcomes were shared and winners were felicitated. During the session, both Prof. P. Chakrabarti and Prof. Rajiv Prakash reiterated the pivotal role of innovation in engineering and technology for the overall betterment of society and the nation. They encouraged the participants to continue nurturing their curiosity, creativity, and drive to solve meaningful problems.

The session concluded with the distribution of participation certificates, followed by the announcement of winners in various categories:

- **Poster Presentation Awards:**
    - 1st Prize: Mr. Kishan Tamboli (IIT Bhilai) for his project "Efficient Graph Triangle Counting on Modern GPUs."
    - 2nd Prize: Ms. Deepika Sharma (IIT Bhilai) for her work on "Computational Strategies for Mitigating Water Contamination in Agriculture."

- **Oral Presentation Awards:**
    - 1st Prize: Mr. Yogesh Kumar Dewangan
    - 2nd Prize: Mr. Rishabh Ranjan Jha
    - 3rd Prize (Jointly): Ms. Anjali Yadav and Mr. Agniv Tapadar

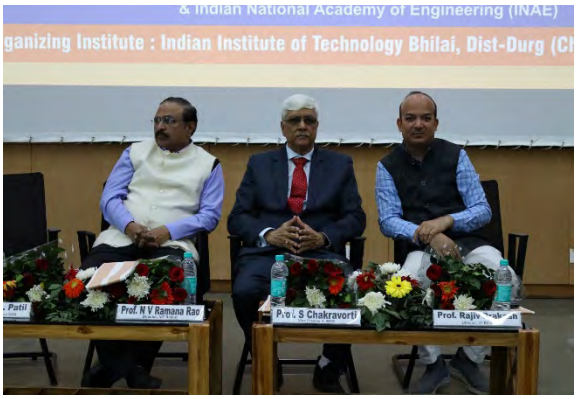
- **Innovation Hackathon Awards:**
    - Awarded to high-performing student teams from NIT Raipur and BIT Durg, whose inventive solutions stood out in terms of feasibility, originality, and social impact.

The Youth Conclave 2024 concluded on a high note, not just as an event, but as a launchpad for young innovators. It successfully created a space for vibrant exchange of ideas, peer learning, and exposure to expert mentorship. More than just a competition or a lecture series, the conclave served as a catalyst for nurturing the spirit of innovation among India's next generation of engineers and technologists.

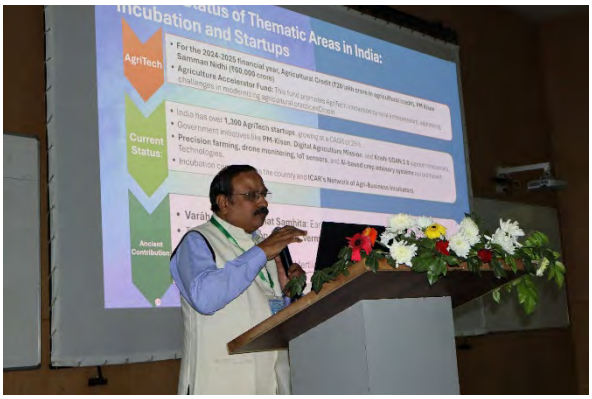
As the valedictory session drew to a close, it was evident that the seeds of change had been sown. The conclave marked not just the culmination of a well-executed event, but the beginning of a journey for many young minds ready to build solutions for a better tomorrow.

The dignitaries are lighting the lamp during the inaugural ceremony on 12th Dec, 2024

Prof Indranil Manna, President, INAE delivering Presidential Address during Inaugural function



The dignitaries on stage during the inaugural Ceremony on 12th Dec, 2024



Prof. N V Ramana Rao (Director, NIT Raipur) delivering keynote address

Prof. P. Chakrabarti during keynote address

Participating Students attending the keynote address

Group Photograph of the participants of Youth Conclave

(ii) AVINYA 2025 at MVJ College of Engineering (MVJCE), Bangalore

In a spirited celebration of creativity, problem-solving, and technological innovation, MVJ College of Engineering (MVJCE), Bangalore, hosted AVINYA 2025, a 30-hour continuous hackathon — on March 19 - 20, 2025. The event was conducted in collaboration with the Indian National Academy of Engineering (INAE), under the aegis of ANRF (SERB) as part of the ANRF (SERB) – INAE Innovation Hackathon.

True to its Sanskrit namesake, *"Avinya,"* meaning innovation, the hackathon sought to inspire and engage the brightest young engineering minds from institutions across the country. The event focused on creating impactful technological solutions under three major themes: Healthcare and Management, Smart Vehicles, and Cybersecurity & Blockchain.

The two-day event commenced on March 19, 2025, with an opening ceremony held at MVJCE's Smt. Rajalakshmi Seminar Hall. Dr. Ajayan K.R., Principal of MVJCE, delivered the welcome address, expressing his enthusiasm for the partnership between MVJCE and INAE. He proudly highlighted the recent Memorandum of Understanding signed between the two institutions, which had already yielded two successful events in a short span of one month. Dr. Ajayan emphasized the importance of such collaborations in fostering innovation and providing students with exposure to real-world engineering challenges.

The Presidential Address was delivered virtually by Mr. J.D. Patil, President, INAE. In his speech, Mr. Patil elaborated on the history and mission of INAE, underscoring its role in promoting excellence and innovation in engineering across India. He emphasized the transformative power of hackathons in identifying real-life challenges and cultivating innovative, entrepreneurial thinking among students. His remarks highlighted how such platforms contribute not only to national development but also to job creation and sustainable technological growth.

Following this, the Inaugural Address was presented by Prof. Sivaji Chakravorti, Vice President, INAE. Through an engaging and story-driven narrative, Prof. Sivaji emphasized the importance of thinking differently. He encouraged the participants to embrace teamwork, curiosity, and resilience throughout the hackathon. The ceremony concluded with a heartfelt vote of thanks by Dr. M. Brindha, Dean of Affiliation & Accreditation at MVJCE and the Coordinator of AVINYA 2025, who expressed her gratitude to all dignitaries, participants, evaluators, and organizing members for their commitment and contributions.

Hackathon Highlights and Activities

The hackathon was structured as an intense, uninterrupted 30-hour innovation sprint, where student teams from various engineering institutions worked on domain-specific problem statements. These problem areas were distributed across three thematic tracks:

C. Healthcare and Management
D. Smart Vehicles
E. Cybersecurity & Blockchain

Each team worked under continuous mentorship and assessment from domain experts, who provided real-time feedback and guidance. Participants demonstrated exceptional ingenuity and technical skill in tackling diverse real-world challenges. Notable projects included:

- AI-powered smart glasses for early glaucoma detection
- Non-invasive hemoglobin monitors for patient care
- Blockchain-enabled platforms for secure welfare scheme management and decentralized medical equipment rental
- Smart accident detection and response systems integrated into autonomous vehicle prototypes
- Expose Net, a browser extension to improve online transparency and accountability
- Little Imaginators, a youth-oriented initiative that encouraged younger students to dream big and innovate early

These projects reflected a blend of technical depth and social impact, showcasing how student-led innovation can influence both industry and society.

AVINYA 2025 also featured inspirational keynote addresses by renowned industry leaders:

- Mr. Subbaraja Sirasala, Senior Enterprise Solutions Architect at GE Aerospace, addressed participants on the "Role of Technology & Its Impact on Cybersecurity". He discussed the ever-evolving nature of digital threats, the growing role of AI and machine learning in cyber defense, and the urgent need for resilient systems and proactive defense strategies.
- On Day 2 (March 20, 2025), Mr. Shravan S. Naidu, Principal Architect and Director at Alegeus, delivered a talk titled "Engineering Beyond the Classroom: The Journey of Lifelong Learning." He encouraged students to embrace a mindset of continuous learning, adaptability, and personal growth — traits that are indispensable in a rapidly changing technological world.

Thematic Competitions and Judges

The hackathon's competitive segment was divided into three thematic tracks, each evaluated by eminent experts from academia and industry:

1. Healthcare and Management (10 teams)
   Judges:
   - Mr. Vasantha Kumar, Engineering Manager, Alegeus, Bangalore
   - Mr. Shravan S. Naidu, Principal Architect & Director, Alegeus, Bangalore

2. Smart Vehicle (9 teams)
   Judges:
   - Dr. Raghavendra, Professor, IISc, Bangalore
   - Mr. Bejoy John, Senior Director, OWS Manufacturing Shops, GE Aerospace, Bangalore

3. Cybersecurity & Blockchain (8 teams)
   Judges:
   - Mr. Navdeep Agarwal, Senior Security Architect, GE Healthcare, Bangalore & Director, ISC2
   - Mr. Subbaraja Sirasala, Senior Enterprise Solutions Architect, GE Aerospace, Bangalore

The projects were assessed based on criteria such as innovation, feasibility, scalability, teamwork, presentation, and alignment with the chosen theme.

To offer a well-rounded experience and celebrate the spirit of creativity, a cultural program was held on the evening of March 20. Organized by MVJCE's student-led clubs, the RaagAbhinaya Club presented a stage play and short films, while the Saahitya Club conducted an expressive slam poetry session. These cultural showcases added an artistic and reflective dimension to the highly technical event.

The hackathon concluded with a final evaluation and announcement of results, marking the end of 30 hours of brainstorming, coding, designing, and problem-solving.

AVINYA 2025 proved to be an outstanding example of how collaborative academic-industry initiatives can nurture future-ready engineers. By combining intensive hands-on experiences, inspirational thought leadership, and vibrant student participation, the event cultivated a fertile ground for ideation, learning, and innovation.

This landmark event reaffirmed the role of engineering education in addressing national and global challenges. As AVINYA 2025 came to a close, it left behind a legacy of inspired minds, new connections, and a renewed drive to innovate for a better future.

Mr. J D Patil, President, INAE addressing students on 19th March 2025 at Dr. M V Jayaraman Auditorium

Judges of Cyber Security & Block Chain Theme evaluating the students'

Prof. Sivaji Chakravorti, Vice President, INAE interacting with students

Students of Erode Sengunthar Engineering College receiving prize

Joint Initiatives with DST

India-Taiwan Programme of Cooperation in Science & Technology

International Cooperation Division (ICD), Department of Science and Technology (DST) entrusted INAE to implement India-Taiwan joint program from 2023 onwards. This cooperation is being coordinated by National Science and Technology Council (NSTC) from Taiwan's side. In this regard, a MoU was signed between INAE and ICD, DST on May 15, 2023 in presence of the Secretary, DST, and the President, INAE. It is a joint program of cooperation between India and Taiwan and a joint call for proposal is launched every year. A total of eleven projects in 2023 and fifteen projects in 2024 were approved jointly by DST and NSTC for a period of three years, which are currently in progress. The details of approved projects can be viewed at INAE website www.inae.in.

During 2024, a call for proposals was launched on June 1, 2024 with last date as July 31, 2024. The priority areas for R&D projects are Artificial Intelligence, IoT (Internet of Things), Big Data, Cyber Security; Biotechnology, Healthcare including Functional Genomics, Drug Development and Biomedical Devices; Agriculture and Food Sciences; Green Energy Technology/ Renewable Energy (solar energy and bioenergy)/ Clean Energy; Semiconductor & Communication; Aerospace Technology and Manufacturing Technologies. A total of 165 eligible bilateral proposals were received which were evaluated by the members of the Project Evaluation Committee (PEC) constituted for the purpose and a total of 15 bilateral proposals are approved mutually by India and Taiwan for a period of three years to be commenced from January 2025. The list of projects approved for implementation in 2025 are as follows:

1. **Project Title:** Deep Learning-Based Capacty Estimation for Channels with Memory and Input Constraints
   Indian PI: Prof Navin Kashyap, Professor, Dept. Electrical Communication Engineering, Indian Institute of Science, Bengaluru
   Taiwanese PI: Stefano Rini, Associate Professor, National Chiao Tung University, Taiwan
2. **Project Title:** Design and Implementation of Compensation Strategies for Hardware Impairments in 6G OTFS Systems
   Indian PI: Dr Sanjeev Sharma, Department of Electronics Engineering, IIT (BHU) Varanasi
   Taiwanese PI: Yen-Cheng Kuan, International College of Semiconductor Technology, National Yang Ming Chiao Tung University, Hsinchu City Taiwan
3. **Project Title:** 3D Printed Tacky liquid metal-ionogel hybrids for bioelectronic interfaces
   Indian PI: Dr Tushar Sakorikar, Assistant Professor, BITS Pilani KK Birla Goa Campus, Goa, India
   Taiwanese PI: Sheng-Sheng Yu, Associate Professor, Department of Chemical Engineering, National Cheng Kung University, Taiwan
4. **Project Title:** Bifacial perovskite solar cells for agrivoltaics
   Indian PI: Dr Satvasheel Powar, Associate Professor, North Campus Indian Institute of Technology Mandi Kamand, Mandi, Himachal Pradesh
   Taiwanese PI: Chao-Yu (Peter) Chen, Professor, National Cheng Kung University (NCKU) Taiwan

5. **Project Title**: Geothermal assisted HVAC System
   Indian PI: Dr. Gurubalan Annadurai, Assistant Professor, Department of Energy Science and Engineering, IIT Bombay
   Taiwanese PI: Wang, Jung-Chang, Full Professor, Department Head of DME, Department of Marine Engineering (DME), National Taiwan Ocean University (NTOU)

6. **Project Title:** Rational Design of Composite Solid Polymer electrolytes for High Performance All-Solid-state Lithium Batteries
   Indian PI: Prof. Bhanu Nandan, Professor, Department of Textile and Fibre Engineering, Indian Institute of Technology Delhi
   Taiwanese PI: Dr. Che-Yi Chu, Associate Professor, Department of Chemical Engineering, National Chung Hsing University, Taiwan

7. **Project Title:** Development of the Manufacturing Technologies for Solid-State Lithium Batteries for Renewable Energy Storage Systems
   Indian PI: Dr Ranjith Thangavel, Assistant Professor, School of Energy Science and Engineering, IIT Guwahati
   Taiwanese PI: Prof Chia-Chen Li, Professor, Department of Materials Science and Engineering, National Tsing Hua University, Taiwan

8. **Project Title:** Development of eco-friendly, flexible perovskite ABX3 (A = Fa, Cs; B = Ge, Sn; C = Cl, Br, I) quantum dot-based solar cell devices with NiO hole transport layer & Zn(Ox Sy) electron transport layer
   Indian PI: Dr. Robin Khosla, Assistant Professor, Indian Institute of Technology (IIT) Mandi, Himachal Pradesh
   Taiwanese PI: Prof. Zong-Liang Tseng, Associate Professor, Ming Chi University of Technology, Taiwan

9. **Project Title**: Catalytic Hydrodeoxygenation of Co-Pyrolyzed Bio-oil from Biomass Residues and Plastic Waste
   Indian PI: Prof. Kaustubha Mohanty, Professor (HAG), Indian Institute of Technology Guwahati
   Taiwanese PI: Prof. Chi-Min Shu, Distinguished Professor, and Dept. of Safety Health and Environmental Engineering, National Yunlin University of Science and Technology (Yun Tech), Taiwan

10. **Project Title**: Developing Non-Invasive Monitoring Techniques for Tumor Progression and Therapeutic Response in PDAC Mouse Models
    Indian PI: Dr. Nripen Chanda, Senior Principal Scientist, CSIR-CMERI, Durgapur
    Taiwanese PI: Dr. Ching-Chieh Weng, Department of Biomedical Science, National Chung Cheng University, Taiwan

11. **Project Title:** Disposable SERS Sensors For Screening of Cardiac Biomarkers
    Indian PI: Prof Sandeep Verma, Professor, Centre for Nanosciences, Indian Institute of Technology Kanpur
    Taiwanese PI: Dr Surojit Chattopadhyay, Professor, Institute of Biophotonics, National Yang Ming Chiao Tung University

12. **Project Title:** Novel Molten Catalyst for Dry Reforming of Methane: Experiments and Modeling
Indian PI: Dr Vishal Agarwal, Associate Professor, Indian Institute of Technology Kanpur
Taiwanese PI: Yu-Chuan Lin (Professor), National Cheng Kung University, Taiwan.

13. **Project Title:** Cell and nuclear response in a uniaxial stretcher with micropatterns recapitulating native tissue morphology
Indian PI: Dr. Sreenath Balakrishnan, Assistant Professor, Indian Institute of Technology Goa
Taiwanese PI: Prof. Pen-hsiu Grace Chao, Professor, Department of Biomedical Engineering, National Taiwan University, Taiwan

14. **Project Title**: Cold spray Additive Manufacturing of flexible printable electronics and their mechanical characterization
Indian PI: Dr Lakshmi Narayan Ramasubramanian, Assistant Professor, Indian Institute of Technology Delhi
Taiwanese PI: Dr Jung-Ting Tsai, Assistant Professor, National Taiwan University of Science and Technology, Taiwan

15. **Project Title:** Evaluation of Phototherapy on Wound Healing of Diabetic Foot Ulcer through Deep Learning with Optical Coherence Tomography Imaging
Indian PI: Dr. Sheena Christabel Pravin, Assistant Professor, School of Electronics Engineering, Vellore Institute of Technology, Chennai
Taiwanese PI: Dr. Chi-Wen Lung, Professor and Chair Department of Creative Product Design Asia University, Taiwan.

Vaishvik Bharatiya Vaigyanik (VAIBHAV) Fellowship

A Memorandum of Understanding (MOU) was signed between DST and INAE for implementation of Vaishvik Bharatiya Vaigyanik (VAIBHAV) Fellowship on July 15, 2024. This initiative is pursuant to Government of India VAIBHAV Summit organized in October 2020 to connect Indian STEMM diaspora with Indian Institutions. Hon'ble Prime Minister has inaugurated Vaishvik Bharatiya Vaigyanik (VAIBHAV) Summit in October 2020 to connect Indian STEM diaspora with Indian Institutions through a month-long dialogue.

Further, the Department of Science and Technology (DST), Ministry of Science and Technology, Government of India announced the first cycle of first call of VAIBHAV Fellowships on 15th June 2023 which was closed on 31 July 2023 in the following areas of research - 1. Quantum Technologies, 2. Artificial Intelligence and Machine Learning, 3. Computational Sciences, 4. Data Sciences, 5. Photonics, 6. Energy, 7. Electronics and Semiconductor Technologies, 8. Communication Technologies, 9. Aerospace Technologies, 10. Materials and Processing Technologies, 11. Earth Sciences, 12. Environmental Sciences, 13. Advanced Manufacturing, Technologies, 14. Health, Medical Sciences and Biomedical Devices, 15. Pharmaceuticals and Bio-Technology, 16. Agricultural Sciences, 17. Social Sciences for SDGs, and 18. Management.

A total of 302 proposals were received by DST against this call. The VAIBHAV Fellowship envisages a collaboration between scientists of Indian Diaspora with Indian Higher Educational Institutions (HEIs), Universities and/ or public funded Scientific Institutions. The VAIBHAV Fellow would identify an Indian Institution for collaboration and may spend up to two months in a year for maximum 3 years. Based on

scientific merit, complementarities of the project objectives, scientific strengths of the project coordinators, national priorities and availability of budget, The Department of Science and Technology (DST), Government of India has decided to support 22 VAIBHAV proposals and 2 Distinguished VAIBHAV fellows. Similarly, the 2nd cycle of 1st year Call of VAIBHAV Fellowships was announced which closed on 31 March 2024. A total of 17 proposals were supported by DST. Subsequent to the signing of MoU, INAE has since been monitoring the projects and engaged in implementing of the fellowships. The visits by VAIBHAV fellows have been progressed and post visit reports submitted to DST.

DST-Women International Grant Support (WINGS) program

Department of Science and Technology (DST) has entrusted INAE to undertake the implementation of WINGS program, which aimed to provide opportunities to Indian Women Scientists, Engineers & Technologists to undertake international-level research experience in advanced research labs of relevant institutions of the world, to enhance their scientific research capacities. The program includes three modules (i) Module I: WINGS Internship (up to 12 months), (ii) Module II: WINGS Fellowship (up to 12 months), and (iii) Module III: Wings Science visit (up to one month). INAE undertook several preparatory actions to ensure the smooth implementation of the WINGS program. Key pre-launch activities to include the design of the program flyer, development of a targeted social media advertisement campaign, and activities undertaken for nation-wide publicity through newspapers. On the governance front, INAE conducted the capacity-building and orientation efforts essential for program execution. A Program Advisory Committee (PAC) is being constituted by DST, with the PAC expected to guide and oversee the program. Additionally, INAE developed program resources, managed databases, and produced outcome reports. With foundational work largely complete, further progress awaits PAC approval by DST.

Workshop for Women Scientists working in Space and Allied Sciences (WiSLP)

The Women in Space and Allied Sciences Leadership Programme (WiSLP) was held from 21–24 of January 2025 at the Aryabhatta Hall, Department of Science and Technology (DST), New Delhi, India. The programme was organised by the DST and the UK-India Education and Research Initiative (UKIERI), India, delivered by the British Council, India and the Coventry University, UK, and hosted by the DST and the Indian National Academy of Engineering (INAE). The initiative focuses on supporting institutions and women scientists in fostering and strengthening women's leadership. The 4-day fully residential workshop featured various activities that gauged and honed the communication, decision-making, and technical skills of the candidates, especially skills relevant to the areas of leadership, administration, and financial management. Twenty-six women scientists from across the country participated in the workshop.

The programme enabled the candidates to nurture a leadership identity, inculcate confidence, and facilitate effective communication. In addition, they learned the role of ethics and tangible knowledge of intellectual property rights (IPR) and Indian policies in the building of a leader, who is capable of delivering optimum governance and effecting strategic management of academic institutions.

❖ Identifying Candidates

The WiSLP aims to empower women scientists in the field of space and allied science areas in India towards leadership and governance roles. These potential leaders will be provided mentoring and training workshops under the programme in order to hone their skill sets required for such attaining leadership positions.

Applications were invited from women scientists with promising research credentials from various scientific and technical Indian institutions and universities. Candidates were shortlisted based on the following eligibility criteria:

- Regular employed women Scientists (early and mid-career) working in S&T institution, in the age range of 35–50 years.
- Area of research interest related with space or any of the allied areas of S&T

The candidates were shortlisted by a selection committee, on the basis of factors including recognized leadership potential, demonstrated initiative, and excellent performance in academics & research. Justification for candidature provided by the applicants was also considered for identifying potential candidates for the training. Travel support of up to Rs. 14,000, in addition to airport pickup and drop facility, and accommodation for four days was provided to the shortlisted candidates.

❖ Day-wise Highlights of the Programme

The inaugural session of the Women in Space and Allied Sciences Leadership Programme (WiSLP) set the stage for an empowering four-day workshop aimed at fostering leadership among women scientists in space and allied sciences. The session commenced with welcome remarks by Dr. Vandana Singh, Head of the WISE-KIRAN Division, DST, New Delhi. Following this, Mr. Michael Houlgate, Deputy Director, British Council India, delivered the opening remarks, emphasizing the significance of international collaboration in leadership development. Eminent dignitaries, including Mr. Pradeep Chaturvedi, Vice-President (Academic, Professional, & International Affairs), INAE, New Delhi, and Ms. A. Dhanalakshmi, Joint Secretary, DST, Govt. of India, New Delhi, highlighted the national and international initiatives that support women in STEM leadership roles.

Dr. Vandana Singh, Head, WISE-KIRAN Division, DST, New Delhi (extreme left) with key invitees Mr. Pradeep Chaturvedi, Vice-President (Academic, Professional, & International Affairs), INAE, New Delhi (left), Ms. A. Dhanalakshmi, Joint Secretary, DST, Govt. of India, New Delhi (centre), and Mr. Michael Houlgate, Deputy Director of the British Council India (right) during the inaugural session

Ms. A. Dhanalakshmi, in her address, highlighted the importance of gender parity in the country. She also mentioned that such workshops will provide pathways to women scientists for rising the ladder and attaining leadership position in science and research careers. Mr. Pradeep Chaturvedi, during his address, provided an insightful overview of the INAE and its various programmes. He highlighted the Academy's key initiatives aimed at fostering innovation, research, and excellence in engineering. Furthermore, Mr. Chaturvedi elaborated on both international and national activities undertaken by INAE, emphasizing their significance in supporting aspiring engineers and professionals. These initiatives provide valuable opportunities for participants to engage in collaborative research, knowledge-sharing, and professional development. The session concluded with a vote of thanks proposed by Lt Col Shobhit Rai (Retd), Deputy Executive Director, INAE, New Delhi, marking the official commencement of the programme.

Following the vote of thanks, the first training session of the day began with the trainers Prof. Elena Gaura, Associate Pro Vice-Chancellor (Research) (Academic Engagement) and Prof. James Brusey, Professor of Computer Science, Research Centre for Computational Science and Mathematical Modelling, from the Coventry University, UK, introducing the WiSLP to the candidates. They elaborated upon the programme's intent and goals, especially the development of mentoring and networking skills. The candidates acknowledged the importance of mutual understanding in the program's success. They recapitulated as well as updated their knowledge of online collaborative tools and established the digital setup and resources required for subsequent sessions.

A 40-minute talk by Mr Rohit Kumar (Director, Finance, DST) on financial management followed, wherein the candidates learnt key aspects of financial policies, planning, and budgeting as well as grant and risk management. They were acquainted with general financial rules (GFR) for procurement, the GeM portal, and types of tenders. He explained the concepts of grant-in-aid and financial propriety as well as the ideal elements for efficient management of public money.

Mr Rohit Kumar, Director, Finance, DST, New Delhi, during his talk on Financial Management: Key Aspects, Tools, and Resources

This was followed by a 90-minute discussion on the role of women in leadership, highlighting their contributions to space science through the Space Superstars initiative. After lunch, the session explored

leadership traits (and how to acquire them), the difference between leadership and management, and the signature of a good leader, employing group and individual activities. Another networking break allowed for building peer connections. The day concluded with a reflection on intersectionality and identity: participants examined their leadership potential by evaluating their current capabilities and their aspirations. In addition, they commenced preparing their Day-4 presentations.

The candidates reviewed highlights from Day 1 that they deemed the best, in addition to previewing the Day-2 schedule. The interactive activities primarily focused on self-reflection, leadership strategies, and skill-building within leadership frameworks. The candidates discussed common qualities they admired in their WiS role models and also identified their authentic leadership style.

Dr. Mamta Pathania, Associate Professor, Indian Institute of Public Administration (IIPA), Delhi, during her talk on Ethics, Accountability, and Governance

A 40-minute talk around mid-morning by Dr. Mamta Pathania, Associate Professor, Indian Institute of Public Administration (IIPA), Delhi, touched upon ethical dilemmas and integrity threats. She began her talk by prodding the candidates to recall their earliest lessons on ethics from their childhood. Having set the stage for how we interpret ethics and morality and what its implications are in our professional lives, she went on to discuss the dilemmas we face in the workplace that put to test our decision-making. She discussed accountability in the workplace and in governance and public trust, employing a quick activity and a video clip to supplement her talk.

This was followed by a 90-minute training session on effective communication skills, including writing concisely across formats and using tools, such as a large language model (LLM)-based application. Following lunch, a 75-minute session on women's soft power and its implications in leadership underscored the unique strengths of women leaders, outlining strategies for collaborating with male colleagues and fostering allies in the process. A networking break was followed by a 60-minute session on people and team management, focussing on technical, empathetic, inclusive, and balanced leadership. Participants also planned research themes and identified focus areas for Day-3 and Day-4 sessions.

The sessions for the day focussed on learning and demonstrating confident communication techniques and bridging gaps in their leadership skills. The candidates reflected upon their learnings from the previous day; a group activity followed that helped them appreciate the significance of diversity and inclusion in the workplace. A subsequent session delved into the candidates' attitudes toward their careers, their families, and societal values, with a special focus on mental health and overall well-being.


Trainers from the Coventry University, UK, Prof. Elena Gaura, Associate Pro Vice-Chancellor (Research) (Academic Engagement) and Prof. James Brusey, Professor of Computer Science, Research Centre for Computational Science and Mathematical Modelling, during their respective training sessions on Day 3


Dr. Sachin Chowdhry, Associate Professor, Indian Institute of Public Administration (IIPA), Delhi a) during his talk on Indian policies and governance and b) with the programme candidates

A 40-minute talk by Dr. Sachin Chowdhry, Associate Professor, Indian Institute of Public Administration (IIPA), Delhi, provided insights into governance and policy frameworks. The speaker invoked several recent government schemes and policies to emphasise his points. He discussed the various elements of policy formulation: stakeholder consultation, evidence-based policymaking, scale and logistics, etc. A query from one the candidates that resonated with her peers was, "How can we participate in and contribute towards national policymaking?", to which Dr Chowdhry offered tangible suggestions and solutions, encouraging the candidates to apply what they learnt in their professional and social lives.

In a 75-minute session after lunch, the candidates explored the everyday work lives of notable role models in the field of Space, through which they learnt the role of empathy in traversing diverse social and economic landscapes.

This was followed by a 60-minute session on the complementary relationship between leadership and management. The candidates learnt project management essentials, including budgeting and science administration, through guided exercises. The candidates further prepared their Day-4 presentations. The day concluded with a special session by Dr. Sanjay Mishra, Senior advisor/Scientist-H, Department of Biotechnology (DBT), Govt. of India. He delivered an insightful talk on "Adaptive Leadership: Leading Through Uncertainty" wherein he emphasized the importance of adaptability in leadership, especially in the face of uncertainty and rapid change. He highlighted key strategies for effective decision-making, resilience, and innovation in challenging environments. His talk provided valuable perspectives to the participants, equipping them with practical approaches to enhance their leadership skills in dynamic and unpredictable scenarios.

Dr Sanjay Mishra, Senior Advisor/Scientist-H, Department of Biotechnology (DBT), New Delhi, with the programme candidates

The sessions for the day focussed on practical leadership skills, including negotiation, presentation, and influencing. The candidates recapitulated insights from the previous day. They drew future-oriented action plans as leaders and practised navigating challenges through role-playing exercises. They learnt how to manage difficult conversations, exchange feedback, and address criticism with humility, confidence, and a willingness to improve.

Prof. (Dr.) Avinash Kumar, Former Associate Director/Scientist G, ER&IPR, DRDO HQ, Delhi, during his talk on IPR and intellectual-assets management

A 40-minute talk by Prof. (Dr.) Avinash Kumar, Former Associate Director/Scientist G, ER&IPR, DRDO HQ, Delhi, introduced the candidates to intellectual property rights (IPR) in the context of Indian higher education. The candidates learnt how to manage their intellectual assets effectively. He drew from his experiences at various organizations, describing the nuances of policy formulation and industry collaboration in the context of research and development.

The candidates delivered Three-Minute-Thesis (3MT) presentations, showcasing their ideas. Certificates for completion of the programme were distributed in addition to the People's Choice Award for the three best 3MT presentations. An evaluation survey questionnaire was sent to the candidates by the trainers, soliciting feedback from the former.

Prof. Abhay Karandikar, Secretary, DST, interacted with the participants of the Women in Space and Allied Sciences Leadership Program (WiSLP) on January 24, 2024, during the concluding session. During his address, Prof. Karandikar emphasized the crucial role of women in science, technology, and leadership, encouraging participants to take on greater responsibilities and drive innovation in their respective fields. He highlighted various DST initiatives supporting women in STEM and underscored the importance of collaboration, mentorship, and continuous learning in shaping future leaders.

The session was highly engaging, with participants actively seeking guidance on career growth, policy-making, and research opportunities. Prof. Karandikar addressed their queries, offering valuable insights and motivation. His inspiring words left a lasting impact, reinforcing the importance of resilience, leadership, and excellence in the evolving landscape of space and allied sciences.

Candidates and the organizing team of WiSLP-Delhi with
Prof. Abhay Karandikar, Secretary, DST, New Delhi following the closing session

❖ **Key Takeaways for Candidates**

A key highlight of the programme was the informal format of discussions between the trainers and the candidates that allowed an unhindered exchange of ideas and views. Through their responses to the feedback questions, the candidates reported the following about the programme:

- The training workshop helped them learn techniques to overcome workplace obstacles as women in STEM as well as complete tasks in a short period.
- The talks were extremely relevant, especially in the context of the Indian academic and administrative scenario; they added that they are now better prepared to resolve everyday problems facing them at their institutes and universities. One of the candidates from north-eastern India noted that she feels encouraged to organize a similar leadership workshop at her university with the assistance of the DST in order to disseminate the knowledge to more researchers and educators from the north-east.
- The candidates plan to apply their learnings to "advocate for inclusivity and collaboration, mentor women and sponsor projects devised and managed by women, build diverse teams, challenge bias, strengthen networking, etc." They intend to "implement adaptive strategies to address challenges in education and team management effectively". As stated by one, "By shifting from a purely technical mindset to one that emphasizes leadership and influence, I can create positive change both within my team and in the wider scientific community."

- Noting the importance of mental well-being, one of the candidates emphasised the significance of work-life integration by setting boundaries and prioritizing self-care.
- One of the candidates found the sessions to be a "perfect combination of engaging storytelling, providing both enrichment and insight…the complex topics were made accessible and inspiring" for such a diverse set of learners; "their capacity to cultivate an interactive and inclusive learning environment fostered an environment in which ideas thrived and all individuals were motivated to participate."

Candidates during a role-playing session

- The candidates outlined diverse plans to disseminate their learnings. Several aimed to conduct workshops and seminars at their universities, targeting scientists, and engineering professionals. Sharing workshop insights through mentorship networks, informal discussions, and focused sessions was a common theme. Some planned to integrate the acquired knowledge into existing training programs and guest lectures. Several participants emphasized creating mentorship programs, both formal and informal, to support junior faculty and students, especially women in STEM. Dissemination through publications, conference presentations, and advocacy for women in STEM were also mentioned. One participant specifically expressed interest in leading initiatives for women in Space Bioengineering, highlighting leadership development as a key takeaway.

❖ **Key Takeaways for Organiser and Host Institutions**

The INAE prepared a feedback questionnaire, which were emailed to the candidates on the 23rd of January 2025. The feedback received, with responses from 15 out of 26 candidates, was highly encouraging.

- 12 out of 15 respondents rated their overall experience as "excellent". The rest rated it as "good".
- 8 out of 15 respondents found the workshop content "highly relevant", with the remaining 6 finding the content "moderately relevant"
- 14 respondents found the workshop to be well-structured in terms of sessions, activities, breaks, etc., and 1 found it to be partially well-structured.

- The knowledge and communication skills of the facilitators and speakers were rated as “excellent” by 14 and “good” by 1 out of 15 respondents.
- Average rating (out of 5) by the respondents for
  - quality of topics covered: 4.5
  - relevance of leadership skills discussed: 4.7
  - clarity of presentations: 4.4
  - effectiveness of group discussions: 4.7
  - engagement and interactivity: 4.8

The candidates offered diverse feedback for improving future workshops. A key suggestion was incorporating more interactive elements such as simulations as well as more tailored case studies relevant to participants’ specific career challenges. Several candidates requested more technical content, including lectures on recent research and technologies. They also suggested expanding the diversity of speakers and facilitators to include individuals from varied backgrounds, industries, and experiences. Curriculum enhancements were also proposed. The candidates suggested allocating more time for discussions with speakers and for addressing participant questions and advocated for post-workshop mentorship programs to provide continued support and guidance. Some suggested incorporating allyship training for male colleagues and implementing long-term mentorship networks to foster continuous growth.

Candidates reported satisfaction with the venue, facilities, and arrangements; all respondents agreed that the workshop was conducted in a supportive and inclusive environment. Some candidates requested earlier notification for registration to facilitate travel arrangements, as well as increased travel support. A few candidates suggested a more detailed and organized program schedule to better manage time and engagement. The candidates reiterated that they look forward to participating in more such workshops in the future, recommending that this programme be conducted across the country to benefit women researchers, educators, and administrators, not just in the field of space and allied sciences but also in other STEM fields.

Joint INAE-ANRF (erstwhile SERB) Scheme to Promote Translational Research in Engineering Abdul Kalam Technology Innovation National Fellowship

Joint INAE-SERB Scheme to Promote Translational Research in Engineering Abdul Kalam Technology Innovation National Fellowship

Abdul Kalam Technology Innovation National Fellowship, launched in 2017, recognizes, encourages and supports translational research by engineering professionals in public-funded institutions. Nominations for the 2024-25 fellowship were due by June 30, 2024. Abdul Kalam Technology Innovation National Fellowship does not celebrate the past academic achievements but the translational research leading to possible commercialized or deployable technology; pilot scale or field trial worthy technology; patent (filed/ sold/ commercialized); working model or prototype for demonstration and trial (in addition but not limited only to scientific publication). The inaugural cohort of six fellows was honoured by the then Honourable President of India, Shri Ram Nath Kovind, and the then Honourable Minister of Science and Technology, Dr Harsh Vardhan, during the Technology Day celebration at Vigyan Bhawan on May 11, 2018.

In March 2024, SERB informed about temporarily halting the scheme due to the transition to ANRF, followed by discussions about budget cuts for FY 2024-25 and 2025-26. It was further communicated that no extensions for existing nominations or new selections are permitted, resulting in a reduction in the budget as per official letter confirming this decision received on March 11, 2025. Consequently, no further extensions or new nominations will be entertained for this fellowship under its current framework.

Altogether, 57 professionals have been conferred this fellowship so far. The scheme was a great success and the translational research conducted under this scheme has resulted in 115 patent filings and the establishment of technology ventures through technology transfer and the creation of startups. The publication of 374 high-impact research papers, supporting the academic and practical validation of their innovations have been published so far.

Despite its discontinuation, the Abdul Kalam Technology Innovation National Fellowship remains a landmark initiative that successfully bridged the gap between academic research and industry-ready innovation, leaving a legacy of impactful contributions to India's scientific and technological advancement.

SERB (subsumed into ANRF)-INAE Digital Gaming Research Initiative

The ANRF-INAE Online and Digital Gaming Research Initiative was launched as a unique program to leverage Digital Gaming Research and Industry in India and to achieve self-reliance in advanced Augmented Reality (AR)/ Virtual Reality (VR) technologies to create indigenous gaming platforms for a number of applications ranging from education to leisure with the backdrop of Indian Ethos, for desktop and hand-held devices. This initiative is in line with national priorities. The ANRF-INAE Online and Digital Gaming Research Initiative launched to leverage Digital Gaming Research and promote such Industry in India is progressing well. The call for proposals was invited in the following three categories under this initiative:

Category I: R&D in Learning, Educational, and Leisure Online Gaming Platforms

Category II: Immersive Game Prototypes, with a focus on Indian Culture & Values

Category III: Collaborative Technical Design Process- Creation of SERB Game Labs

Subsequently, Category III was withdrawn by ANRF (erstwhile SERB). The Program Management and Advisory Committee (PMAC) was constituted to evaluate, select, and review proposals. Based on the recommendations from the PMAC, presently eleven projects are in progress. The initiative launched to leverage Digital Gaming Research and promote such Industry in India is progressing well. The call for proposals were invited and the Program Management and Advisory Committee (PMAC) was constituted to evaluate, select, and review proposals received in response of the call for proposal. It was suggested by the PMAC to conduct a review meeting of the projects and accordingly project progress are monitored by the PMAC review meetings conducted biannually. So far 2 review meetings have been conducted in 2024 (March and November) wherein project PIs presented their work progress before the PMAC and third review meeting was held in April 2025.

The list of eleven projects currently in progress are as under:

Category-I: R&D in Learning, Educational, and Leisure Online Gaming Platforms

1. PI: Dr Deepti Prit Kaur, Chitkara University, Punjab
   Project Title: Ed-Immerse: Integration of Immersive technology in STEM Education

2. PI: Dr. Anshu Bhardwaj, CSIR-Institute of Microbial Technology, Chandigarh
   Project Title: Multiplayer game lab on the cloud to increase Awareness on pressing health problems like Antimicrobial Resistance

3. PI: Dr. Koumudi Patil, IIT Kanpur
   Project Title: Game lab for Responsible Change (GLRC)

4. PI: Dr. Yogeshwar V Navandar, NIT Calicut
   Project Title: Design and Development of Virtual Reality Application for Traffic Safety Education in Indian School Going Children

5. PI: Dr. Tushar Kanti Mishra, Manipal Institute of Technology
   Project Title: Game based Deep Ocean Knowledge Enrichment through Virtual Reality Simulations and Mission Dives in Indian Sub-Continent Context

Category-II: Immersive Game Prototypes, with a focus on Indian Culture & Values

1. PI: Dr Souvik Mukherjee, Centre for Studies in Social Sciences, Calcutta
   Project Title: Highlighting Indian Heritage through video games

2. PI: Dr Manish Narwaria, Indian Institute of Technology Jodhpur
   Presenter: Dr. Rajendra Nagar, Assistant Professor, Department of Electrical Engg, IIT Jodhpur
   Project Title: HampiRun: A Metaverse Based Immersive 3D Game

3. PI: Dr Avinash Sharma, Indian Institute of Technology Jodhpur
   Industry partner: Dr Pawan Harish, Muni Animation
   Project Title: Developing automated solutions of motion transfer & digital assets generation for Indic Games

4. PI: Dr Alan S, Karpagam Academy of Higher Education, Coimbatore
   Project Title: Game-Based Learning of Indian Tradition and Temple Architecture Through Modern Technology

5. PI: Dr. R. Santhosh, Karpagam Academy of Higher Education, Coimbatore
   Project Title: Immersive Game Prototype – Conquest of Chola Dynasty

6. PI: Prof Uma Mudenagudi, KLE Technological University, Hubballi
   Project Title: KALPIT: Digital Creation to Enable Gamification Based on Indian Ethos

Academy Activities

Seminars/Workshops/Conferences –National

The Academy organizes Symposia/Seminars/Workshop/Conferences at national/international levels on topics of national importance. Based on the deliberations, INAE invariably brings out policy recommendations for suitable follow-up action by the concerned Ministry/Department/agency.

Engineers Conclave 2024

Engineers Conclave 2024 (EC-2024), an annual mega event, was organized by the Indian National Academy of Engineering (INAE) jointly with INAE Hyderabad Chapter and was supported by major engineering institutions of the country, such as Defence Research and Development Organization (DRDO) on September 26-27, 2024 at the prestigious Defence Research and Development Laboratory at Hyderabad. Prof Indranil Manna, President, INAE and Vice-Chancellor, Birla Institute of Technology (BIT), Mesra, Ranchi and Dr. Samir V Kamat, Secretary DDR&D and Chairman DRDO, Ministry of Defence, Govt. of India were the Co-Chairs of Engineers Conclave 2024. Dr. Jaiteerth R Joshi, Program Director, DRDL, Hyderabad was the Convener of EC-2024. This year's Engineers Conclave was a grand celebration of engineering excellence, knowledge sharing, and collaboration showcasing the R&D success stories of DRDO and Industry for Defence Applications. With the two themes focusing on "Additive Manufacturing for Defence Applications" coordinated by Dr G Madhusudhan Reddy**,** Former Outstanding Scientist and Director, DMRL, Hyderabad and "Defence Manufacturing Technologies," coordinated by Mr Jitendra J Jadhav, Director General, Aeronautical Development Agency, Bengaluru, which were chosen keeping in view the current national priorities and interests; the event brought together engineers, scientists, researchers, and industry leaders to explore and discuss cutting-edge technologies and advance the state-of art in terms of indigenization in chosen areas.

The Engineers Conclave 2024 was the eleventh such conclave and commenced with an Inaugural Session on September 26, 2024 at DRDL. The event witnessed a galaxy of eminent luminaries who graced the occasion with their wisdom and insights. The Inaugural Session begun with a warm Welcome Address by Mr U Raja Babu, Director General – Missiles and Strategic Systems (DGMSS) followed by a Presidential Address by Prof. Indranil Manna, President, INAE who presented a brief background of INAE and the Engineers Conclave. The Guest of Honour - Dr. Samir V Kamat, Secretary DDR&D and Chairman DRDO, Ministry of Defence, Govt. of India highlighted pertinent issues in his address followed by the release of the Conclave Souvenir. The Inaugural Session was graced by the Chief Guest - Dr. Anil Kakodkar, Former President, INAE; Chancellor, Homi Bhabha National Institute; Member, AEC; Chairman, Rajiv Gandhi Science & Technology Commission, Govt. of Maharashtra; Former Chairman, AEC. The Hon'ble Raksha Mantri Shri Rajnath Singh sent a Message conveying good wishes for the Conclave which was projected on the screen during the Inaugural Session.

Inaugural Session in Progress (Left to Right: Dr Samir V Kamat, Dr Anil Kakodkar, Prof Indranil Manna, Dr JR Joshi, Mr G.A. Srinivasa Murthy and Mr U Raja Babu

Inaugural Session of Engineers Conclave 2024- Dignitaries on dais

Message by Hon'ble Raksha Mantri, Shri Rajnath Singh

Dr. Samir V Kamat, Secretary DDR&D & Chairman DRDO delivering Address

Prof Indranil Manna, President, INAE delivering Address

Dr. Anil Kakodkar, Former President, INAE and Chief Guest, Inaugural Session delivering Address

Dr BN Suresh, former President, INAE addressing the audience

Mr JD Patil, Vice -President, INAE delivering Plenary Talk

Dr PS Goel, former President, INAE addressing the gathering

Prof. Amaresh Chakrabarti delivering Plenary Talk

Valedictory Session in progress

Prof Indranil Manna, President INAE felicitating Dr. G. Satheesh Reddy, Chairman, Valedictory Session

The event featured plenary speakers, technical sessions, and networking opportunities, providing a platform for visionaries and innovators to shape the future of engineering in chosen themes of interest. The event highlights included Parallel Technical Sessions on both the themes which provided an opportunity for the delegates to gain knowledge of the latest technological developments, gap areas and promises for future growth on both themes. The Chairman of the Valedictory Session: Dr. G. Satheesh Reddy, Former Scientific Advisor to Raksha Mantri & Former Secretary DD R&D and Chairman DRDO highlighted the salient outcomes of the Conclave. The Co-Chair, Valedictory Session was Mr G. A. Srinivasa Murthy, DS and Director, Defence Research & Development Laboratory (DRDL) who touched upon the tangible deliverables emanated from the deliberations. The Summing up of Technical Sessions of two Themes by respective Coordinators highlighted all the vital issues discussed and deliberated with a view to bring out actionable recommendations to serve as inputs for policy formulation and to advance the concerned areas. As envisaged, the Engineers Conclave 2024 met the envisaged objectives of providing a common platform for the best engineering minds from R&D organizations, Academic Institutions and industry to share knowledge and innovative ideas with a view to arrive at actionable recommendations to be forwarded to the concerned stakeholders from the Government Departments/agencies and other organizations for the progress of the two themes and advancement of state-of-the-art indigenous technologies in allied areas, thereby paving the way for further technological advancement of the Nation.

Other Activities/Affairs of INAE

(i) 38th INAE Foundation Day Celebrations held on April 22, 2024 at New Delhi

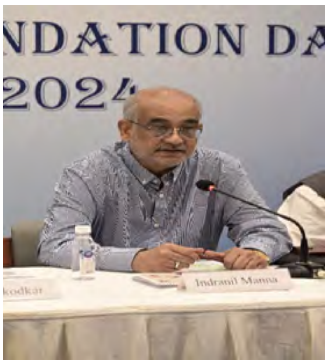
Indian National Academy of Engineering (INAE) was founded on 20th April 1987 to promote excellence in Engineering and Technology (E&T) in the country. INAE celebrates this landmark as its Foundation Day each year to rededicate itself to the professed goals. Accordingly, INAE celebrated its 38th Foundation Day on 22nd April 2024 in virtual/hybrid mode. Dr. Anil Kakodkar, *FNAE*, Chancellor, HBNI, Mumbai; Former President, INAE, and Former Chairman of Atomic Energy Commission and Secretary to Government of India, Department of Atomic Energy Mumbai was the Chief Guest at the said INAE Function. The celebrations commenced with the delivering of the Welcome Address by Prof. Indranil Manna, President, INAE and Vice Chancellor, Birla Institute of Technology (BIT), Mesra, Ranchi wherein he highlighted the importance of the occasion and gave an overview of the major activities and achievements of the Academy during the last one year. This was followed by the Address by Vice-Presidents of INAE viz Prof. UB Desai, *FNAE*, Professor Emeritus, IIT Hyderabad, Former Director, Indian Institute of Technology, Hyderabad; Prof. Sivaji Chakravorti, *FNAE*, Professor, Electrical Engineering Department, Jadavpur University, Kolkata and former Director, NIT Calicut and Mr. JD Patil, *FNAE*, Member of Executive Committee of Management & Advisor (Defence & Smart Technologies) to L&T Chairman & MD, Larsen & Toubro Limited – Defense, Mumbai who touched upon the important milestones in their concerned areas of responsibilities.

Former Presidents Dr BN Suresh and Dr Sanak Mishra also addressed the online audience with pertinent ideas on the way forward. The Address by Chief Guest, Dr Anil Kakodkar, Chancellor, HBNI, Mumbai; Former President, INAE; and Former Chairman of Atomic Energy Commission and Secretary to Government of India, Department of Atomic Energy was enlightening and informative. He elucidated that the Academy has made its presence felt on the national/international domain and is making strides on the road to fiscal and functional autonomy in line with directives and concerted efforts are ongoing to see that the Academy continues to make a mark in promoting the growth and cause of engineering and technology by furtherance of meaningful activities in line with the objectives. The function was a grand success.

38th INAE Foundation Day Celebrations held on April 22, 2024 at New Delhi

Panelists

Dr Anil Kakodkar, former President, INAE



Prof Indranil Manna, President, INAE

Mr JD Patil, Vice-President, INAE

Dr BN Suresh, former President, INAE

Seminar on "Green Hydrogen" jointly organized by INAE Delhi Chapter and International Solar Alliance on April 22, 2024 at New Delhi in hybrid mode

The 38th Foundation Day Celebrations of INAE was followed by a Seminar on "Green Hydrogen" organized jointly by INAE Delhi Chapter and International Solar Alliance (ISA) at New Delhi in hybrid mode. The Seminar commenced with Welcome Remarks by Mr. Pradeep Chaturvedi, *FNAE*, Chairman, INAE Delhi Chapter followed by Opening Remarks by Prof Indranil Manna, President, INAE and Special Address by Dr. Ajay Mathur, *FNAE,* Director-General, International Solar Alliance and Chairman, INAE Forum on Energy. Mr Bhupinder Singh Bhalla, Secretary, Ministry of New and Renewable Energy, Government of India was the Chief Guest of the function and he delivered an illuminating address covering all aspects relevant to the propagation of a Green Hydrogen economy in the National context. The main objective of the Seminar was to bring out a "Guidance Document" based on the deliberations on the following three thematic areas covering sectors such as Railways, Steel, fertilizers, and refineries.

Three sessions were held addressing, Green Hydrogen- Relevance, Policy, Regulations and Standards, Economics of Green Hydrogen, and Demand creation for Green Hydrogen in the Indian context. The sessions were chaired by Dr Anil Kakodkar, *FNAE*, Chancellor, HBNI, Mumbai; Former President, INAE; and Former Chairman of Atomic Energy Commission and Secretary to Government of India, Department of Atomic Energy, Dr Ajay Mathur, *FNAE,* Director-General, International Solar Alliance and Chairman, INAE Forum on Energy, and Dr BN Suresh, *FNAE*, Former President, INAE and Chancellor, Indian Institute of Space Science and Technology (IIST) and Honorary Distinguished Professor, ISRO Headquarters; Director, VSSC, Trivandrum; and Member, Space Commission.

The First Session on Green Hydrogen- Relevance, Policy, Regulations and Standards covered the following aspects Hydrogen has long been recognized as a pathway to deep decarbonization, particularly in hard-to-abate sectors. There is a renewed global interest in this versatile energy resource, with several governments announcing Green Hydrogen policies, strategies, and targets, and global multilateral and private sector organizations increasingly recognizing Hydrogen in their near-to mid-term strategies. This session brought together policymakers and experts to analyse the role of existing policies, regulations, and standards in ensuring the scaling up of green hydrogen deployment in India. The objectives of the session were to Assess policy and regulatory frameworks and incentives that can accelerate green hydrogen ecosystem readiness and approach for market creation and harmonization of global standards for domestic consumption and export.

The second session on Economics of Green Hydrogen in the Indian context covered the issues as follows. India has established green hydrogen as a core pillar of its decarbonization and net zero strategy. India's National Green Hydrogen Mission (NGHM) sets out a roadmap for using hydrogen to meet its climate targets and make India a green hydrogen hub. This mission aims to enable India to become a global hub for the production, usage, and export of green hydrogen and its derivatives. This session delved into the current economic landscape of green hydrogen in India. It explored factors influencing its cost competitiveness, including renewable energy prices, electrolyzer technology advancements, green hydrogen production and use; and infrastructure development. The objectives of the session were to analyze existing and emerging business models for off-take of green hydrogen in India and identify key economic factors and policy instruments that can drive down green hydrogen costs.

The third session on Demand creation for Green Hydrogen in the Indian Context covered the following issues: The National Green Hydrogen Mission demarcates the sectors and the market development approach. The highest priority is accorded to those sectors where green hydrogen would support the replacement of fossil fuels and fossil fuel-based feedstocks. These include: replacement of fossil fuelderived hydrogen with green hydrogen in ammonia production and petroleum refining; blending of green hydrogen in City Gas Distribution (CGD) systems and production of steel with green hydrogen. The objective of the session was to understand the emerging demands of green hydrogen in various sectors across India and examine effective strategies to accelerate green hydrogen demand in India.

Glimpses of Seminar on "Green Hydrogen" jointly organized by INAE Delhi Chapter and International Solar Alliance on April 22, 2024 at New Delhi in hybrid mode.

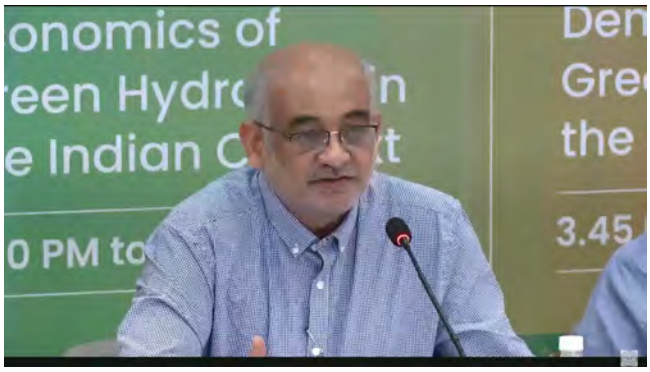
Panelists during Seminar on "Green Hydrogen"

Mr BS Bhalla, Secretary, Ministry of New and Renewable Energy, Govt of India

Mr Pradeep Chaturvedi, Chairman INAE Delhi Chapter and Dr Ajay Mathur, Director-General, International Solar Alliance

Dr Sanak Mishra, former President, INAE

Mr TK Ramachandran, Secretary, Ministry of Ports, Shipping and Waterways



Prof Indranil Manna, President, INAE delivering Address

Glimpses of Panelists during Session

Panel Discussion in Progress

Left to Right: Mr BS Bhalla, Dr Ajay Mathur and Prof Indranil Manna, President, INAE

Left to Right: Mr Pradeep Chaturvedi, Dr Ajay Mathur and Mr BS Bhalla

The sessions were followed by a Panel Discussion and Audience interaction and way forward wherein the outcomes of the deliberations were summarized and collated to get a comprehensive roadmap of the way forward in each of the technical, policy and research areas discussed during the seminar. Eminent experts from Academia, R&D, Government Agencies and Industry from India and abroad participated in the deliberations adding to their relevance, importance and impact in making a paradigm shift towards a Green Hydrogen Economy which is a much-needed regime for the futuristic technologies and for reducing the carbon footprint. The seminar was attended by about 160 persons online and was an outstanding success in meeting the envisaged objectives.

(ii) National Technology Day Celebrations by INAE - Panel Discussion on "AI/ML: Imperatives, Opportunities and Threats" held on 11th May 2024 (Saturday) in virtual mode

To commemorate the National Technology Day a Panel Discussion on "AI/ML: Imperatives, Opportunities and Threats" was held on 11th May 2024 (Saturday) in virtual mode. The following Panelists participated viz Dr Manish Gupta**,** Director, Google Research India, Bengaluru; Dr Anand Deshpande**,** Founder Chairman and Managing Director, Persistent Systems, Pune; Dr Rohini Srivathsa, Chief Technical Officer, Microsoft India and South Asia; Mr R. Chandrashekhar, Former Secretary, Department of IT and Dept of Telecom; Former President, NASSCOM, Chairperson, Centre for Digital Future; Dr Shubhashis Gangopadhyay**,** Vice Chairperson, Centre for The Digital Future (CDF) & Founding Dean of Indian School of Public Policy, Economics, Law & Economics, Policy Praxis Lab and Prof Vineeth N Balasubramanian**,** Department of Computer Science and Engineering, IIT Hyderabad. Prof. Indranil Manna, President, INAE and Vice-Chancellor, BIT, Mesra delivered the Welcome Address. The event was moderated by Prof. UB Desai, Vice-President, INAE, Professor Emeritus and Former Director, IIT Hyderabad.

(iii) National Engineers Day 2024 Celebrations by INAE - Celebrations by INAE Headquarters - Online Distinguished Lectures focused on the theme "Engineering Innovations in Medicine: Pioneering Advances at the Intersection of Technology and Healthcare".

National Engineers Day is celebrated all over the nation on 15th September every year to honour the birth anniversary of Bharat Ratna Dr M Visvesvaraya and to highlight the pivotal role of engineering and technology in national development. To commemorate this occasion, Indian National Academy of Engineering (INAE) celebrated National Engineers Day on 15th September 2024 (Sunday) morning in virtual mode. The online event comprising distinguished lectures focused on the theme "Engineering Innovations in Medicine: Pioneering Advances at the Intersection of Technology and Healthcare". The celebration commenced with a Welcome Address by Prof Indranil Manna, President, INAE, who emphasized the importance of engineering innovations in transforming healthcare. Following this, Dr SK Sarin, Director, Institute of Liver and Biliary Sciences (ILBS), President, National Academy of Medical Sciences and the Chief Guest of the event delivered the Opening Remarks. His insightful talk, particularly on Personalized Medicine, addressed key topics such as "Polygenic Risk Assessment DT4H, HGP2" and "Organ Regeneration Banking," inspiring attendees with the potential of these advanced medical technologies.

Thereafter, Prof Suman Chakraborty, *FNAE,* Institute Chair Professor, Sir JC Bose National Fellow, Former Dean R&D and Head, School of Medical Science & Technology, IIT Kharagpur made a presentation on "Community Transformation via Democratized Diagnostic Technologies for the Underserved." He showcased his innovative development of ultra-low-cost diagnostic technologies aimed at enhancing disease detection in resource-limited settings. His work includes nucleic acid-based rapid tests and smartphone-based screenings, which empower community health workers and marginalized women, fostering socio-economic transformation and promoting gender parity.

Prof Rohit Srivastava, *FNAE*, Himanshu Patel Chair Professor in Applied Biosciences and Former Head of Department of Biosciences and Bioengineering, IIT Bombay then spoke on "Affordable Healthcare Technologies for India". He shared insights from his research on biosensors and point-of-care diagnostic technologies designed for rural and maternal healthcare. Prof Srivastava highlighted four commercialized devices: the SYNC Bluetooth integrated glucometer for diabetes management, UChek for routine urine analysis, ToucHb for non-invasive haemoglobin detection, and CareMother, a smartphone platform connecting doctors and pregnant women to monitor high-risk pregnancies in rural areas.

.The session was concluded with closing remarks and expression of gratitude to all speakers and participants, reiterating the significance of engineering in advancing healthcare solutions. The event successfully brought together leading experts to discuss the transformative impact of engineering innovations in the healthcare sector. The insights shared during the session underscored the importance of collaboration between engineering and medical fields to address healthcare challenges in India, particularly for underserved populations. National Engineers Day 2024 was a celebration of creativity, innovation, and the commitment of engineers to enhance the quality of life through technology. The event was well attended online and appreciated by all participants and delegates.

Welcome Address by Prof Indranil Manna, President, INAE

Opening Remarks by Chief Guest -Dr SK Sarin

Prof Suman Chakraborty, FNAE giving his talk

Prof Rohit Srivastava, FNAE giving presentation

Important Visit to INAE Office at Technology Bhavan, New Delhi

Prof Indranil Manna and Mr Kris Gopalakrishnan

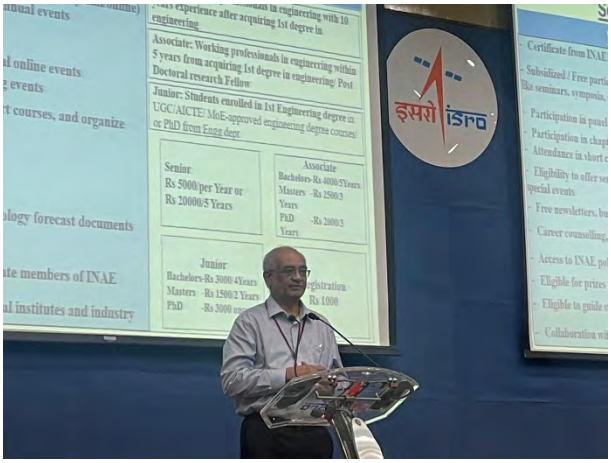
Mr Kris Gopalkrishnan, *FNAE*, Chairman of Axilor Ventures and co-founder of Infosys visited INAE Office at Technology Bhavan, DST Complex, New Delhi on July 30, 2024 for an informal meeting with Prof Indranil Manna, Presdient, INAE wherein the recent initiatives taken by INAE for fiscal and functional autonomy in deference to Government Directives and the way forward for the Academy was discussed.

Reaching out to Policy Makers: Interaction with Government Agencies

Joint Consultative Committee

Indian National Academy of Engineering (INAE), during the recent past, in addition to its well-defined activities, has been giving a major thrust in carrying out activities on issues of National importance, where engineering interventions can provide the needed solutions. In order to facilitate identification of topics on thrust areas for conduct of activities, INAE had constituted joint Consultative Committees with DST, CSIR, DRDO, ISRO, DAE, SERB (erstwhile ANRF) and AICTE. These Committees are co-chaired by the head of the organization (Secretary/Chairman) and the President of INAE. The main objective of these Committees is to identify and pursue engineering challenges of current relevance and future importance that awaits innovative intervention. The following meetings took place last year.

The **ISRO-INAE Consultative Committee** meeting was held on May 22, 2024, in hybrid mode at ISRO HQ, Bengaluru. The meeting was co-chaired by Dr S. Somanath, Chairman, ISRO/Secretary, Department of Space and Prof. Indranil Manna, President, INAE wherein it the importance of conducting systematic studies for future missions and bridging global technology gaps was also highlighted. The meeting was attended by Mr AS Kiran Kumar, Dr V Narayanan, Mr M. Sankaran, Dr. S. Unnikrishnan Nair, Mr ES Padmakumar and Mr Shantanu Bhatawdekar from ISRO side and Dr PS Goel, Dr BN Suresh, Prof Sanjay Mittal Prof RI Sujith and Dr VR Lalithambika from INAE side. The discussions focused on advancing joint programs in sensor technology, additive manufacturing, advanced materials, software development for space applications, and the development of heavy-lift launch vehicles aligned with India's 2047 space vision. The Committee emphasized the need to leverage INAE's expert fellowship for policy engagement and technical guidance, including the formation of national teams on strategic technologies. It was agreed to draft an umbrella MoU to formalize collaborations and develop a structured action plan. The Committee reinforced the commitment to strengthen collaborative initiatives between ISRO and INAE.



Prof Indranil Manna, President, INAE making a presentation to ISRO Scientists during the meeting

Group Photograph of Members during ISRO-INAE Consultative Committee Meeting

The **DRDO-INAE Consultative Committee** meeting was held on September 26, 2024, at DRDL, Hyderabad, co-chaired by Dr. Samir V. Kamat, Secretary DDR&D and Chairman DRDO and Prof. Indranil Manna, President, INAE. The meeting was attended by Dr Anil Kakodkar, Dr PS Goel, Dr BN Suresh, Dr Sanak Mishra, Prof UB Desai, Mr JD Patil, Prof Sivaji Chakravorti, Dr. Jaiteerth R Joshi and Dr. Jaganath Nayak. The Committee emphasized strengthening institutional engagement between DRDO and INAE through increased Individual and Institutional Memberships, enhanced nominations for INAE Fellowship and Young Associate programs, and the initiation of collaborative projects. It was agreed that INAE would consider recommending project ideas aligned with DRDO's research domains and facilitate targeted training programs and lecture series in emerging technologies such as AI/ML, Quantum Computing, and Cyber Security. The Committee also endorsed a strategic outreach campaign to promote INAE's new membership categories and identified actionable steps to deepen the partnership, including establishing a nodal agency within DRDO for coordinated nominations and program execution.

Group Photograph of Members during DRDO-INAE Consultative Committee Meeting

DRDO-INAE Consultative Committee Meeting in Progress

Research Schemes

INAE Chair Professorship

INAE Chair Professorship was instituted in order to encourage engineers/technologists with outstanding research contributions, promote long-term participation in academic research and enhance the research standards in academic institutions.

Call for nominations for the INAE Chair Professorship were invited as per revised guidelines and the last date of receipt of nominations as November 20, 2024. The following nominees were conferred the INAE Chair Professorship for the duration January 1, 2025 – December 31, 2027.

1) Prof Sudip Misra, Indian Institute of Technology Kharagpur
2) Prof Saptarshi Basu, IISc, Bengaluru

INAE Distinguished Professors/Technologists

The objective of this Scheme is to utilize the expertise of INAE Fellows after superannuation and those not in regular employment primarily for research in Institutions/ Universities/ Research & Development establishments, and industry in India. The Fellows may choose any institution of their choice which may be the same institution from where superannuated. Nominations for the year 2024 were invited with the revised guidelines for the subject Schemes and last date of receipt of nominations was November 20, 2024. The following nominees were conferred the INAE Distinguished Professors/Technologists for the duration January 1, 2025 – December 31, 2027.

1) Prof Bijoy Bhattacharyya, Jadavpur University
2) Prof Madhukar Onkarnath Garg, BITS Pilani Goa
3) Dr RB Grover, BARC, Mumbai

Mentoring of Engineering Teachers by INAE Fellows/ Young Associates

INAE undertakes mentoring of Engineering Teachers from recognized Engineering institutions with a view to enhance the quality of Engineering education being imparted in the country. Applications for the year 2024 for Mentoring of Engineering Teachers by INAE Fellows/ Young Associates were invited with the revised guidelines with amendments in terms of the financial emoluments and last date of receipt of nominations was April 30, 2024. The nominations were approved by the Governing Council in its 151st meeting held on June 28, 2024.

A total of 14 valid nominations were selected under the scheme Mentoring of Engineering Teachers by INAE Fellows/ YA for the year 2024-25:

S No	Mentor Name	Name and Address of Organization where INAE Fellow/Young Associate (Mentor) is serving	Engg Teacher Name	Name and Address of Institution/University
1	Prof Balaraman Ravindran	Indian Institute of Technology Madras, Chennai	Dr. Karthick Seshadri	National Institute of Technology, Andhra Pradesh
2	Prof Sri Niwas Singh	Indian Institute of Information Technology & Management Gwalior	Mr Samarendra Pratap Singh	IET, Dr R.M.L Avadh University, Ayodhya
3	Prof K Ramesh	Indian Institute of Technology, Madras	Dr Hariprasad MP	Amrita Vishwavidhyapeetham Amritapuri Clappana PO Kollam Kerala
4	Dr CP Ravi Kumar	Texas Instruments, Bagmane Tech park, CV Raman Nagar, Bengaluru	Ms Sasikala N	Dayananda Sagar University Bengaluru
5	Dr CP Ravi Kumar	Texas Instruments, Bagmane Tech park, CV Raman Nagar, Bengaluru	Dr Pushpa Mala S	Dayananda Sagar University, Bengaluru
6	Prof Krishnarmurthi Ramesh	Indian Institute of Technology, Madras, Chennai	Dr Tarkes Dora Pallicity	Indian Institute of Technology Guwahati
7	Dr S. V. Kulkarni	IIT Bombay	Dr. Thirumurugan C	TIFAC-CORE Research Centre, VIT Vellore. T.N.

8	Dr S. V. Kulkarni	IIT Bombay	Dr R.Madavan	Kariyamanikam Road, Samayapuram, Tamil Nadu
9	Dr. Hari B. Hablani	IIT Indore	Manvi Dhawan	Igniting Dreams of Young Minds (ISRO affiliated 'Space Tutor' NGO
10	Dr Prahlada Ramarao	Director-Centre for Energy Research S-Vyasa Yoga University, Prashanti Kuteeram, Bengaluru	Dr Monica Ravishankar	GITAM University, Bengaluru
11	Dr Aloknath De	IISc Bangalore	Dr Ravichandra	Maharaja Institute of Technology, Mysore
12	Dr Aloknath De	IISc Bangalore	Ms Swati Saxena	GSFC University, Vadodara, Gujarat
13	Dr Tapan Kumar Gandhi	IIT Delhi	Dr Sakshi	Sharda University, Greater Noida
14	Mr Narasimhan Venkatesh	Sr Director, Engineering, Silicon Labs	Sree Lakshmi Gundebommu	CVR College of Engineering Ibrahimpatnam, Hyderabad

Mentoring of Engineering Students by INAE Fellows/ YA (Internship Opportunity under the Mentoring of INAE Fellows/ Young Associates)

INAE undertakes mentoring of meritorious 3rd /4th year B.E./B.Tech/BSc. (Engg.) students from recognized Engineering institutions, for two months during the academic year, with a view to provide them guidance so as to excel further in their field of study and improve the quality of engineering education. Applications for the year 2024 for Mentoring of Engineering Students by INAE Fellows/ Young Associates were invited with the revised guidelines with amendments in terms of the financial emoluments and last date of receipt of nominations was April 30, 2024. The nominations were approved by the Governing Council in its 151st Meeting held on June 28, 2024.

A total of 16 valid nominations were selected under the scheme Mentoring of Engineering Students by INAE Fellows/ YA for the year 2024-25:

S No	Mentor Name	Name and Address of Organization where INAE Fellow/Young Associate (Mentor) is serving	Student Name	Name and Address of Institution/University
1	Dr Arnab Banerjee	IIT Delhi	Kaushik Kashyap	Jamia Milia Islamia, Jamia Nagar, Delhi
2	Prof Sushmita Mitra	ISI Kolkata	Unneta Chatterjee	University of Calcutta
3	Prof Sushmita Mitra	ISI Kolkata	Soham Mitra	Indian Institute of Information Technology, Kalyani
4	Dr Samaresh Das	IIT Delhi	Aditya Ananad	Indian Institute of Technology (BHU) Varanasi,UP
5	Prof Parag R. Gogate	Institute Of Chemical Technology, Mumbai	Rahul Anand Mishra	Bharati Vidyapeeth College of Engineering, Navi Mumbai, Maharashtra, India
6	Dr Aloknath De	Adjunct Prof, IISc Bangalore	Pratham Gowtham	Rashtreeya Vidyalaya College of Engineering
7	Dr Aloknath De	Adjunct Prof, IISc Bangalore	Sneh Padaliya	GFSC University
8	Prof SV Kulkarni	IIT Bombay	Sidharth Variar	Veermata Jijabai Technological Institute (VJTI), Mumbai
9	Prof SV Kulkarni	IIT Bombay	Ruturaj Subodh Rao	Veermata Jijabai Technological Institute, Mumbai
10	Prof Rahul Mitra	IIT Kharagpur	Sanskriti Nayak	NIT Rourkela

11	Prof Saptarishi Basu	IIS, Bangalore	Arghya Paul	IIT Shibpur
12	Dr Naga Vara Aparna Akula	CSIR – Central Scientific Instruments Organisation	Akshita Arora	Narsee Monjee Institute Of Management Studies, Chandigarh Campus
13	Mr Chandra Sekhar Tiwary	IIT Kharagpur	Diganta Mondal	Ramakrishna Mission Vidyamandira
14	Prof Prasun Kumar Roy	Shiv Nadar University (Institution of Eminence) Greater Noida, Delhi NCR.	Mayur Mankar	Indian Institute of Science Education and Research Bhopal
15	Prof Yogesh M Joshi	IIT Kanpur	Rewa Bipin Kulkarni	MIT - ADT University school of Bioengineerig Sciences & Research Institute, Rajbag Campus
16	Dr Uttam Kumar Ghorai	Ramakrishna Mission Vidyamandira, Howrah	Soumya Purkayastha	Haldia Institute of Technology, West Bengal

INAE Forums

One of the important objectives of the Academy is to assist the Government from time to time in formulating policies on critical technical issues. For this purpose, five forums were constituted – INAE Forums on Energy; Technology, Foresight and Management; Engineering Interventions for Disaster Mitigation; Indian Landscape of Advanced Structural Materials and Civil Infrastructure. These forums enable giving inputs to policy makers, institutes of higher learning & research, industries, etc. The following are the updates on activities carried out during the year.

Report on "Sustainability of Civil Infrastructure" by INAE Forum on Civil Infrastructure held on March 11, 2025 at India International Centre, New Delhi

The Indian National Academy of Engineering (INAE), founded in 1987 comprises India's most distinguished engineers, engineer-scientists and technologists covering the entire spectrum of engineering disciplines. INAE functions as an apex body and promotes the practice of engineering & technology and the related sciences for their application to solving problems of national importance. The Academy also provides a platform to deliberate upon the futuristic planning for country's development requiring engineering and technological inputs and brings together specialists from such fields as may be necessary for comprehensive solutions to the needs of the country.

Workshop in progress

The INAE Forum on Civil Infrastructure, consisting of domain experts was set up in January, 2018, and had earlier undertaken to study the National status of 'Urban Transportation' and 'Housing in India' – the challenges being faced, and, the possible way forward to tackle these. The Forum undertakes comprehensive studies of the problem involving not only the engineering issues, but also other related

ones such as, policy interventions needed, societal involvement, and, regulatory mechanisms. Currently the Forum is studying the vitally important subject relating to Sustainability of Civil Infrastructure, a subject of much contemporary concern. The study relates to such aspects as, infrastructure demand, impact of infrastructure on environment, life cycle cost analysis, suitability for use of construction materials and technology. The main objective of the forum is to create "White Papers" from its study to provide a set of needed actions, related to, Policy Initiatives, Engineering Development/Research, Education.

In order to cover comprehensive aspects in the field of "Sustainability of Civil Infrastructure", a brainstorming workshop was conducted by the INAE Forum on Civil Infrastructure on March 11, 2025 at India International Centre, Lodhi Road, New Delhi to review the report in its pre-final stage and solicit views of respective domain experts. This workshop was aimed to bring together domain experts, policymakers, and other stakeholders to discuss and deliberate on the pressing issues related to the sustainability of civil infrastructure. The workshop was attended by various prominent members of the INAE Forum on Civil Infrastructure and invitees working in different arenas of civil infrastructure. These included experts in civil engineering, sustainability, urban development, and policy-making, all contributing their knowledge and insights to the discussion on sustainable infrastructure practices.

L to R: Dr V K Saraswat, FNAE, Member, NITI Aayog, New Delhi, Mr JD Patil, President, INAE with and Prof Prem Krishna, Chairman, INAE Forum on Civil Infrastructure

The workshop focused on the importance and requirement of sustainability in civil infrastructure development, highlighting the use of waste materials and innovative design practices to address environmental and sustainability challenges and to promote economic growth.

Workshop in progress on "Sustainability of Civil Infrastructure"

Key inputs received from invitees:

Mr J D Patil – Presidential Address

1. Sustainability plays a crucial role in governing large organizations, and our cities are becoming increasingly challenging to live in.
2. A report on sustainability is highly valuable for policymakers and major corporations, as it can help identify sustainable solutions, such as utilizing waste materials in construction instead of depleting natural resources.
3. One critical area requiring attention is the emission levels from the construction industry. The management, reduction, and control of these emissions should be a key focus.
4. Innovative methods and solutions must be developed to promote a sustainable and clean environment.

Dr V K Saraswat – Address by the Chief Guest

1. **Infrastructure Investments:** Ongoing investments in various sectors should be closely monitored, with a particular focus on the energy sector.
2. **Carbon Emissions & Energy Consumption:** High carbon emissions from cement and steel production, along with excessive energy use in buildings, pose significant challenges. The integration of renewable energy, adoption of low-carbon construction methods, and consideration of biodiversity preservation in construction projects are essential.
3. **Funding for R&D:** Exploring funding opportunities with the Railway Ministry for research and development of steel slag-based aggregate.
4. **PV Recycling Plants:** Developing a plan to establish photovoltaic (PV) recycling plants for silicon and silver recovery.
5. **Vertical Axis Wind Turbines:** Investigating the feasibility of implementing vertical axis wind turbines instead of horizontal ones for improved performance.

6. **Fish Conservation in Hydropower:** Researching the implementation of fish ladders and bypass systems in hydropower plants to protect fish populations.
7. **Solar Desalination for Water Grid:** Exploring the potential for creating a water grid using solar desalination technology along India's coastline.
8. **Packaging Standards:** Developing and standardizing packaging guidelines to make them more accessible and easier to follow.
9. **Strategic Planning & Financial Scalability:** Promoting strategic planning, replicability, and financial scalability to drive transformation.
10. **AI & Data Analytics in Decision-Making:** Encouraging data-driven decision-making using artificial intelligence and advanced data analytics.
11. **Carbon Capture & Taxing:** Implementing carbon capture utilization and carbon taxation to mitigate environmental impacts.
12. **Green Building Certification:** Promoting green building standards through:
    (i) Use of low-carbon construction materials (e.g., fly ash, bamboo composites)
    (ii) Energy-efficient designs, passive cooling, solar rooftops, and smart lighting
    (iii) On-site waste recycling for concrete and bricks
13. **Eco-Friendly Materials:** Encouraging the use of innovative, biodegradable, and eco-friendly building materials.
14. **Regulatory Standards:** Establishing clear approval guidelines and BIS standards for building materials to ensure quality and compliance.

Prof SS Chakraborty

1. **Emphasis on Nature-Based Solutions & Green Energy:** Prioritizing sustainable approaches that leverage natural processes and promoting the widespread adoption of green energy solutions.
2. **High Emissions from Steel & Cement:** Steel and cement production contribute nearly 20% of total emissions, yet limited progress has been made in reducing their environmental impact.
3. **Energy-Efficient Building Materials & Construction Practices:**
   (i) Promoting the use of energy-efficient materials in construction.
   (ii) Addressing unsafe construction practices that contribute to disasters, such as landslide-prone structures.
4. **Diversification of Energy Sources:** Considering nuclear energy as a viable option alongside renewable energy sources to ensure a balanced and sustainable energy mix.
5. **Roadmap for Cleaner Steel Production:** Collaborating with INSDAG to implement strategies for cleaner steel production. With over 20 alternative materials available, state-level policies should be developed to facilitate their adoption.
6. **Skill Development & Education:** Strengthening educational programs and skill development initiatives at various levels to equip professionals with knowledge and expertise in sustainable practices.

Prof Monto Mani

1. **Microplastics & Infrastructure Emissions:**
   (i) Microplastics significantly contribute to emissions in the infrastructure sector.
   (ii) Conduct research on microplastics originating from roads and EVs, particularly focusing on tire wear as the largest contributor.
   (iii) Explore mechanisms to filter and recover microplastic contaminants from tires and footwear to prevent environmental pollution.
2. **Materials & Carbon Sequestration:**
   (i) High Emissions from Steel & Cement: 92% of infrastructure emissions are attributed to steel and cement. Approaches toward negative emissions should be explored, such as using materials that sequester carbon.
   (ii) Novel Carbon-Absorbing Materials: Investigate non-cement-based materials that can absorb carbon during the setting process.
   (iii) Recycled Plastics in Infrastructure: Caution is needed when using recycled plastics in roads and buildings, as they may leach polymers and heavy metals at elevated temperatures (~60°C), leading to environmental risks.
   (iv) Integration of Sustainability in **Chapter Five** of the study report: Incorporating aspects of non-toxicity and carbon sequestration into Chapter Five for a more comprehensive approach.
3. **Energy Efficiency & Net Zero Goals:**
   (i) Strengthen the focus on energy efficiency and achieving net-zero emissions.
   (ii) LED Advertising Panels: Address the high energy consumption of dynamic LED panels (~3kW per panel, equivalent to a geyser). Over-reliance on such energy-intensive systems, whether powered by renewables or non-renewables, increases the ecological footprint.
   (iii) Illumination & Biodiversity Impact: Examine the impact of excessive artificial lighting on eye safety and nocturnal biodiversity.
4. **Urban Infrastructure & Traffic Decongestion:**
   Without addressing traffic congestion, energy efficiency measures in transportation will have limited impact. Example: In Bangalore, with travel speeds of ~10 km/hr, vehicle emissions remain counterintuitively high, regardless of fuel efficiency.
5. **Social & Environmental Impact Considerations:**
   (i) Skill Development & Employment Generation: Integrate Social Life Cycle Assessment (SLCA) into infrastructure planning to explore geographically distributed employment opportunities, reducing rural-urban migration.
   (ii) Re-examine Civil Engineering Additives: Assess common admixtures and additives in construction for their contribution to microplastics and persistent environmental pollutants (e.g., PFAS, “forever chemicals”).
   (iii) Infrastructure for Ecosystem Restoration: Investigate how civil infrastructure projects can contribute to remediating environmental pollutants and restoring local biodiversity and ecosystem services.
6. **Greenhouse Gas (GHG) Mitigation Strategies:**
   (i) Develop holistic approaches to reducing GHG emissions across infrastructure sectors.
   (ii) Encourage research on sustainable construction methods, carbon capture, and waste-to-energy solutions.

Prof Mahesh Chandra Tandon

Establishing an Engineer's Act in the country is crucial to regulate the engineering profession, ensuring that high ethical standards and technical expertise are maintained. This act would help establish clear guidelines for engineers, enforce professional accountability, and promote consistency in practices across the industry, ultimately enhancing the quality and integrity of engineering projects. Plan of action to be decided with regulation for implementation.

Prof Pradeep Kumar Ramancharla

1. **Technology & Sustainability Alignment:** Technologies that are unsuitable for specific geoclimatic conditions or inherently unsustainable should not be promoted. The use of inappropriate technologies and materials leads to long-term unsustainable infrastructure.
2. **Gap Between Ideals & Implementation:** There is a significant disconnect between sustainability discussions and actual practices. Human convenience is often prioritized over environmental coexistence, which is a critical concern.
3. **Addressing Systemic Errors in Infrastructure Development:**
   (i) **Error of Concept:** Can be mitigated through capacity building and education.
   (ii) **Error of Implementation:** Can be controlled through strict quality assurance and control measures.
   (iii) **Error of Intention:** Is the most challenging to address and may require legislative measures, such as a dedicated bill or act, to enforce accountability.
4. **Establishment of a National Sustainability Tribunal:** A regulatory body should be formed to oversee and enforce sustainability practices across sectors. This tribunal could set guidelines, monitor compliance, and take corrective action against violations of sustainable development principles.

Mr Satyajit Mohapatra

1. **High Carbon Emissions from Steel Production:** Steel is an essential material but also one of the largest contributors to carbon dioxide emissions.
2. **Importance of Scrap Recycling:** Recycling scrap steel is crucial in reducing carbon emissions and promoting circular economy practices.
3. **Role of Renewable Energy in Steel Manufacturing:** Integrating renewable energy sources into steel production can enhance power efficiency and reduce environmental impact.
4. **Innovations & Roadmap for Sustainable Steelmaking:**
   (i) **AMN Steel:** Focuses on scrap steel recycling and the integration of renewable energy.
   (ii) **Hydrogen in Blast Furnaces:** A structured roadmap has been developed, outlining progress in hydrogen-based steel production.
5. **Challenges in Material Selection & Implementation:**
   (i) While material selection is widely discussed, existing codes and regulations require updates to align with modern sustainability standards.
   (ii) High-quality steel options are available, but their adoption remains a challenge.
6. **Zinc-Aluminum-Magnesium (ZAM) Steel:** Introduced in the past 15 years, yet implementation is hindered by bottlenecks in steel grade selection and regulatory approval.

Mr Rajit Sengupta

1. **Develop a Sustainability Implementation Database:** Create a structured working module or database to track and support the execution of sustainability solutions at the ground level.
2. **Integrate Economic Considerations in Material Selection:** Sustainability discussions must include economic feasibility to ensure practical adoption of eco-friendly materials.
3. **Incorporate Local Geology & Context in Infrastructure Design:** Infrastructure projects must be tailored to regional geoclimatic conditions to enhance durability and sustainability.
4. **Explore Nature-Based Solutions:** Utilize ecosystem-based approaches for sustainable infrastructure development, reducing reliance on resource-intensive technologies.
5. **Resource Consumption & Technology Adoption:**
   (i) Reduce excessive consumption and avoid an unchecked push for new technologies that may not align with long-term sustainability goals.
   (ii) Ensure technology implementation, which considers local conditions for effective and practical application.
6. **Aligning Sustainability Knowledge with Action for large scale infrastructure projects:** While a wealth of sustainability knowledge exists, there is a critical gap in practice. Clear guidelines and correct direction for implementation are essential. Example: Glass buildings are widely known to be unsustainable, yet they continue to be constructed. Further, another example is the proposed tunnel for mobility in Bangalore—while aiming to improve transport; it may not be a truly sustainable solution and requires deeper evaluation.

Prof Manu Santhanam (online)

1. **Chapter 3: Life Cycle Assessment (LCA)**
   (i) Incorporate illustrations and examples to clarify the application of LCA in the sector.
   (ii) Provide case studies from the group, such as LC3 cement and Recycled Concrete Aggregates (RCA), to demonstrate practical implementation.
2. **Chapter 4: Suitability of Materials**
   (i) The proposed content is extensive; a structured approach is necessary for better presentation.
   (ii) Consider descriptive assessments for key materials while referring to existing literature for broader coverage.
3. **Chapter 7: Vision & Roadmap:** Present the vision from multiple perspectives—government, industry, and academia—to ensure a comprehensive roadmap.
4. **Policy Gaps & Material Suitability**
   (i) The absence of a clear mandate and policy hinders the use of unconventional materials like recycled concrete aggregate.
   (ii) Policies and guidelines should facilitate their adoption.
5. **Advancing Supplementary Material Usage:** Focus on research and development to improve the understanding and application of supplementary materials in construction.
6. **Water Consumption in Construction:** Construction activities consume large volumes of water; treated wastewater should be prioritized for use in these projects.

Mr P K Mishra, INSDAG

1. **Focus on Construction Material Sustainability:** Greater awareness and emphasis are needed on sustainable materials and their long-term impact.

2. **Mandatory Life Cycle Cost (LCC) Analysis:**
   (i) LCC should be a compulsory criterion before selecting construction materials to ensure cost-effectiveness and sustainability. Example, Japan builds tall buildings with steel designed for a 100-year lifespan—India must adopt similar sustainable and durable construction practices.
   (ii) Currently, LCC is included in the General Financial Rules (GFR) for railways, but it is not mandatory—this needs to change for all public infrastructure projects.
3. **LCC in Public Asset Planning:** Any public asset, especially those designed for long-term use (e.g., 200-year lifespan infrastructure), must undergo a mandatory LCC study before finalizing construction methods.
4. **Education & Training on Sustainable Materials**
   (i) Professionals need structured training to design sustainable structures effectively.
   (ii) Educational institutions should integrate material sustainability, LCC methodologies, and structural design into their curricula.
5. **Skill Development in Construction & Fabrication:** There should be focused training programs for construction-related skill development, such as fabricators and material specialists, to enhance workforce expertise.

Discussion: Response by Forum Members

Prof Manoranjan Parida

Integrating Steel Slag Aggregates & Life Cycle Cost Analysis (LCC) in Infrastructure Projects

1. **Utilization of Steel Slag-Based Aggregates:**
   (i) Steel slag aggregates can be effectively used in construction, provided they are incorporated into the BIS codes and supported by policy guidelines.
   (ii) The Ministry of Steel is currently examining guidelines for their implementation, which should be formalized into a national steel policy to ensure widespread adoption.
2. **Mandatory Life Cycle Cost (LCC) Analysis in Infrastructure Projects:**
   (i) LCC should be a standard part of project screening for highway and infrastructure development to assess long-term sustainability.
   (ii) Incorporating LCC in project evaluations will enhance decision-making in material selection and serve as a key component in training programs for engineers and policymakers.
3. **Field Demonstrations & Long-Term Performance Assessment:**
   (i) Beyond laboratory testing, on-field trials are necessary to evaluate the real-world performance and durability of new materials like steel slag aggregates.
   (ii) Implementation strategies must consider long-term performance data to validate material effectiveness before large-scale deployment.

Mr VN Heggade

Strengthening Sustainability in Steel, Cement, and Construction Sectors

1. **Mandatory Renewable Captive Power Plants for Steel & Cement Manufacturing**
   (i) Given that 92% of CO_2 emissions in built infrastructure come from cement and steel (and 80% in the building sector), it is crucial to mandate steel and cement manufacturers to have renewable energy-based captive power plants to reduce their carbon footprint.

(ii) Electric Arc Furnaces (EAF), which consume significant energy, should also be required to integrate renewable energy sources.

2. **Implementing Sustainable Building Standards Across All Sectors**
   (i) Sustainable building standards should be mandatory across all sectors, including government infrastructure, roads, and dams.
   (ii) Current policy-making standards are not embedded in building codes, which prevents their implementation—this gap needs to be addressed.
3. **Sustainability in Procurement & Contracting**
   (i) The procurement process and contracting currently do not prioritize sustainability.
   (ii) A Quality-Cost-Sustainability System (QCSS) must be included in Detailed Project Reports (DPRs) to ensure sustainability considerations in material selection and construction methods.
   (iii) Contractors must be required to use alternative materials and sustainable practices, rather than prioritizing cost alone.
4. **CBAM & Green Hydrogen for Steel Production**
   (i) Carbon Border Adjustment Mechanism (CBAM) policies, like those in Germany, will impose taxes on non-green steel.
   (ii) To remain competitive in the global market, India must adopt green hydrogen for steel production and develop regional standards for sustainable buildings, roads, and infrastructure.

Mr Alok Bhowmick

Advancing Sustainable Infrastructure Development: Policy & Implementation Strategies

1. **Adopting Model Code for Concrete 2020 for Faster Implementation**
   (i) The Model Code for Concrete 2020 offers a structured approach to integrating sustainability into construction practices.
   (ii) Its adoption can accelerate the implementation of sustainable design and material selection across infrastructure projects.
2. **Rethinking Infrastructure Contracting Beyond EPC**
   (i) The EPC (Engineering, Procurement, and Construction) model does not account for Life Cycle Cost (LCC), making it unsuitable for sustainable infrastructure development.
   (ii) Alternative models should be explored for long-term sustainability and accountability.
3. **Government-Industry Agreements for Sustainability**
   (i) The government must take the lead in sustainability efforts. Example: Netherlands, where the government has MoUs with industries to drive sustainability, can serve as a model for India.
   (ii) A regional sustainability framework should be developed to ensure locally available materials are prioritized, reducing carbon footprints and promoting economic viability.

Mr Sanjay Pant

Strengthening Sustainable Construction Practices

1. **Structural Safety Through Bamboo Design Code:** Entire bamboo-based buildings can be designed to be structurally safe by adhering to the Bamboo Design Code, making them a viable sustainable alternative.
2. **Utilization of Construction and Demolition (C&D) Waste:** Established BIS standards for construction and demolition waste should be effectively used in infrastructure development.

3. **Leveraging the National Building Code (NBC) for Sustainability:** The National Building Code (NBC) of India includes a dedicated chapter on sustainability at the township level, first introduced in 2005, revised in 2016, and currently under review. These guidelines should be referenced for external development, infrastructure planning, and sustainable urban expansion.
4. **Emphasizing Maintenance and Building Performance Tracking:** Sustainable construction should focus not just on materials and methods but also on long-term maintenance. This includes tracking building performance in terms of water efficiency, energy use, and overall environmental impact.
5. **Recognizing Existing Standards for Alternative Materials:** Various waste and alternative materials (e.g., fly ash, recycled aggregates, bamboo composites) already have BIS codes and design standards in place. Sustainability assessments may explore viable options based on workable options brought out in BIS codes.

(b) INAE Forum on Engineering Interventions for Disaster Mitigation

Meeting of INAE Forum on Engineering Interventions for Disaster Mitigation held on June 22, 2024 in virtual mode chaired by Prof DN Singh, IIT Bombay, Mumbai. During the said meeting the following points were deliberated viz. "Climate Resilient Infrastructure Landscape: Are We Ready with Engineering Solutions?", by Prof. SS Chakraborty; Alternate Perspective for Strategic Framework: A Shift Towards Societal Resilience - A Strategic Framework for Engineering Interventions in Disaster Mitigation, proposed by Prof. Nagesh R. Iyer; white paper on the man-made and unforced disasters in the built habitat, by Ms Alpa Sheth; Need for a Sharp Focus and SOPs for Specific Engineering Interventions for Disaster Mitigation, by Prof. N. Raghavan; Climate change and the enhancement in frequencies/ intensities of natural disasters, by Prof. U. C. Mohanty; Increasing flood frequencies under climate change and Digital Twin for Floods in Bangalore city, by Prof. P. P. Mujumdar and Disaster management and economic development, by Dr. B.C. Roy. The progress on above reports/white papers were reviewed in the meeting.

Events Organized by Local Chapters

INAE Local Chapters organized a number of interesting webinars/activities in the last one year some of which are summarized below.

INAE Delhi Chapter

(i) Seminar was jointly organized by INAE Delhi Chapter, International Solar Alliance (ISA) on "Green Hydrogen" on 22nd April 2024

The Seminar was jointly organized by the Indian National Academy of Engineering (INAE) Delhi Chapter, International Solar Alliance (ISA) on "Green Hydrogen" coupled with 38th INAE Foundation Day Function 2024 at the INAE Headquarter in hybrid mode. Mr. Bhupinder Singh Bhalla, Secretary, Ministry of New and Renewable Energy, Government of India was the Chief Guest on Monday, 22nd April 2024. Three sessions were held addressing, Green Hydrogen- Relevance, Policy, Regulations and Standards, Economics of Green Hydrogen, and Demand creation for Green Hydrogen in the Indian context. The sessions were chaired by Dr Anil Kakodkar, *FNAE*, Chancellor, HBNI, Mumbai; Former President, INAE; and Former Chairman of Atomic Energy Commission and Secretary to Government of India, Department of Atomic Energy, Dr Ajay Mathur, *FNAE*, Director-General, International Solar Alliance and Chairman, INAE Forum on Energy, and Dr BN Suresh, *FNAE*, Chancellor, Indian Institute of Space Science and Technology (IIST) and Honorary Distinguished Professor, ISRO Headquarters and Former President, INAE; Director, VSSC, Trivandrum; and Member, Space Commission. (*Already covered in INAE Activties)*

(ii) Seminar on "Information Session about the Individual Membership of INAE" on 19th September 2024

The Department of Civil Engineering (CED) at Indian Institute of Technology, IIT Delhi , in collaboration with the Delhi Chapter of the Indian National Academy of Engineering (INAE) organized a distinguished Seminar on " Information Session about the Individual Membership of INAE " on Thursday, 19th September 2024 in hybrid mode. The Seminar was delivered by Lt Col Shobhit Rai (Retd), Deputy Executive Director, INAE. The introduction of the nation's sole engineering academy and a premier body comprising of top engineering professionals from industry, academia, and R&D sectors, is inviting individuals engaged in Engineering and Technology (E&T) to join and become Individual Members of INAE, and its benefit were highlighted. The welcome addressed by Mr Pradeep Chaturvedi, *FNAE*, Chairman, INAE Delhi Chapter.

The welcome note was addressed by Professor Indranil Manna, President, INAE. The event was organized and moderated by Professor Dr Vasant Matsagar, *FNAE*, and was attended both in-person and virtually via online streaming. The Seminar was well-attended by faculty members and students providing the information about the Individual Membership of INAE and the benefits of the membership on Thursday, 19th September 2024.

Pictorial Delight of the Seminar on "Information Session about the Individual Membership of INAE"

(iii) **Seminar on "Reliability Analyses of Nonlinear Dynamic Systems Excited in Time Domain using REDSET - An Alternative to Random Vibration and Simulation" by Professor Achintya Haldar, Emeritus Professor of Civil Engineering and Engineering Mechanics, University of Arizona, USA on 20th September 2024**

The Department of Civil Engineering (CED) at Indian Institute of Technology, IIT Delhi , in collaboration with the Delhi Chapter of the Indian National Academy of Engineering (INAE) organized a distinguished Seminar on "Reliability Analyses of Nonlinear Dynamic Systems Excited in Time Domain using REDSET - An Alternative to Random Vibration and Simulation" on Friday, 20th September 2024 in hybrid mode. The Seminar was delivered by Professor Dr Achintya Haldar, Professor of Civil Engineering and Engineering Mechanics, University of Arizona, USA; Centennial Professor and da Vinci Fellow; Distinguished Member of ASCE; Fellow of SEI. Professor Haldar provided his valuable insight on implementing reliability analysis methods for understanding behaviour of nonlinear dynamic systems considering uncertainties. The department expresses its sincere gratitude to Professor Haldar for his insightful talk and presentation. The Seminar was well-attended by faculty members and students from different department of IIT Delhi in-person and online, fostering a stimulating environment for academic discourse and knowledge exchange.

Glimpses of the Seminar at IIT Delhi

(iv) **Seminar on "Concepts for Frequency Sweep and Efficient Repeated Analysis in the context of Vibroacoustic Optimization and Uncertainty Quantification" by Professor Dr Steffen Marburg, Chair of Vibroacoustics of Vehicles and Machines of the Technical University (TU) of Munich, Germany on 30th September 2024**

Lecture on "Concepts for Frequency Sweep and Efficient Repeated Analysis in the Context of Vibroacoustic Optimization and Uncertainty Quantification" organized by the Delhi Chapter of the Indian National Academy of Engineering (INAE) on Monday, 30th September 2024 in virtual mode. The Seminar was delivered by Professor Dr Steffen Marburg, Chair of Vibroacoustics of Vehicles and Machines of the

Technical University (TU) of Munich; Director of the International Institute of Acoustics and Vibrations; and Former Chair for Engineering Dynamics at the Universität der Bundeswehr (University of the Federal Armed Forces) in Munich, Germany. The INAE expresses its sincere gratitude to Professor Marburg for his insightful talk and presentation. Professor Marburg highlighted the advantages of implementing frequency sweep and efficient repeated analysis for vibroacoustic optimization and uncertainty quantification. The Seminar was well-attended by faculty members and students in-person from different department of IIT Delhi and large audience attended it online.

(v) **Seminar on "Indigenous Knowledge in India on Civil Engineering" wherein lecture delivered by Professor Dr T.G. Sitharam, Chairman, All India Council for Technical Education (AICTE) on 1st January 2025**

The Department of Civil Engineering (CED) at Indian Institute of Technology, IIT Delhi , in collaboration with the Delhi Chapter of the Indian National Academy of Engineering (INAE) and the Indian Knowledge Systems (IKS) programme sponsored by the Ram and Mithlesh Gupta Foundation organized a distinguished Technical Seminar on "Indigenous Knowledge in India on Civil Engineering" on Wednesday, 1st January 2025. The Seminar was delivered by Professor TG Sitharam, Chairman of the All India Council for Technical Education (AICTE). Professor Sitharam's insightful presentation highlighted the critical role of indigenous knowledge systems in shaping the evolution of civil engineering practices in India, offering a fresh perspective on the integration of traditional and modern engineering techniques. The Seminar was well-attended by faculty members, students, and professionals, fostering a stimulating environment for academic discourse and knowledge exchange. The Department expressed its sincere gratitude to Professor Sitharam for his insightful talk and presentation.

Photographs of the Event

Prof TG Sitharam, Chairman, AICTE delivering talk

Prof Vasant Matsagar, IIT Delhi addressing the gathering

Glimpses of the Audience

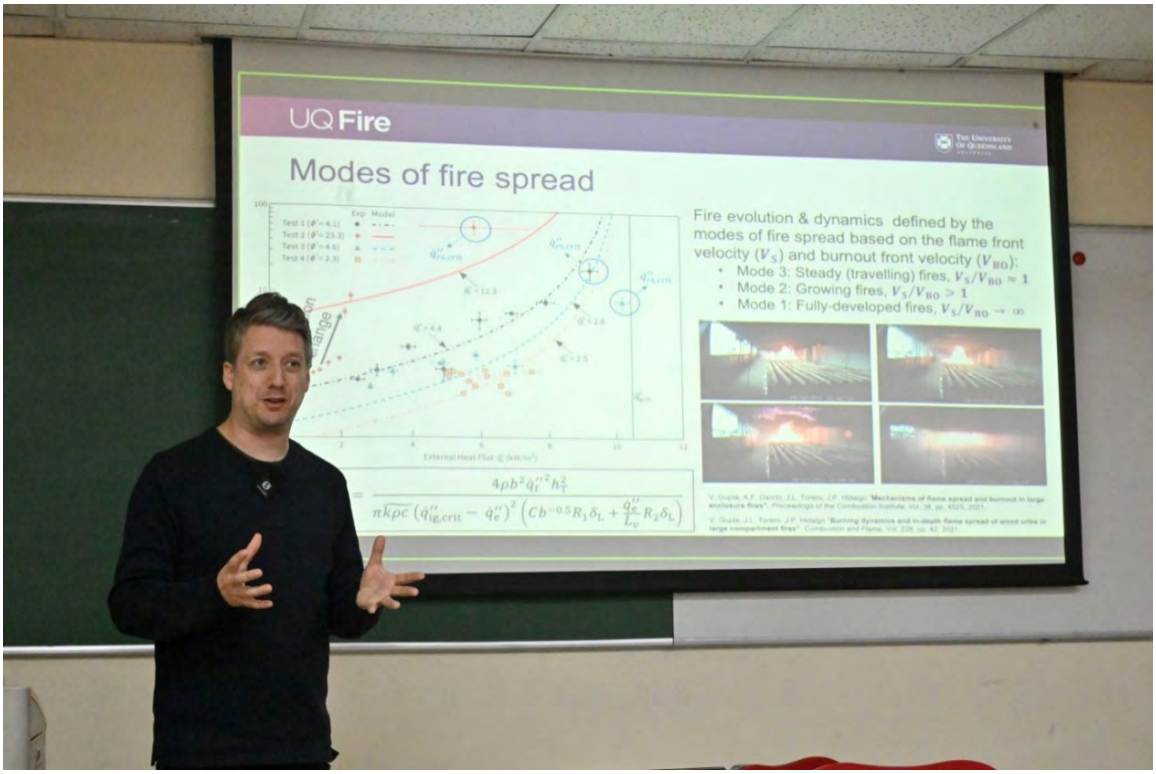
(vi) **Seminar on "Holistic Fire Safety in Built Infrastructure" by Dr David Lange, Associate Professor in Structural and Fire Safety Engineering at The University of Queensland (UQ) on 14th February 2025**

The Department of Civil Engineering, IIT Delhi, in collaboration with the Indian National Academy of Engineering (INAE) and the UQ-IITD Research Academy (UQIDRA), recently hosted a highly insightful seminar on "Holistic Fire Safety in Built Infrastructure". The session was held on 14th February 2025, featuring Dr David Lange, Associate Professor in Structural and Fire Safety Engineering at The University of Queensland (UQ).

Dr Lange, a leading expert in fire safety and structural engineering, shared valuable insights on the evolving role of fire safety in modern built environments. Drawing from ongoing research and projects at UQIDRA, he highlighted the importance of adopting a holistic fire safety strategy in today's infrastructure. Topics discussed included advancements in structural fire engineering, timber fire safety, façade fire safety, and the integration of these elements into comprehensive fire safety strategies for buildings.

The seminar provided an in-depth exploration of how fire safety engineering has evolved and the need for more advanced, adaptable approaches given the increasing complexity of buildings. Dr Lange's extensive research contributions have had a significant impact on fire safety standards in Australia, and his expertise offered a fresh perspective on fire safety practices worldwide.

Group Photograph during seminar at IIT Delhi



Dr David Lange delivering talk

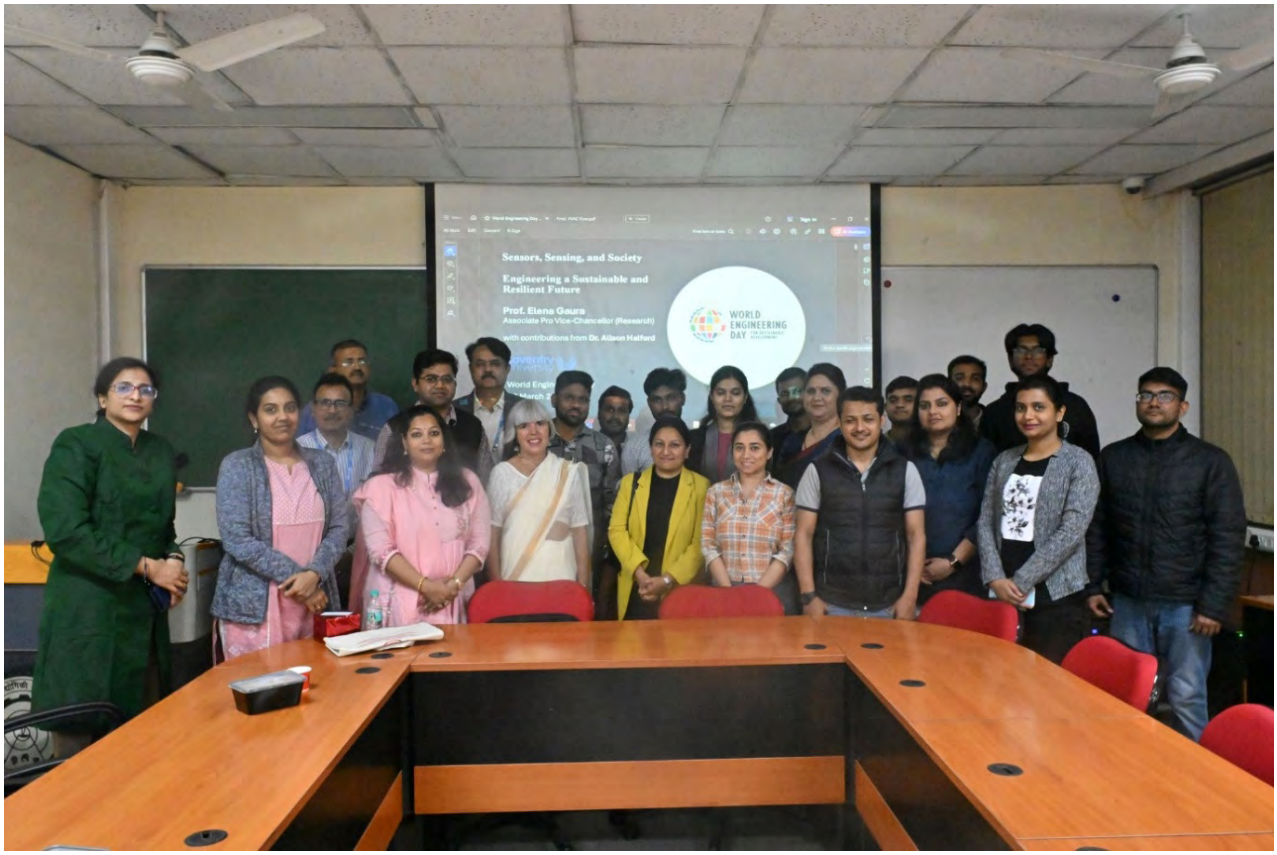
(vii) **Talk on "Tomorrow's Engineering Challenges" by Professor Elena Gaura, Professor of Pervasive Computing, FWES, Associate Pro-Vice Chancellor Research from Coventry University, UK, 3rd March 2025**

On 3rd March 2025, the Delhi Chapter of the Indian National Academy of Engineering (INAE) and the Department of Civil Engineering at IIT Delhi hosted a thought-provoking hybrid talk by Professor Elena Gaura, a leading expert in pervasive computing and Associate Pro-Vice-Chancellor for Research at Coventry University, UK.

The session explored the transformative role of sensors and sensing technologies in driving a sustainable, resilient, and equitable future. Professor Elena delved into critical areas like:

(1) Environmental Sensing & Net Zero Goals
(2) Human-Centric Sensing for Health & Well-being
(3) Sensing for Digital & Physical Infrastructure

Her insights highlighted how these technologies are shaping engineering research, while also raising important discussions about data ethics, accessibility, and security. The talk emphasized the need for a multidisciplinary, collaborative approach that integrates computing, materials science, and social sciences to create responsible and impactful engineering solutions.



Group Photograph of Participants

Prof Elena Gaura addressing the audience

(viii) **Seminar on "Utilisation of Airborne Sensor Systems for Localisation of Trapped Victims in Disaster Management", wherein lecture delivered by Professor Dr Leonhard Reindl and Professor Dr Juergen Woellenstein from University of Freiburg in Germany on 24th March 2025**

The Delhi Chapter of the Indian National Academy of Engineering (INAE) and the Department of Civil Engineering, IIT Delhi successfully hosted a seminar on "Utilisation of Airborne Sensor Systems for Localisation of Trapped Victims in Disaster Management" on 24th March 2025. Renowned experts Professor Dr Leonhard Reindl and Professor Dr Juergen Woellenstein from the University of Freiburg, Germany shared their groundbreaking research on technologies designed to enhance rescue operations in disaster-stricken areas. Professor Reindl, Director of the Centre for Renewable Energy, and Professor Woellenstein, Head of the Gas Sensors Department, explored innovative systems such as wireless sensor networks, surface acoustic wave devices, and microwave communication technologies. These advancements are critical in improving the safety and efficiency of rescue teams, particularly in scenarios involving building collapses and infrastructure failures.

The seminar emphasized the importance of these technologies for countries like India, which are highly susceptible to natural disasters, particularly earthquakes. By minimising risks to rescue teams and improving victim localization, these innovations promise significant contributions to disaster management. The event was organized and moderated by Professor Vasant Matsagar, *FNAE*, and was attended both in-person and virtually via online streaming. This seminar provided invaluable insights into the future of disaster response, highlighting the need for global collaboration in advancing life-saving technologies.

Visual Delight of Proceedings of the Seminar

Group Photograph of Participants of the Seminar

INAE Mumbai Chapter

Annual General Body Meeting (AGBM) of INAE Mumbai Chapter was held in hybrid mode on 29th March 2025 at Training School Hostel, Anushaktinagar, BARC. The agenda was as follows:

1. A talk on 'Navigating the complexities of the nuclear regime' by Dr. R.B. Grover, Member of the Atomic Energy Commission and Chairman of the Board of Research in Nuclear Sciences
2. Review of activities of the Chapter in last one year (2024-25)
3. Selection of the new Executive Committee of the Chapter for three years (2025-2028)

The following events/workshops/webinars were organized by INAE Mumbai Chapter during the last one year as per details given below:

(i) INAE Mumbai Chapter organized a Webinar on "Economy, Energy, and Ecology: Some personal thoughts" was delivered by Dr. Ajit Sapre, *FNAE*, Group President, Reliance Industries on April 28, 2024 in hybrid mode**.** Dr. Ajit Sapre has more than 40 years of industrial experience in oil & gas, refining, petrochemicals, renewable energy, sustainability, biotechnology, etc., working for Reliance Industries, and ExxonMobil, USA.

Abstract: Relatively inexpensive fossil energy is responsible for the rapid progress of humanity post-industrial revolution. Without energy, there is limited economic growth. Capitalistic economics, with the advancement of diverse technologies, has helped improve standard of living of an increasingly human population, and now digital/ AI technologies are accelerating this progress. With technological progress, there's a consolidation of power, wealth inequality, and biodiversity loss. Human activities have altered the Earth beyond repair for humanity to prosper forever. There is an optimistic view that green energy, electrification, and decarbonization may mitigate this change. Is this a triumph of hope versus practical reality? Activities that give benefits in 30, 50 years have no economic motivation, as capitalism promises everything now, amplified by on demand throw away society. Are there any alternate economic and societal paradigms for humanity?

Brief bio-data of the speaker

Dr. Ajit Sapre has more than 40 years of industrial experience in oil & gas, refining, petrochemicals, renewable energy, sustainability, biotechnology, etc., working for Reliance Industries, and ExxonMobil, USA. He has contributed to several innovative technology developments and commercialization. He has broad experience in varied technical areas, manufacturing, business, and corporate strategy. He received his PhD in Chemical Engineering from the University of Delaware and MBA from Cornell University. He has published more than 100 technical papers, one book, 3 book chapters, and has more than 200 International patents and more than 50 U.S. patents to his credit. He has won numerous national and international awards, the most recent being *2023* ASM International Medal for Advancement of Research, the first from India to receive this prestigious Industrial R&D award.

Highlights & Recommendations

Energy and economy are two sides of the same coin. In the era of climate change and sustainability, to climb the ladder of prosperity for the 80% of the world population living in developing countries demands a paradigm shift in pushing frontiers of science and technology with a

singular focus on new inventions and "inclusive innovation" for implementation. It will require a concerted effort across the boundaries of multiple disciplines to achieve affordable excellence. Without large-scale nuclear energy, both fission and fusion, and renewable energy deployment, humanity must live within the photosynthetic energy budget of the current biological cycle. The only reason our current society exists beyond that capacity is the infusion of fossil energy, the primary cause of global warming. We have already exceeded the 1.5 °C temperature rise limit agreed with the Paris accord. We need to put significant effort to adopt to a warmer world, as it will impact food, water, energy, health, etc. France has already developed a national plan for 4 °C temperature rise by 2100. We in India need to develop a similar plan for every region. The advances in biological sciences will help mitigate significant challenges posed by a warmer world. To meet India's energy demands, we should continue the large-scale deployment of renewables, nuclear, geothermal and natural hydrogen using advances in horizontal drilling and fracking technologies. India has large agri waste, municipal waste and other organic waste resources, they all can be converted to energy dense renewable green oil to reduce imported crude oil. Although there is excitement around green hydrogen (water splitting with solar energy), due its low volumetric energy density and high delivered costs, its utility should be prioritized for difficult to decarbonize industries such as steel, cement, etc., unless new inventions help reduce cost dramatically. We must intertwine our resources to help India leapfrog into the future, with a collective mandate: Science for Solution; Technology for Transformation; and Innovation for Impact. Fast followers will never catch up with fast movers. Therefore, our aim should be to lead the world with commercializing indigenous science and technology.

(ii) **INAE Mumbai Chapter in association with Centre of Excellence in Oil, Gas and Energy-IIT Bombay jointly organized a Webinar delivered by Professor (Dr.) Ganpati D Yadav, National Science Chair Govt. of India; Emeritus Professor of Eminence; Former Vice Chancellor, Institute of Chemical Technology, Mumbai on** "Aiming for the Net Negative Goal to Achieve Sustainability: Role of Green Hydrogen in Energy Security, Decarbonization, Biomass Valorization & Waste Plastic Recycling" on 16th October 2024 at IIT Bombay, Mumbai **in hybrid mode**.

Abstract: The net zero goal by 2050 is a cherished dream of all world economies. In achieving the 49000 TWh of energy by 2050 will have 73% of its contribution from renewables. In that hydrogen will have a share of 25%. The new trinity for science will be solar, wind and hydrogen. The leading economies of the world should go for production of green hydrogen in pursuit of the Net Zero goal of the Paris Agreement of 2015. Hydrogen is best suited for converting any biomass and carbon dioxide emanated from different sources, into fuels and chemicals. Hydrogen will also lead, on its own as energy source, to the carbon negative scenario in conjunction with other renewable non-carbon sources such as solar, wind, tidal, geothermal, nuclear or the like. Hydrogenation of biomass leads to many valuable products. So, tomorrow's refineries will be literally carbon dioxide refineries- converting it into hydrocarbons, methanol, dimethyl ether (DME), formic acid, alcohols, syn gas, electricity, hydrogen vehicles, fuel cells, ammonia, and fertilizers, etc. using hydrogen which should be obtained from water splitting. DME is the best replacement for diesel and LPG and the same infrastructure could be utilized. That will lead to carbon-negative economy bringing down the temperature of the globe below

1.5 °C. Today's crude oil-based economy for the manufacture of fuels, chemicals and materials will not have a sustainable future. Faced with the twin challenges of sustaining socioeconomic development and shrinking the environmental footprint of chemicals and fuels manufacturing, a major emphasis is on either converting biomass into low-value, high-volume biofuels or refining it into a wide spectrum of products. Using carbon for fuel is a flawed approach and unlikely to achieve any nation's socioeconomic or environmental targets. In controlling CO2 emissions, hydrogen will play a critical role. Hydrogen is best suited for converting waste biomass and carbon dioxide emanated from different sources, whether fossil or biomass into fuels and chemicals as well as it will also lead, on its own as energy source, to the carbon negative scenario in conjunction with other renewable non-carbon sources. This new paradigm for production of fuels and chemicals not only offers the greatest monetization potential for biomass and shale gas, but it could also scale down output and improve the atom and energy economies of oil refineries. There is also a need to rethink on the ban on single use plastic (SUP) and a new policy is required to encourage general public to pay a deposit on every single article irrespective of size and get it refunded when it is returned which will allow segregation at source. Several hydrogenation reactions can be used to depolymerize or to make fuels from waste plastic and the nasty atoms in the plastic such as Cl, S, N can be converted into HCl, H2S and NH3 and absorbed. Waste plastic is a great source of fuel and chemicals.

Brief bio-data of the speaker

Professor Ganapati D. Yadav is a highly distinguished, unbelievably prolific, and hugely decorated multi-talented engineering scientist in India known for his contributions to Sustainability, Net Zero, Green Hydrogen, Decarbonization, Waste to Wealth covering Green Chemistry, Chemical Engineering, Energy Engineering, Biotechnology and Nanotechnology. He holds titles of National Science Chair (GOI) & Emeritus Professor of Eminence and Former Vice Chancellor of Institute of Chemical Technology, Mumbai having three campuses in India, Mumbai, ICT-IOC Bhubaneswar and Marathwada Jalna. The two additional campuses were his creation and during his tenure ICT received phenomenal funds of INR 1800 Crore. It is a record for any academic leader. Apart from being a great engineering scientist, he is an innovator with 134 Patents, 551 papers, and has guided as a single supervisor 113 Ph.Ds., 153 Masters and 48 Post-docs. He received two honorary doctorates: D.Eng. (NIT-A) and D.Sc. (DYPU Kolhapur). A Wikipedia profile is available on him and there are over 80 video clips on his lectures, addresses and life profile. He is still active in guiding students and transferring technologies to industry. He has been a successful consultant to industry for the past 43 years. He has received over 150 awards, including the Padma Shri in 2016, and was elected to the US National Academy of Engineering (one among 18 living Indians) and the US National Academy of Inventors (only the second Indian). He has been a successful consultant to many industries and sits as an Independent Director on the boards of limited companies including Godrej Industries, Clean S & T, Meghmani Organics, Bhageria Industries and earlier he served on the board of Aarti Industries for 2 terms. His pioneering work in green hydrogen production and CO2 refineries is internationally acclaimed, with three companies currently pursuing commercialization. He is a fellow of all Indian science and engineering academies, TWAS, RSC UK, and IChemE, and serves as President of the Indian Chemical Society. His accolades in 2024 include the SASTRA C.N.R. Rao award and the Advantage India Chemical Conclave Award. With an h index of 70, i10 index of 360 with 18,700+ citations, and over 985 invited & oration lectures, he is recognized as one of Asia's top scientists by Asia Magazine in Singapore. He has served on many committees

of GOI, AICTE, UGC, CSIR, DST, DBT, and professional bodies such as CII, FICCI, ICC, etc. He had the honour of addressing 5 convocations of renowned universities. He is now appointed as the Chairman of the Advisory Committee of the Green Hydrogen platform of Ministry of New and Renewable Energy, Govt. of India.

Highlights & Recommendations

1. Pursue Net-Negative Emissions as a Central Climate Goal
   - Governments, industries, and research institutions must prioritize achieving net-negative carbon emissions rather than just net-zero.
   - This involves removing more CO_2 than we emit through scalable technologies like carbon capture, utilization, and storage (CCUS), and biomass valorization.
   - Carbon should not be part of any fuel mix. Use of bio-fuels such as ethanol is good for a short term to reduce the import bill but in the long run, bioethanol should be used to make chemicals and materials. Ethanol to ethylene will open up 11 major bulk chemicals and 19 speciality chemicals sector.
2. Treat CO_2 as an Asset, Not a Liability
   - Shift the mindset from CO_2 being a pollutant to viewing it as a feedstock for value-added chemicals.
   - Think of CO2 refineries to make many chemicals like methanol, DME, hydrocarbons, LPG and SAF.
   - Promote R&D and industrial integration of CO_2-to-chemicals technologies, especially using waste carbon sources like C1 gases and biomass.
3. Maximize Waste Biomass Valorization and Circular Economy
   - Promote waste-to-resource strategies by converting agricultural and other waste biomass and industrial off-gases into fuels, hydrogen, and chemicals.
   - Integrate recycle engineering and circular economy principles into national sustainability missions to minimize waste and close material loops.
4. Accelerate Green Hydrogen (GH_2) Deployment
   - Recognize GH_2 as the "saviour of the world" in the clean energy transition.
   - Enable mass adoption of ICT-OEC hydrogen production technology, especially with its promise of < USD ~1/kg production cost for 100 TPD.
5. Embed Hydrogen Economy into Climate and Energy Policy
   - Urgently embed hydrogen economy solutions into national strategies to meet Paris Agreement goals.
   - Foster cross-sectoral hydrogen use for energy storage, industry, and transportation by incentivizing R&D, manufacturing, and deployment.
6. Mandate Policy Support and Government Adoption
   - Governments must adopt and invest in the hydrogen economy as a national priority. Govt

of India should encourage industries to be exporters of green energy by 2030 and at least 700 GW renewable energy production should be targeted.

- Introduce policy frameworks that support early adoption, infrastructure development, and public-private partnerships.

7. Foster Confidence: "We Can MAKE IT"

- With innovation, policy support, and collective will, the transition to a hydrogen-powered circular economy is achievable.
- PLI scheme should be applied to green hydrogen and green ammonia and carbon dioxide conversion processes.
- Public campaigns and scientific outreach should reinforce the message: "We can MAKE IT in India."

(iii) **Two-day Workshop on Two-day Workshop on "Applications of Advanced "Analytical Techniques in Research & IndustryApplications of Advanced Analytical Techniques in Research & Industry" on 18-19 February 2025 organized by Centre for Sophisticated Instruments and Facilities (CSIF) IIT Bombay, Sophisticated Advanced Instruments Facility (SAIF) IIT Bombay, and INAE Mumbai Chapter**.

The Centre for Sophisticated Instruments and Facilities (CSIF), IIT Bombay, Mumbai, India in collaboration with the Indian National Academy of Engineering (INAE), Mumbai Chapter organized a workshop on "Applications of Advanced Analytical Techniques in Research & Industry" on 18-19 February 2025 under the Institute of Eminence (IOE) outreach program.

The workshop was inaugurated on February 18, 2025, in the P.C. Saxena Auditorium, IIT Bombay, by Prof. Aniruddha Bhalchandra Pandit, Vice-Chancellor, Institute of Chemical Technology, Mumbai. In his inaugural address, Prof. Pandit emphasized the importance of such workshops and recommended incorporating hands-on training to ensure a deeper and meaningful learning experience for participants. During the inaugural function, Prof. S.V. Kulkarni, Co-Chair, INAE (Mumbai Chapter) and Prof. Anindya Datta, Head CSIF-SAIF, also addressed the gathering.

The workshop focused on the applications of sophisticated analytical equipment and aimed to introduce participants to the latest advancements in instrumentation technology and their practical applications in various industries. The event was designed to explore the integration of these technologies into real-world scenarios and enhance participants' understanding of their operational and strategic benefits.

Objectives: The workshop aimed to:

- Provide an in-depth understanding of advanced analytical instruments across various sectors.
- Highlight the practical applications of these technologies in industries such as healthcare, manufacturing, agriculture, pharmaceuticals, and research.
- Foster collaboration and knowledge exchange among professionals, engineers, and industry experts.

Agenda

The workshop was structured as follows:

- **Opening Remarks**: Introduction to the topic and the significance of sophisticated equipment in modern research and industries
- **Session 1**: Overview of Time-resolved Fluorescence Spectroscopy, 2D NMR Spectroscopy.
- **Session 2**: X ray diffraction, Fundamentals & Applications of FTIR & LRIS
- **Afternoon session**: **Poster presentation** by participants from various universities, institutes, and industries showcasing their research activities.
- **Session 3**: Decoding the role of mycobacterial lipid remodelling, Mass spectrometry in Pharmaceuticals, Evolution of pesticide residue analysis methods using GCMS & LCMS.
- **Session 4**: Introduction to SAXS for structural determination, SAXS: An invaluable tool for Nanomaterials and soft matter, Applications & Advancements in analytical methods for trace and isotopic measurement using ICP-MS, Modern Techniques in Structural Biology.
- **Flash presentation:** Selected participants presented their research findings in brief, impactful sessions.
- **Closing Remarks**: Summary of key discussions and insights along with future outlook on analytical techniques

Speakers and Presenters

The workshop featured several distinguished speakers from academia, industry, and equipment manufacturers covering a range of advanced analytical techniques:

- **Dr. Harilal Bhaskar, National Co-Ordinator I-STEM, Bangalore**- Overview of ISTEM (Indian Science, Technology, and Engineering facilities Map)
- **Prof. Sameer Sapra, IIT Delhi-** Experience with SATHI (Sophisticated Analytical & Technical Help Institutes)
- **Dr. Shreeram Oak - Country Head Bruker India Scientific Pvt. Ltd-** Advances in IR Imaging Microscopy.
- **Mr. Anthony Thomas, Spectro Ametek-** Emerging Trends in Multi-Element Analysis
- **Mr. Chandrakant Pawar, Thermo Fisher Scientific India Pvt. Ltd-** Applications of Mass Spectrometry
- **Prof. Sobhan Sen, JNU, New Delhi-** Measuring Molecular Dynamics from Picoseconds to Seconds using Time-Resolved Fluorescence Spectroscopy: An Introduction
- **Prof. Suvarn S Kulkarni, Chemistry, IIT Bombay-** 2D NMR spectroscopy: a valuable tool for characterisation of organic compounds
- **Dr. A. K. Tyagi, BARC, Mumbai-** X-ray diffraction: An indispensable tool in research and industry
- **Prof. Dipanshu Bansal, Mechanical Engg, IIT Bombay-** Fundamental & applications of FTIR and LRIS
- **Prof. Sobhana Kapoor, Chemistry Dept., IIT Bombay-** Decoding the role of mycobacterial lipid remodelling and membrane dynamics in antibiotic tolerance
- **Dr. Sangeeta Mirgal, Sun Pharma Advanced Research Company, Mumbai-** Mass Spectrometry in Pharmaceuticals: Analysing Small Molecules and Nucleic Acid-Based Therapeutics

- **Dr. Kaushik Banerjee, ICAR, Pune-** Evolution of pesticide residue analysis methods in India based on GC-MS & LC-MS
- **Prof. Guruswamy K Chemical Eng. Dept., IIT Bombay-** Introduction to SAXS for structure determination
- **Dr. Sugam Kumar BARC, Mumbai-** Small-Angle Scattering: An Invaluable tool for Nanomaterials and Soft Matter
- **Prof. Sameer Ranjan, Earth Science Dept., IIT Bombay-** Applications and Advancement in analytical methods for trace and isotopic measurement using Q-ICPMS and MC-ICPMS
- **Prof. Ruchi Anand, Chemistry Dept., IIT Bombay-** Modern Techniques in Structural Biology

During the workshop, participants showcased their research through poster presentations, and selected participants were invited for flash presentations. A committee evaluated the presentations and recommended the best poster and flash presentation awards.

Award Winners:

S. No.	Name of the Participant	Affiliation	Position
1	Revati Dharampal Sagare	KLE College of Pharmacy, Hubli	1st
2	Ameya Narendra Parkar	Institute of Chemical Technology (ICT) Mumbai	2nd
3.	Suchita Gulabrao Waghmare	Dept. of Pharmaceutical Sciences, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur	3rd

Participant Interaction

The workshop was highly interactive, with numerous Q&A sessions following each presentation. Participants had the opportunity to engage in direct discussions with the speakers, seek clarifications, and explore specific topics related to their fields of interest. This interactive format enhanced knowledge exchange and encouraged meaningful dialogue between experts and participants.

Workshop Attendance

A total of 255 participants attended the workshop, with representation of 36 participants from both IIT Bombay and 219 from other institutions.

Conclusion: The workshop was a resounding success, providing participants with valuable insights into the importance of sophisticated analytical instruments. It also highlighted the need for continued innovation and investment in technology to stay at the forefront of scientific and industrial advancements. The event also fostered collaboration and knowledge sharing, further strengthening the bridge between academia and industry.

Recommendations:

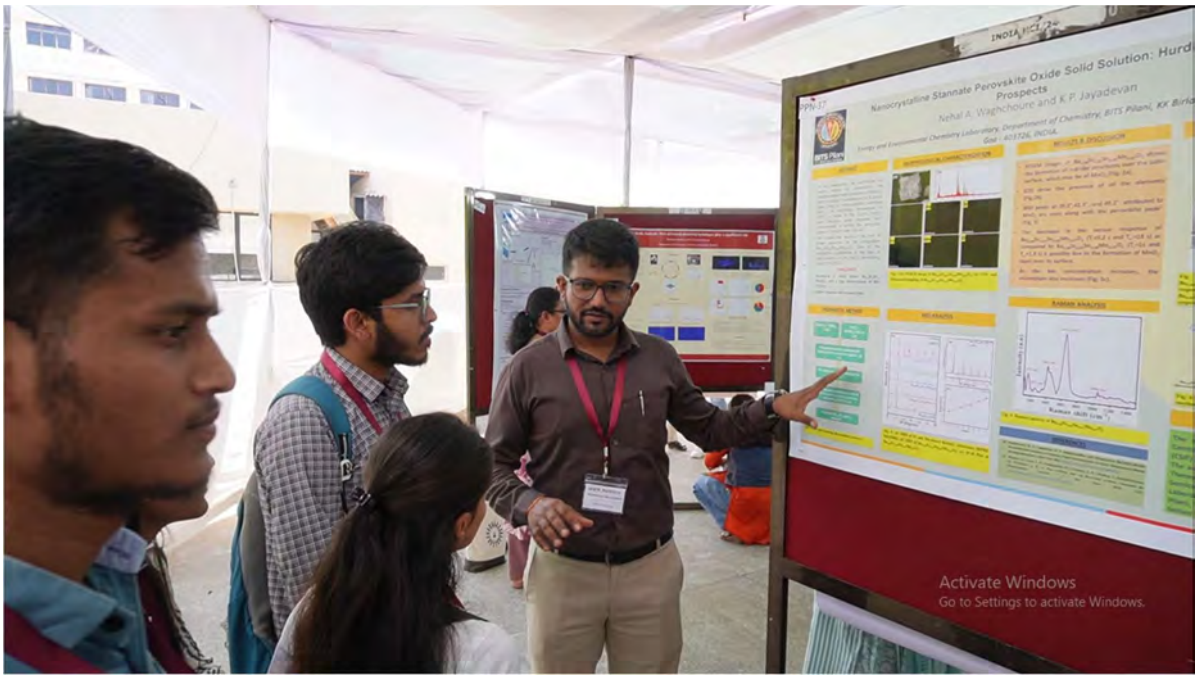
- **Future Workshops**: It is recommended that future workshops focus on the more specific challenges faced by particular sectors in adopting sophisticated equipment.

- **Training Programs**: Companies should consider offering more detailed training sessions for their workforce to effectively integrate and manage new technologies.
- **Collaboration**: Encourage more collaborations between academia, industry professionals, and technology developers to stay ahead of evolving technological trends.

Photographs of the Workshop

Inaugural address by Prof. A.B. Pandit, Vice-Chancellor, Institute of Chemical Technology, Mumbai

Participants interact with speakers and ask specific questions related to their fields of interest



Poster presentation session

Best poster presentation winners

Group photograph during closing ceremony

(iv) **Webinar by INAE Mumbai Chapter on 29th March 2025 on "Navigating the complexities of the nuclear regime" by Dr. R.B. Grover, a member of the Atomic Energy Commission and Chairman of the Board of Research in Nuclear Sciences.**

Abstract: The global nuclear regime is complex, comprising international treaties, UN resolutions, guidelines of the International Atomic Energy Agency, standards of the International Commission on Radiation Protection, and informal understandings. India is engaged in harnessing nuclear science and technology for the welfare of the nation, and while doing so, has honoured its legal obligations and informal understandings. Also, India has demonstrated a commitment to safety by following a science-based approach to regulation. This must continue when India expands the role of nuclear power. The regime's influence on nuclear power arises because of the intertwining of the nuclear fuel cycle for generating electricity and nuclear weapon technologies. This influences the growth of nuclear power. India has been navigating these complexities considering its geopolitical situation and based on its need to exploit nuclear power for national development following an independent path. India's uranium reserves are very modest. Before 2008, India could not import uranium from the international market. Over the years, India has strengthened its science and technology base. This strength resulted in India taking up the diplomatic initiative that led to the Nuclear Suppliers Group amending its guidelines in 2008 to facilitate international civil nuclear trade with India. This has enabled India to take up an ambitious target to expand nuclear power. The talk will briefly cover the complexities of the nuclear regime and explain the need for large-scale exploitation of nuclear power by India.

Brief biodata of Dr. Grover

Dr Ravi B Grover is a member of the Atomic Energy Commission, Chairman of the Board of Research in Nuclear Sciences, and continues to be associated with Bhabha Atomic Research Centre (BARC) and Homi Bhabha National Institute (HBNI). He graduated from the Delhi College of Engineering (DCE), Delhi University and received a Ph.D. from the Indian Institute of Science (IISc). He worked in BARC, the secretariat of the Department of Atomic Energy (DAE), and HBNI. His past positions include Director of the Knowledge Management Group, BARC; Director of the Strategic Planning Group, DAE; Principal Advisor, DAE; Director/ Vice-Chancellor, HBNI; and DAE Homi Bhabha Chair. Working in BARC, he specialized in nuclear reactor thermal hydraulics, process design, and safety analysis. He worked on the design of the research reactor Dhruva and a compact power reactor. In recent years, he has been working on energy studies with special reference to nuclear energy. He participated in negotiations with other countries and international agencies leading to the resumption of international civil nuclear trade. He was the Sous-Sherpa of the Government of India for the Nuclear Security Summits held in 2010, 2012, 2014, and 2016. He has been representing India as the chair of India's delegation to the ITER Council from its beginning in 2006. He played a very significant role in conceptualizing and establishing HBNI and concurrently with other responsibilities, he was its Founder Director/ Vice-Chancellor from 2005 to 2016. He has received many awards including Lifetime Achievement Award for the year 2011 by DAE. He was conferred with a Padma Shri in 2014. He was President of the Indian Society of Heat and Mass Transfer during 2010-13. He is a Fellow of the Indian National Academy of Engineering, the Maharashtra Academy of Sciences, and the World Academy of Art and Science.

Highlights & Recommendations

To reach the decarbonization goals by 2070, Indian electricity generation from all low-carbon sources (variable renewables and nuclear) must be exploited to their full potential, and this must be done using system-level optimization studies. India has honoured its legal obligations and informal understandings to exploit nuclear energy for the welfare of the nation. It is technologically enabled to increase nuclear energy generation further. India has established a science-based approach to regulation, and this must continue as India increases its nuclear-installed capacity. While the use of fossil fuels may continue, the focus must be to perfect carbon capture on an industrial scale in an economical manner. System engineering-backed studies must be pursued to arrive at the optimum symbiosis between electricity storage and hydrogen generation as energy carriers. The amendment to the Atomic Energy Act is important to reach our targets of nuclear power generation. The operator of a nuclear power plant must be informed about obligations regarding safety, security, safeguards, design authority, decommissioning, and waste management. This can best be done by explicitly including all these issues in the Atomic Energy Act and the Rules promulgated under it. Therefore, amending the Atomic Energy Act is important. In addition, education must be imparted about the requirements of safety and civil nuclear liability.

INAE Bhubaneswar Chapter

(i) 35th Distinguished Lecture Lecture- 35 of INAE Distinguished Lecture Series jointly organised by INAE Bhubaneswar Chapter, SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Prof. Dipti Ranjan

Sahoo, Associate Dean (Infrastructure), Professor of Structural Engineering, Department of Civil Engineering, Indian Institute of Technology Delhi on 9th May, 2024 on "Anti-seismic devices for earthquake resilient infrastructure" was held online.

Key Points: Seismic resiliency of civil infrastructure is extremely important to minimize the unexpected loss of life and properties in the event of a moderate or major earthquake. Traditionally, earthquake-resistant design methods allow the structures to undergo controlled and repairable damages. Unfortunately, many past earthquakes have witnessed the complete collapse of code-compliant structures. In recent years, several vibration control techniques have been developed aiming to mitigate earthquake-induced disasters. This lecture highlighted the concepts of seismic-resilient design utilizing the recently developed low-cost and affordable anti-seismic devices. A variety of such devices developed using steel and other smart materials were discussed. Finally, the issues and challenges in designing seismic-resilient infrastructure shall be highlighted.

You tube Video Recording Link : https://youtu.be/V81IRmXUG7g

People Participated: 53

(ii) 36th Lecture of the INAE Distinguished Lecture Series jointly organised by INAE Bhubaneswar Chapter, SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Prof. Partha P. Chakrabarti**,** Dept of Computer Science and Engineering, Indian Institute of Technology Kharagpur on the topic "Artificial Intelligence - Emerging Face of Scientific, Industrial and Social Revolution: Challenges and Opportunities for India" on 17th May 2024 in virtual mode.

Key Points: This talk provided a glimpse of modern Artificial Intelligence and Machine Learning (AI/ML) and showcased its power and scope in solving scientific, industrial and social problems in a new way. It also highlighted the dangers of using AI/ML in an inappropriate manner and the precautions to be taken. Finally, the talk presented the challenges and opportunities that it offers for a country like India and its aspirations.

You tube Video Recording Link : https://youtu.be/MKkxe05Giqs

People Participated: 65

(iii) 37th Distinguished Lecture of INAE Distinguished Lecture Series was jointly organised by INAE Bhubaneswar Chapter, SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Prof. Venkatesh Kodur, University Distinguished Professor and Director, Michigan State University, USA on 18th July, 2024 on "World Trade Center Building Disaster: Stimulus for Fire Safety Innovation" in virtual mode.

Key Points: Fire represents one of the most severe environmental hazards to which buildings and built infrastructure is subjected to, and thus provision of appropriate fire safety measures is a major requirement in building design. Fires can threaten life safety and also can lead to significant economic and public losses. The magnitude of fire problem is getting worse in recent years, especially in countries like India, due to increasing urbanization, higher fuel loads in buildings, innovative structural and architectural concepts, and the use of high performing construction

materials with poor fire resistance properties. However, much of the fire safety design provisions in current building codes and standards are based on outdated prescriptive based methodologies that may not be fully applicable to current design scenarios.

The September 11th World Trade Center (WTC) disaster, in which fires played a major devastating role in the loss of life and the destruction of numerous buildings around Ground Zero, offers an ideal case study to highlight the drawbacks in the current fire safety provisions, and to explore innovative strategies for enhanced fire safety in buildings. This 9-11 terrorist incident was the worst building disaster in history resulting in the largest loss of life from building collapses in North America. Following the disaster, the Federal Emergency Management Agency (FEMA), the American Society of Civil Engineers (ASCE), the City of New York, and several other federal agencies and organizations established a high-profile "Experts Team" to investigate the collapse and damage to the buildings around Ground Zero. This 'Building Performance Assessment Team' (BPAT) investigation comprised of site visits to Ground Zero, forensic survey of the WTC site, land-fill, and steel recycling centres, review of videotape records and eyewitness accounts, interviews with building design teams, and analysis using computer models. Based on this information, the team produced a detailed report with a number of recommendations for achieving enhanced fire safety in buildings, and this investigation report was submitted to US Congress. The lessons learned from this investigation offer a unique opportunity to develop innovative strategies and technologies for minimizing the adverse impact of fire hazard in built infrastructure.

In the first part of the presentation, an overview of the results from the building performance investigation of the WTC disaster was presented. The overall damage to the buildings and infrastructure in "Ground Zero" area was reviewed and discussed. The devastating role of fires and the combined failure of all three levels of fire defense mechanisms that led to collapse of the Twin Towers and other buildings were explained. The conclusions and recommendations, documented in the FEMA and National Institute of Standards Technology (NIST) reports, were summarized. In the second part of the presentation, fire performance problems in modern buildings and infrastructure were discussed and the drawbacks in current fire safety design provisions were highlighted. The various innovations and technologies that are needed to address fire safety issues in modern buildings and infrastructure were highlighted. In addition, some of the recent changes being implemented in the US codes and standards for enhanced fire safety in buildings were outlined.

People Participated: 48

(iv) 38th Lecture of the INAE Distinguished Lecture Series was jointly organised by INAE Bhubaneswar Chapter, SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Prof. Radhakant Padhi, Professor, Indian Institute of Science, Bangalore on the "Autopilot Inspired Artificial Pancreas for Type-1 Diabetic Patients of India" on 19th July, 2024 in virtual mode.

Key Points: Type-1 diabetic patients have pancreatic failure and are incapable of secreting any insulin to the blood plasma. Hence, if untreated, they cannot live for long time. The current practice, which is largely followed in the world, is through daily multiple insulin injections. Unfortunately, however, besides being a painful practice, it normally leads to gross inaccuracies, thereby not being able to harvest the full potential of insulin. Fortunately, commercially available insulin pumps

are now available which can be programmed to deliver the desired amount of insulin in a very slow rate. However, because they operate continuously for a long time, inaccuracies in manual programming also leads to inaccuracies leading to glucose excursions beyond the desired limits. To address this issue, the current approach in the world is to develop a robust closed-loop feedback system, called artificial pancreas, wherein a small amount of insulin is continuously infused to the patient's body through the subcutaneous route by an insulin pump, depending on the situation of the patient as sensed by a subcutaneous CGM sensor.

This talk gave an overview of the Artificial Pancreas (AP) concept, followed by the specific activities being carried out by the speaker at the Indian Institute of Science, in collaboration with MS Ramaiah Medical College, in Bangalore, towards the development of an effective artificial pancreas system for Type-1 diabetic patients of India. A large part of this research has been inspired by the speaker's experience in designing AP (auto-pilot) systems for aerospace systems. From a modest beginning in 2017, substantial progress has been made in both back-end and front-end developments, leading to successful lab testing followed by clinical trials under controlled environment. The current status of this research as well as the future plan of action towards realizing this dream were outlined in this talk.

People Participated: 96

(v) 39th Lecture of the INAE Distinguished Lecture Series was jointly organised by INAE Bhubaneswar Chapter, SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by 39th Distinguished Lecture by INAE Bhubaneswar Chapter on "Human-Centric Manufacturing - a new era" by Prof. Surjya K. Pal, Professor, IIT Kharagpur on 30th September 2024 in virtual mode**.**

Key Points: The transition from handmade tools and steam-operated machines to internet-driven operations clearly illustrates that technology is the cornerstone of industrial growth. While automation, digitization, and data-driven processes have long been integrated into various industries in the era of Industry 4.0, the human-centric approach was lacking in this industrial revolution. Industry 5.0 introduces human-centric innovation by integrating human intelligence with the capabilities of machines, artificial intelligence, and robotics. With the three pillars of Industry 5.0, namely, human-centric, resilience and sustainability, it incorporates human-machine collaboration for improved decision making, work-life balance and adaptability of process. Describing the different enabling technologies and techno-functional principles of Industry 5.0, this presentation aimed to provide a comprehensive understanding on the role of humans as creative decision-makers while machines handle repetitive or dangerous tasks. Key elements of this presentation included cognitive artificial intelligence (C-AI). Moreover, it also showcased some case studies on applications of C-AI in manufacturing, developed at Centre of Excellence in Advanced Manufacturing Technology. Overall, this presentation emphasized the importance of human factors to have a symbiotic relationship with machines, to achieve improved productivity, safety, and efficiency in today's manufacturing.

You Tube Video Recording Link : https://youtu.be/DDA_KIpfZk8

People Participated: 66

(vi) The 40th Distinguished Lecture of INAE Distinguished Lecture Series was jointly organised by INAE Bhubaneswar Chapter, SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Prof. Sudeshna Sarkar, Professor, Department of Computer Science & Engineering, IIT Kharagpur on 1st October 2024 on "Uncovering Bias and Perspectives in News: NLP Approaches for Automated Content Analysis" in virtual mode.

Key Points: In today's media landscape, where news reporting is often subjective, understanding diverse perspectives is essential. This talk delved into automated news content analysis using Natural Language Processing (NLP) techniques to extract events and arguments, and for examining biases and variations in news coverage. They focused on identifying selection, coverage, and statement biases through both machine learning (ML) and large language model (LLM)-based approaches. Key tasks included event extraction, stakeholder analysis, sentiment prediction, and bias detection, with a particular emphasis on few-shot and zero-shot settings to enhance model generalizability across various news domains. Notable contributions include a joint event extraction model, a natural language inference method for news aspect identification, and stakeholder classification using P-tuning. Additionally, they explored methods to mitigate sentiment bias in news articles using sentence rewriting techniques. This research introduces innovative methodologies, advancing computational journalism and providing valuable tools for analyzing modern media narratives.

You Tube Video Recording Link : https://youtu.be/U2L9wdbXTNk

People Participated: 62

(vii) The 41st Distinguished Lecture of INAE Distinguished Lecture Series was jointly organised by INAE Bhubaneswar Chapter, SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Dr. Shankar S Mantha, Chancellor, RB University, Nagpur on 3rd October, 2024 on "AI in Education" in virtual mode.

Key Points: The application of Artificial Intelligence (AI) in education holds the potential to revolutionize the learning experience for both educators and students. AI technologies, such as sentiment analysis algorithms, can be trained to interpret complex emotions and concepts, including those found in Sanskrit Shlokas. By identifying not only the positive or negative sentiments but also the specific emotions conveyed in the text, AI offers deeper insights into educational content and emotional intelligence, paving the way for more personalized and effective learning experiences.

You Tube Video Recording Link : https://youtu.be/zs7Mibf94vM

People Participated: 49

(viii) The 42nd Distinguished Lecture of INAE Distinguished Lecture Series was jointly organised by INAE Bhubaneswar Chapter, SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Prof. Debdeep Mukhopadhyay, Institute Chair Professor, Dept. of Computer Science and Engineering, Indian Institute of Technology Kharagpur on 30th October, 2024 on "Hardware Security in the Modern World: From Things to Cloud" in virtual mode.

Key Points: Cryptography plays a vital role in securing electronic transactions. However, in spite of their mathematical robustness when these algorithms are translated to concrete implementations there can be opportunities for attacks due to weaknesses in underlying implementations. Hardware Security addresses this gap between theory and practice, and attempts to model these menacing side-channel leakages. The talk emphasized some key findings in this amazing journey of translating crypto-theory to practically secure-systems, starting with an optimal differential-fault-analysis of the Advanced-Encryption-Standard, which is the de-facto standard block-cipher world-wide. Subsequently, a quick peek was taken into the contributions in fault-tolerance in cryptography, where the researchers unearth how countermeasures can be compromised using novel fault-analysis, along with how such countermeasures can be assessed for leakage using scalable test-methodologies. The talk then shifted its focus to the domain of micro-architectural leakages which presents some of the earliest reports world-wide of exposing how computer architecture developed with only performance in perspective can compromise ciphers. The talk subsequently briefed their fundamental contributions in promoting usage of novel hardware-security primitives, called Physically-Unclonable-Functions for authentication in resource constrained environments, like Internet-of –Things (IoT). The talk concluded with their recent break-through in making encrypted-search a reality, addressing privacy concerns in the pervasive cloud.

You Tube Video Recording Link : https://youtu.be/DnF9QUmb5aY

People Participated: 178

(ix) The 43rd Distinguished Lecture of INAE Distinguished Lecture Series was jointly organised by INAE Bhubaneswar Chapter, SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Dr. Shibashish Giri, Endogenous stem cell specialist in Medical Research and Therapy in Medical faculty of University of Leipzig and Technical University of Munich, Germany and Chief Scientific Officer (AB Company, UK, USA) adjunct professor in MIPT, Moscow, Russia and other European Universities on 13th November, 2024 on "Nobel Discoveries for Health and wellness" in virtual mode.

Key Points: The Nobel Prize-winning technology of 2023 in medicine have witnessed a revolutionary development in the field of mRNA technology in medicine, have now become universally accepted for best solution for both early diagnostic as well as for therapeutic applications for all kind of diseases. The researchers have also discovered wide range of mRNA and established mRNA profiles to detect diabetic, prediabetic, osteoporosis, heart blockage, liver cancer, fatty liver and breast cancer in 5 to 7 years in advance. Conventional diagnostics are complex, expensive and time consuming, but the mRNA diagnostic could be a simple, blood based super sensitive diagnostic tool to detect the diseases in very early stage. Crucially, mRNA technology is simple enough that it should be possible to make these next generations of treatments and diagnostic wide range diseases around the world including Odisha, at low cost, even in places with few resources. The mRNA-based inventions presented could be a next generation state-of-the-art technique in early diagnostic tools production and have huge therapeutic potentials.

You Tube Video Recording Link : https://youtu.be/AyvTe6U2tQU

People Participated: 125

(x) The 44th Distinguished Lecture of INAE Distinguished Lecture Series was jointly organised by INAE Bhubaneswar Chapter, SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Prof. Ashok Kumar Gupta**,** Professor (HAG) in the Environmental Engineering Division in the Department of Civil Engineering at the Indian Institute of Technology Kharagpur on 14th November 2024 on "Transforming India's water and wastewater management: Treatment technologies, Sustainable Practices, and Resource Recovery" in virtual mode.

Key Points: With the advent of human civilization, water and wastewater management have been integral aspects of human life, as evident from the developments of the Indus Valley civilization. While certain challenges remain unchanged, such as the need for clean water, advancements in technology, and population growth have introduced new complexities that must be addressed scientifically and sustainably. In this regard, the presentation addressed the state of water and wastewater management in India. It emphasized the amount of wastewater generated, existing treatment technologies, and policy aspects. It also highlighted natural and sustainable methods for treating wastewater, along with effective fecal sludge management techniques and resource recovery practices. Additionally, the discussion covered current water demand, the installed capacity of water treatment plants, and innovative space-saving technologies. Furthermore, various government initiatives for water supply in both rural and urban areas were presented. By focusing on these aspects, the presentation aimed to provide insights into the challenges and solutions for managing water resources effectively across the country.

You Tube Video Recording Link : https://youtu.be/oiMu_FZ7t8Q

People Participated: 65

(xi) The 45th Distinguished Lecture of INAE Distinguished Lecture Series was jointly organised by INAE Bhubaneswar Chapter, SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Prof. Makarand Madhao Ghangrekar, Director of National Institute of Technology, Puducherry and Professor in Department of Civil Engineering, IIT Kharagpur on 16 November, 2024 on "Biological and bio-electrochemical wastewater treatment technologies and their efficacies for imparting sustainability to wastewater treatment".

Key Points: Growing scarcity of fresh water reserves and ever-increasing demand for water have led to a condition where the option of reuse of treated wastewater need to be encouraged. Innovative wastewater treatment plants aiming not only at treating the wastewater, but also providing benefits, such as facilitating reuse of treated water, resources or nutrient recovery, are the need of the day. Conventional sewage treatment either require huge land or high capital, maintenance and operational costs, and/or huge energy requirements; which make them unsuitable for use in developing countries. Energy efficient low-cost wastewater treatment systems are the best choice for such countries. Anaerobic treatment systems excel in such respect. A pilot-scale (400 m3/day) up-flow anaerobic sludge blanket-moving bed biofilm (UASB-MBB) reactor followed by a high-rate algal pond (HRAP) was designed, constructed and operated to remove organic matter, nutrients and pathogens from low strength sewage (chemical oxygen demand, COD, of about 230 mg/L) generated on campus. This UASB reactor demonstrated annual average total COD removal

efficiency of 63 ± 8% and total suspended solids (TSS) removal of 86 ± 7%. The HRAP following UASB reactor demonstrated nitrogen removal of 85 ± 3%, phosphate removal of 91 ± 1% and up to 3 log coliform reduction, thus producing treated effluent suitable for horticulture reuse. Biomass granulation has been achieved in the UASB reactor, which has not been reported earlier anywhere while treating such low strength sewage, which was possible due to proper hydrodynamic design.

On Campus of IIT Kharagpur two sewage treatment plants with capacity of 300 m3/day and 1350 m3/day, comprising of moving bed biofilm reactors and tertiary treatment combinations are installed. Performance of these plants along with life cycle costing will be presented. For the higher capacity plant the life cycle cost of producing nearly potable quality treated water is less than 11.0 Rs. Per kL.

Bio-electrochemical systems (BES) have a potential to offer sustainable wastewater treatment and simultaneously recover valuables. This technology is likely to evolve as a way of treating sewage, industrial or agricultural wastewaters and at the same time produce electricity, hydrogen or other chemicals of high value. Thus, by adopting BES, the wastewater can be regarded as a resource, rather than a problem that demanding costly treatment.

Microbial fuel cell (MFC) is one of the popularly adopted configuration of BES, and scientist have widely explored it for treatment of various wastewaters, using them as fuel, and recovering direct electricity for onsite use. However, practical applications of MFCs are limited because of higher fabrication cost of it due to involvement of costly membrane and electrode catalyst. The research efforts undertaken at IIT Kharagpur on development of low-cost ceramic membrane separator and non-platinum-based electrode catalysts for application in MFC considerably reduced the fabrication cost. Utilizing outcome of these investigations a largest (1500 L) pilot-scale MFC based onsite sewage treatment system is designed and constructed at IIT Kharagpur campus. Performance of this 'Bioelectric Toilet (BET)' system for more than two years was satisfactory. This BET is able to treat waste generated from the toilet onsite to produce electricity for illumination of toilet cabin and premises at night and produce reusable quality treated water for flushing the toilet, thus considerably reducing water consumption per use of toilet. In addition, this BET eliminates the problem of smell nearby the toilet due to effective treatment of the waste.

You Tube Video Recording Link https://youtu.be/gQCL0Lt3-lY

People Participated: 77

(xii) The 46th Distinguished Lecture of INAE Distinguished Lecture Series was jointly organised by INAE Bhubaneswar Chapter, SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Prof. Hirendra N. Ghosh, Director and Senior Professor of National Institute of Science Education and Research, Bhubaneswar, Odisha on 26th November, 2024 on **"**Ultrafast Charge Carrier Dynamics of 2D-Transition Metal Chalcogenides Based Heterosystems" in virtual mode.

Key Points: In the last decade, two-dimensional (2D) transition metal dichalcogenides (TMDCs) have received substantial attention due to their high surface-to-volume ratio, excellent charge transfer capacity, low synthesis cost, mechanical strength, and low bandgap energy. Particularly, the layered nature of 2D TMDCs facilitates their integration with other materials to form

heterostructures, thereby extending device functionalities and boosting the performance of related optoelectronic devices. The many-body quasiparticles like excitons, biexcitons, and trions play a crucial role in the optoelectronic and photovoltaic applications of 2D heterostructures. To design and develop efficient devices using these heterostructure materials, it is crucial to understand the mechanisms of formation, transportation, and relaxation of free carriers, excitons, and trions, as most of these processes occur on fast and ultrafast time scales. Ultrafast pump-probe spectroscopic studies can play a crucial role in investigating these processes on extremely short (sub-picosecond) time scales. Therefore, in this presentation, we aim to provide a detailed spectroscopic overview of the intricate charge carrier dynamics within 2D TMDCs heterostructures-based solar energy harvesting materials using cutting-edge ultrafast transient absorption and terahertz spectroscopy techniques. We designed various 2D TMDC heterostructures, such as 2D/0D (MoS2/Au nanoparticles), 2D/1D (MoS2/CdS), 2D/2D (WS2/Au nanofilm) and 2D/3D (WS2/Ni-doped CsPbI3) and explored the quasiparticle dynamics at their interface to enhance the performance of the fabricated optical devices. The conclusions drawn from our study state that a comprehensive understanding of the charge carrier dynamics would create a new avenue toward the advancement of 2D TMDC-based heterostructure in optoelectronic applications.

You Tube Video Recording Link : https://youtu.be/7hKFmsGgNJ0

People Participated: 65

(xiii) The 47th Distinguished Lecture of INAE Distinguished Lecture Series was jointly organised by INAE Bhubaneswar Chapter, SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Mr Skuanta Nanda**,** Architect and Mentor, AI and HPC Research Center, IIT Bhubaneswar on 28th November, 2024 on "Cybersecurity Attacks and Risk Mitigation Strategies for Critical Infrastructures' in virtual mode.

Key Points: Cybersecurity attacks on critical infrastructures pose significant risks, as these systems are increasingly interconnected and reliant on digital technologies. Major sectors such as energy, water, and transportation are prime targets for cybercriminals, with ransomware and Distributed Denial of Service (DDoS) attacks being particularly prevalent. For instance, the Colonial Pipeline incident in 2021 exemplified the severe operational disruptions caused by ransomware, leading to widespread fuel shortages across the East Coast of the United States.

To mitigate these risks, organizations must adopt comprehensive cybersecurity strategies that include regular system updates, employee training on phishing recognition, and robust incident response plans. Implementing network segmentation and intrusion detection systems can enhance defenses against unauthorized access and control over critical systems. Furthermore, collaboration between government agencies and private sectors is essential to establish effective protection frameworks and share best practices for safeguarding vital infrastructure against evolving cyber threats.

You Tube Video Recording Link : https://youtu.be/No4MYtQY2mE

People Participated: 60

(xiv) The 48th Distinguished Lecture of INAE Distinguished Lecture Series was jointly organised by

INAE Bhubaneswar Chapter, SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Prof. Pradip Dutta Professor, Centre for Energy Research, Department of Mechanical Engineering, Indian Institute of Science, Bangalore on "Transition to Clean Energy – New R&D Opportunities for Engineers" on November 30, 2024

Key Points: Today, the world is facing a major crisis in the form of environmental degradation and climate change. In view of this, governments, international think tanks and policy makers are framing new regulations to phase out conventional green-house gas emitting technologies and give way to newer technologies and practices to arrive at a net-zero emission target within a stipulated timeframe. These new policies and regulations are leading to disruption in energy production as well as usage, with greater emphasis on cleaner and renewable energy production, electrification in the transport sector and decarbonization of industrial processes. This talk highlights the global trends in clean energy implementation, and analyses some of the alternatives being pursued. New R&D opportunities, scope for indigenization, and critical role of core engineering disciplines, such as mechanical engineering, in the transition process are also discussed. In addition, some R&D initiatives taken by the speaker's research group are highlighted.

You Tube Video Recording Link : https://youtu.be/TzFMazIzKJc

People Participated: 78

(xv) The 49th Distinguished Lecture of INAE Distinguished Lecture Series was jointly organised by INAE Bhubaneswar Chapter, SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Prof. Sunil Murlidhar Shastri, Consultant, Educator and Speaker in Ocean and Environmental Governance on 6th December, 2024 on "One Ocean, Three Approaches, Five Issues, Seven Solutions" in virtual mode.

Key Points: This talk was based on the philosophy Sunil has adapted, developed, and nurtured throughout his career of over four decades, mainly shaped and formed initially under the tutelage of Elisabeth Mann Borgese. At the heart of the philosophy is how we might inculcate the idea of One Ocean in thought, word, and action. Just as we have only one Planet, there is only one Ocean and not the three or five or seven that our nomenclatures have hitherto defined and described. Having given this reason for his assertion, Prof. Sunil Murlidhar Shastri moves on to the three approaches, namely, advice, advocacy, and action which he had adopted during the latter half of his career as a consultant, educator and speaker and his related pro-bono work. He then introduces five crucial issues or rudimentary questions that address the contemporary concerns which form the very basis of the existence of our civilisation as we have known and imagined. Finally, he talks about the solutions in the form of what he calls the Seven Pillars of Ocean and Environmental Governance explaining how each one of us belongs to at least one of these pillars and which we can adopt and support in our own professional and personal lives and how education and awareness, a pillar which has been central to his entire professional career, may well be looked at as a critical and crucial central pillar.

You Tube Video Recording Link : https://youtu.be/qRKbiPyFzF0

People Participated: 43

(xvi) The 50th Distinguished Lecture of INAE Distinguished Lecture Series was jointly organised by INAE Bhubaneswar Chapter, SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Prof. Jyotsna Dutta Majumdar, *FNAE*, Institute Chair Professor, Dept. of Metallurgical & Materials Engineering, Indian Institute of Technology Kharagpur on 10th December, 2024 on "Increased Lifetime of Metallic Bio-Implants by Surface Engineering" in virtual mode.

Key Points: Commonly used metallic materials for bio-implant applications are titanium and its alloys, AISI 316L stainless steel, Nitinol and Co-Cr-Mo alloy. Metallic implants are mostly applied as implants for hard tissue replacement like orthopedic, dental and cardiovascular implants. However, the challenges associated with long term application of metallic implants include its progressive failure due to chemical, mechanical and mechano-chemical interactions in human body, poor osseointegration and biofilm formation. Increasing lifetime of metallic implants is extremely important to minimize implant failure within human body to avoid revision surgery or inflammation within human body. Surface engineering is a tool which may be applied on finished bio-implant to improve its physical, chemical and mechano-chemical properties. However, a proper designing of surface and choice of optimum process and process parameters are mandatory steps prior to its application for specific purposes.

In the present talk, followed by a detailed overview of the cause of reduced lifetime of metallic implants, application of different surface engineering techniques to minimize failure of bio-implant were discussed. The research activities on applications of advanced surface engineering tools like laser and plasma assisted surface engineering techniques in prevention of failure of metallic implants made of Titanium, AISI 316L stainless steel and Magnesium alloys were also be discussed. Finally, the future direction of research in this direction was stated.

You Tube Video Recording Link: https://youtu.be/2B-zQD7vlnE

People Participated: 83

(xvii) The 51st Distinguished Lecture of INAE Distinguished Lecture Series was jointly organised by INAE Bhubaneswar Chapter, SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Prof. Durga Misra, Department of Electrical and Computer Engineering, New Jersey Institute of Technology, Newark on 30th December, 2024 on "Low Power Devices for In-Memory Computing Hardware" in hybrid mode.

Key Points: Data conversion, storing in volatile memories, transmission, and computation impose high energy consumption, latency, and a memory bottleneck. To achieve energy efficiency new low power nanoscale devices are required for the integration of sensing and in-memory computation to efficiently enable Artificial Intelligence (AI) on resource-limited systems. Resistive random-access memory (ReRAM) devices are currently being investigated for possible implementation of artificial intelligence hardware through in-memory computing. The electrical performance in these devices depends on the dielectric deposition process, precise selection of deposition parameters, pre-deposition surface treatments and subsequent thermal budget. The talk will discuss the ReRAM devices with hydrogen plasma treated HfO2 that have shown low power switching and good conductance quantization with programing pulsed operation that qualify them to be used for

in-memory computing. Engineering the distribution of defects or oxygen vacancies near the top and bottom electrodes has a significant impact on reducing the switching power and improving the multi-level cell (MLC) characteristics of the device.

About the Speaker: Prof. Durga Misra is a Professor and Chair of the Department of Electrical and Computer Engineering, New Jersey Institute of Technology, Newark, USA. His current research interests are in the areas of nanoelectronic devices and circuits, especially in the area of nanometer CMOS gate stacks and switching devices. He is Fellow of IEEE. He is a Distinguished Lecturer of IEEE Electron Devices Society (EDS). He is, also a Fellow of the Electrochemical Society (ECS). He received the Thomas Collinan Award from the Dielectric Science & Technology Division and the Electronic and Photonic Division Award from ECS. He edited and co-edited more than 50 books and conference proceedings in his field of research. He has published more than 200 technical articles in peer reviewed Journals and in International Conference proceedings including more than 100 Invited Talks. He has graduated 20 PhD students and 55 MS students. He received the M.S. and Ph.D. degrees in electrical engineering from the University of Waterloo, Waterloo, ON, Canada, in 1985 and 1988, respectively.

You Tube Video Recording Link : https://youtu.be/4mJ8KsH7pXU

People Participated: 40

(xviii) The 52nd **lecture** of the INAE Distinguished Lecture Series was organized by INAE Bhubaneswar Chapter, jointly with SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Prof. Swagata Dasgupta, Department of Chemistry, IIT Kharagpur on 30th January, 2025 on "The Twists and Turns of Protein Chemistry".

Key Points: Proteins and their interactions are the backbone of biochemical events in which molecular recognition is known to play a major role. Changes can affect the structural and biochemical properties of a protein that in turn alters its ability to bind other molecules, called ligands, that comprise small molecules to large macromolecules. Modifications in proteins account for structural and functional changes that can have an impact on several disease processes. Protein – ligand interactions are influenced by several factors from binding site sequence information, to local biochemical properties of binding sites. Carrier proteins such as human serum albumin to enzymatic proteins such as ribonuclease A and angiogenin as well as structural proteins such as -crystallin have been our proteins of interest. Methods to combat oxidative stress in proteins are based on interaction studies of polyphenols and encapsulated polyphenols with proteins. The effects of glycation on several proteins have shown that reducing sugars are responsible for oligomer formation in proteins. Our studies have provided important insights on the consequences of oxidative stress and glycation in proteins through biophysical studies where structural and functional changes are observed. Interactions of proteins with nanoparticles have also been an interesting area of study.

You Tube Video Recording Link : https://youtu.be/h-U8R0r3ohU

People Participated: 48

(xix) The 53rd lecture of the INAE Distinguished Lecture Series was organized by INAE Bhubaneswar Chapter, jointly with SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER

Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Dr. Prasanta K Mishra on 310th February, 2025 on "An Ounce of Practice Values More Than Tons of Preaching".

Key Points: "The most startling advances have their origin at the boundaries of the specialties, where the techniques developed in one field are applied with fertile effect, to the subject matter of another... If this cross-fertilization dwindles, the rate of scientific advance will almost surely dwindle as well, and so anything that encourages cross-fertilization is all to the good…", said the great Philosopher, Isaac Asimov.

Bio-Data: Born in Cuttack, Orissa in 1945, Dr Prasanta Kumar Mishra schooling from P M Academy, Cuttack in 1959, joined Ravenshaw College and graduated in Mechanical Engineering (BSc Engg), 1966 batch from Regional Engineering College (presently NIT), Rourkela. He obtained his Master of Mechanical Engineering (MME) degree in Machine tools and Production Engineering discipline in 1969 and PhD in Engg (Spark-erosion) in 1974 from Jadavpur University Calcutta. His main interest lies in Advanced Manufacturing Science (Process innovation with Design and Prototype Machine Development), including developing new hybrid manufacturing processes and propagate the knowledge of microsystems) technology to manufacture value-aided products that changes the economy in rural -sectors in India.

You Tube Video Recording Link : https://youtu.be/yEElCXUQpUs

People Participated: 52

(xx) The 54th lecture of the INAE Distinguished Lecture Series was organized by INAE Bhubaneswar Chapter, jointly with SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Prof. Susmita Sur-Kolay, Visiting Professor, Dept. of Computer Science, Ashoka University.on 18th February, 2025 on "Design Automation for Quantum Computing Systems".

Key Points: "The two major drivers for the paradigm of quantum computing have been to overcome the limitations of classical deterministic digital computers in terms of both computational complexity and fabrication technology.

In this talk, she introduced the basic model of quantum computing. Next, she gave a snapshot of algorithms for certain problems for which remarkable speed-up over classical computing has been achieved by quantum computing. Then, with a brief sketch of the progress in technology, she presented specific challenges in design automation for quantum circuits comprising a cascade of error-prone gates. While error correction is indispensable for quantum computing, classical error correction codes are not applicable. Hence, quantum error correction codes are required. However, this demands more quantum resources which are very expensive, which calls for algorithms to optimize the quantum circuits for obtaining reliable outcomes of a quantum computing system.

Bio-data: Prof. Susmita Sur-Kolay received the B.Tech.(Hons.) degree in Electronics and Electrical Communications Engineering from Indian Institute of Technology Kharagpur and the Ph.D. degree in Computer Science and Engineering from Jadavpur University India. She has been a faculty member in the Advanced Computing and Microelectronics Unit of the Indian Statistical Institute, Kolkata, India since 1999 and retired as a Professor in 2024, She is now a Visiting Professor of Computer Science at Ashoka University. During the period 1993-99, she was a Reader in the Department of

Computer Science and Engineering of Jadavpur University. Prior to that, she was a postdoctoral fellow at University of Nebraska-Lincoln, and a Research Assistant at the Laboratory for Computer Science in Massachusetts Institute of Technology. She was also on sabbatical at Princeton University and Intel Corp., USA. She is presently a KIT International Excellence Fellow. Her research contributions are in the areas of algorithmic design automation for VLSI physical design, fault modeling and testing, synthesis of quantum computers, and graph algorithms. She has co-authored several technical papers in leading international journals and refereed conference proceedings, a chapter in the Handbook on Algorithms for VLSI Physical Design Automation and co-edited three books. She was the General Co-Chair of the 29th International Conference on VLSI Design (2016), the Technical Program Co-Chair of the 18th International Conference on VLSI Design (2005), the 11th Symposium on VLSI Design and Test (2007), and ISVLSI (2011) and has served on the program committees of several international conferences. She was on the editorial board of the IET Computers and Digital Techniques, and IEEE Transactions on VLSI Systems. She was a Distinguished Visitor of IEEE Computer Society (India), and is a Fellow of Indian National Science Academy and of Indian National Academy of Engineering, Senior Member of IEEE, Member of ACM, IET and VLSI Society of India. Among other awards, she was the recipient of the President of India Gold Medal (summa cum laude) and Distinguished Alumnus Award at IIT Kharagpur, IBM Faculty Award and Women in Technology Leadership from VLSI Society of India.

You Tube Video Recording Link : https://youtu.be/3DbvQkImXs0

People Participated: 55

(xxi) The 55th lecture of the INAE Distinguished Lecture Series was organized by INAE Bhubaneswar Chapter, jointly with SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Prof. Sarit K. Das, Institute Professor, Indian Institute of Technology Madras, Chennai on 25th February, 2025 on **"**Revitalizing Nanofluids: Three Decades of Evolution, Challenges, and Breakthroughs in Thermal Management and Beyond".

Key Points: At the beginning of the century nanofluid came with a huge promise in the arena of thermal management technologies. This included electronic cooling, cooling of laser equipment and material processing. However, some controversies regarding stability and the magnitude of property enhancement put breaks on its progress towards full potential of its usage. Nanofluids, which are dilute suspensions of nanoparticles in Newtonian liquids has got very different natures concerning stability, transport properties and dispersion dynamics. However, the above phenomena critically depend on the preparation of the nanofluid and the lack of standardization in the method of preparation is the root cause of this controversy. Of late, nanofluids have made a strong comeback proving its decisive edge over usual cooling fluids in as diverse fields such as cooling of electronics, BTMS, and even drug delivery and hyperthermia treatments in healthcare. This lecture traced the development of nanofluid over the last three decades indicating the applications in which it is making a rapid progress.

Bio-data: Professor Sarit K. Das is an Institute Professor at the Indian Institute of Technology Madras, Chennai. He is the first occupant of the V. Balakrishnan Chair Professorship and a Professor of the Mechanical Engineering Department of the Institute. He is the former Director of the Indian Institute of Technology Ropar. He is also the former Dean (Academic Research) of IIT Madras.

Prof. Das studied at the Jadavpur University (BME 1984,MME 1987), NIT Rourkela (PhD 1994) and the Helmut Schmidt University of Hamburg, Germany(PDF). His research group works on various aspects of thermo fluidics like heat and mass transfer in industrial equipment such as heat exchangers and fuel cells, multiphase flow and energy conversion. The group focuses explicitly on Micro-Nano scale processes and is known to be one of the leading groups on Nanofluids in the world. Another area of focus of the group is bio-microfluidics, for medical diagnostics, the platform for drug delivery and understanding pathological states related to cardiovascular diseases and cancer. Prof. Das is a Fellow of the National Academy of Sciences (NASI), the Indian National Academy of Engineering (INAE) as well as of Alexander von Humboldt Foundation. He was a Peabody Visiting Professor at MIT, Cambridge and a visiting Professor - Lund University, Sweden. He is conferred with the prestigious India Citation Awards 2012 by Thomson Reuters. He has published more than 370 research articles and six books. He is the most cited mechanical engineer of the country. Prof. Das is a member of the editorial boards of *Heat Transfer Engineering, Taylor & Francis Publishers* and the former Editor in Chief of *the International Journal of Micro-Nano Scale Transport.* He received the *Lifetime Achievement Award* from IIT Madras.

You Tube Video Recording Link : https://youtu.be/pB6bInBzOpE

People Participated: 45

(xxii) The 56th lecture of the INAE Distinguished Lecture Series was organized by INAE Bhubaneswar Chapter, jointly with SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Prof. Nithin George, Dean of Academic Affairs, IIT Gandhinagar on 10th March, 2025 on "Microphone Array Signal Processing and Beamforming for Hearables".

Key Points: As per estimates of the World Health Organization (WHO), around 63 million people in India suffer from significant hearing disorders. The most widely used rehabilitation measure is an electronic assistive listening device. Improving speech intelligibility, especially in the presence of noise, has been challenging in hearables and other assistive listening devices. One way to improve speech intelligibility is first to estimate the direction of arrival of the sounds of interest, followed by an effective beamforming algorithm development to enhance the speech quality. This talk dealt with design methods for microphone array systems, including developing algorithms for the direction of arrival estimation and beamforming, with particular attention on hearables.

Biodata: Prof Nithin George received his BTech in Electronics and Communication Engineering from the University of Kerala and MTech in Telematics and Signal Processing from NIT Rourkela. He was awarded a PhD in Electrical Sciences from IIT Bhubaneswar in 2012, and he was the first graduate of the Institute. He joined IIT Gandhinagar as a faculty member in Electrical Engineering in 2012. He is currently a TEOCO Chair Professor in Electrical Engineering at IIT Gandhinagar. His research interests include audio signal processing and array signal processing. He has published over 75 articles in top international journals. He received the Department of Foreign Affairs and International Trade (DFAIT), Government of Canada GSEP Fellowship in 2008, INSPIRE faculty award in 2013, Indo-Australia Early and Mid-Career Researchers Fellowship in 2017, Excellence in Institution Building Award of IIT Gandhinagar in 2018 and Excellence in Research Award of IIT Gandhinagar in 2023. He served as the Associate Dean for Postgraduate Studies at

IIT Gandhinagar from 2015 to 2018, and Associate Dean for Faculty Relations from 2018 to 2022. From 2022, he is serving as the Dean of Academic Affairs at IIT Gandhinagar

You Tube Video Recording Link https://youtu.be/y_z-6Io3O5E

People Participated: 43

(xxiii) The 57th lecture of the INAE Distinguished Lecture Series was organized by INAE Bhubaneswar Chapter, jointly with SOA University, CSIR-IMMT Bhubaneswar, IIT Bhubaneswar, NISER Bhubaneswar and IEEE Bhubaneswar Sub-section and delivered by Prof. Lipika Dey, Professor, Computer Science, Ashoka University, on 24th March, 2025 on "Agentic Problem Solving: Intelligent Agents for Adaptive and Autonomous Decision-Making".

Key Points: Agentic AI represents the next frontier in artificial intelligence, where systems are designed to perceive, reason, and act autonomously in dynamic environments. This talk explored the core principles of agentic AI, including intelligent perception, autonomous reasoning, and adaptive execution. Key architectures, problem-solving strategies, and a few real-world applications were discussed.

Speaker Bio: Dr Lipika Dey is a Professor of Computer Science at Ashoka University. Prior to joining Ashoka University, she was a Chief Scientist at Tata Consultancy Services (TCS), Research, where she was heading research in the themes of Economic and Financial Intelligence and Real Time Context Aware Enterprises. She was earlier a member of faculty at the Department of Mathematics, Indian Institute of Technology, Delhi. She was elected to the Fellowship of Indian National Academy of Engineering in 2021. She was also awarded the Distinguished Scientist award by TCS in 2012. She has served as Program Committee member for several conferences like AAAI, KDD etc.

Dr Lipika Dey has a PhD in Computer Science and Engineering from IIT Kharagpur, where she had also done her graduation and post-graduation in Mathematics and Computer Science. She has been an active member of Association for Computing Machinery (ACM) for more than a decade. Beside serving the committee for ACM(W) in India, she also mentors young researchers and faculty in the area of Computer Science, under the aegis of ACM India. She is currently serving as an Eminent Speaker

You Tube Video Recording Link https://youtu.be/HkirMQQXPQ8

People Participated: 34

INAE Kolkata Chapter

Celebration of National Engineers Day by INAE Kolkata Chapter

INAE Kolkata Chapter in association with the Academy of Technology (AoT), Adisaptagram, Hooghly, West Bengal, celebrated Engineers' Day 2024 on September 15, 2024 by organizing a thematic lecture and a talk on experiential learning at AoT. Prof. Sankar K Pal, the Founder Member of the INAE Kolkata Chapter, delivered this year's Engineers' Day Lecture. The talk, titled "Machine Intelligence and Data Science: Why and How?" was aimed at enlightening the budding engineers with an overarching perspective of

the rapidly emerging role of AI in today's engineering landscape. This talk was followed by a lecture on "Spark Your Creativity: Blend Hardware with Innovative Programming" by Dr. Souvick Chatterjee of Mathworks. The event was attended by INAE Fellows, faculty and engineering students from Kolkata.

Annual Meeting of INAE Kolkata Chapter was held at Center for Soft Computing Research, Kolkata on 29th January 2025 to discuss the following Agenda: Reporting the activities of INAE Kolkata Chapter for the year 2024; Proposal for INAE activities for the current year; Election of the office bearers and any other matters.

National Science Day Lecture 2025 organized by INAE Kolkata Chapter

With an overarching aim of promoting scientific awareness, and inspire young minds to pursue careers in science and technology, Indian National Academy of Engineering (INAE) Kolkata Chapter, in association with the Ramakrishna Mission Vivekananda Centenary College (RKMVCC, Autonomous), organized the National Science Day Lecture on March 7, 2025 at Department of Zoology of RKMVCC, Rahara, Kolkata-700118, to commemorate the Raman Effect by Prof. C.V. Raman.

The Science Day lecture was delivered by Prof. Tanya Das, ICMR Emeritus Scientist and former Dean R&D at the Bose Institute Kolkata. Prof. Sankar Kumar Pal (National Science Chair, Govt. of India; President, Indian Statistical Institute, Kolkata; Distinguished Scientist and Former Director, ISI; Founder President, INAE Kolkata Chapter) graced the occasion as the Chief Guest. From the INAE side, Prof. Malay K. Kundu (Indian Statistical Institute & Chairman, INAE Kolkata Chapter), Prof. Debatosh Guha (Institute of Radio Physics and Electronics, University of Calcutta), and Prof. Ranjan Ganguly (Jadavpur University, & Secretary, INAE Kolkata Chapter) were also present.

At the very outset, Swami Kamalasthananda, Principal Ramakrishna Mission Vivekananda Centenary College, welcomed the participants, the invited speaker and the INAE Fellows to the event. He also expressed his earnest gratitude to the distinguished speakers and guests. Prof. S.K. Pal delivered a brief, but inspiring lecture to the students with interesting anecdotes, emphasizing the strong legacy of RKMVCC in imparting quality science education. Prof. M. K. Kundu gave the audience an overview of INAE and the activities of INAE Kolkata Chapter in promoting STEM awareness.

Approximately 150 participants, including faculty, technical staff, and students from RKMVCC attended the celebration that spanned over the entire day. The program was also streamed live through a link provided at the INAE portal. From RKMVCC's side, the whole event was coordinated by Dr. Ajoy Mallik and Dr. Arunava Mukherjee.

The event's hallmark was the Science Day Lecture by Prof. Tanya Das, titled "Cancer Stem Cell: The Pivotal Piece of Cancer Puzzle." Through her talk, which lasted for a little more than an hour, she painted the grim reality of the rapid global upsurge in cancer cases, and the current challenges and shortcomings of the conventional chemotherapy followed by surgery in some special cases.

Her captivating lecture presented a new understanding of breast cancer development and relapse. Through a highly lucid, yet content-rich presentation, Prof. Das explained how her research could efficiently target breast cancer stem cells (*CSCs*), making the drug resistant cells insensitive to chemotherapy. The talk explained how the study by her group not only identified CSCs as the 'pivotal piece' – missing which deciphering the 'cancer puzzle' can never be successful, but also offered a combinatorial treatment strategy with conventional chemotherapeutics for improving recurrence-free survival of breast cancer patients.

In the Q&A session, students and the other participants, including the INAE fellows engaged in a thoughtful discussions and brainstorming. The speaker appreciated the highly intelligent and significant questions posed by the students as she shared her valuable insights on a roadmap for a panacea to this deadly disease.

The program concluded with a Vote of Thanks delivered by Prof. Ranjan Ganguly on behalf of INAE Kolkata Chapter. The speakers and the INAE fellows engaged in informal discussion with the students, faculty and the Principal of RKMVCC after the program while the INAE team was given a tour of the small, yet beautiful campus at the end of the program. Overall, the program was highly appreciated by the students, the INAE Fellows and the speakers.

Inaugural session -Inaugural speech by Prof SK Pal Address by Prof Malay K. Kundu

Science day lecture by Prof. Tanya Das Felicitation of the speaker

Post-lecture interaction at the office of the Principal followed by a campus tour

Glimpses of the National Science Day Lecture held on March 7, 2025 at Ramakrishna Mission Vivekananda Centenary College, Rahara.

INAE Bangalore Chapter

ECODRIVE

Indian National Academy of Engineering-Bangalore Chapter (INAE-BC) and Dayananda Sagar University (DSU), organized a One-Day workshop on "EcoDrive: Accelerating Sustainable Electric Mobility" on May 11, 2024. This theme emphasizes the synergy between Electric Vehicles (EVs) and Robotics as a catalyst for transformative advancements in transportation, creating a harmonious and sustainable future. The workshop was intended to make college students aware of Sustainable EVs and the possible integration of intelligent robotics.

The following talks were held at the event:

(i) Prof. S Sampath, Professor, Inorganic and Physical Chemistry, IISc, Bangalore delivered a talk on batteries.

(ii) Dr L Venkatakrishnan, Chief Scientist, National Aerospace Laboratories, Bangalor delivered a talk on the topic: "Towards Perpetual Flight: A Solar Electric High-Altitude Aircraft".

(iii) Dr Ganesh Murthy CNS, Principal Engineer Daimler Truck Innovation Centre, India, Bangalore delivered a talk on the topic: "Electric Vehicles: Systems, Architecture, Implementation, Testing and Data Analysis".

Student competitions in the form of oral and poster presentations were made and winners were awarded with cash prizes and certificates.

Prof. Roddam Narasimha Memorial Lecture-July 22, 2024

INAE-BC and National Aerospace Laboratories (CSIR-NAL) have undertaken to jointly organize the Roddam Narasimha Memorial Lecture, to be delivered every year on his birthday (July 20th) at CSIR-NAL. This year, 20th July being a holiday, it was held on the 22nd of July, at the S R Valluri Auditorium of CSIR-NAL. Prof. R. I. Sujith, Institute Professor and D. Srinivasan Chair Professor at IIT Chennai, spoke on "Complex system approach to investigate and mitigate combustion instability in turbulent combustors". The event was presided over by the Director CSIR-NAL, Dr Abhay Pashilkar.

PARYAVARAN-2024

A one-day workshop on Environment and Green Energy: PARYAVARAN-2024 was jointly organized by INAE-BC, the M S Ramaiah Institute of Technology and Gokula Education Foundation on September 14th, 2024 (National Engineer's day) at the M S Ramaiah Institute of Technology, Bengaluru. Keynote speakers included Prof. Prof. K N Ganeshaiah, INSA Senior Scientist Department of Genetics and Plant Breeding, University of Agricultural Sciences, GKVK, Bangalore (Role of green environment and climate change on human health and civilizations: Lessons from history and science), Prof. M N Thimmegowda, Professor & Head, Agro-Meteorology, UAS, GKVK, Bengaluru, (Climate change and Agricultural nexus) and Dr. T V Ramachandra Professor at the Centre for Ecological Sciences, IISc (Big data with artificial intelligence for insights of energy, environment, and water nexus for sustainable development).

The workshop series was primarily intended for college students to bring awareness on Sustainability and the evil effects of Climate Change. An overview of the challenges we face in the context of spiralling consumerism, emissions, and pollution were presented to students with a hope to receive new ideas for technologies from ignited young minds on how to deal with threats such as microplastics, CO2 emissions, melting glaciers, and many more challenges of tomorrow.

VISHWA 2025

MVJ College of Engineering, Bangalore, collaborated with INAE-BC, organized VISHWA-2025, a one-day workshop on "Innovations for a Climate-Resilient and Sustainable Future on Earth and Beyond" on February 28, 2025 (National Science Day) at MVJ College of Engineering, Bangalore. The workshop was graced by eminent personalities like Dr. V K Aatre, Former Scientific Advisor to Raksha Mantri and Secretary, DRDO; Dr. B N Suresh, Chairman, Board of Governors, MVJCE, Bangalore & Founding Director and Chancellor, IIST, Thiruvananthapuram; Dr. S Gopalakrishnan, Chairman, INAE, Bangalore Chapter & Senior Professor, IISc; Mr M Sankaran, Director, UR Rao Satellite Centre, ISRO, Bangalore; Dr. Bala Govindasamy, Executive Member, Earth Commission, Future Earth, & Professor, Centre for Atmospheric and Oceanic Sciences, IISc.

INAE Kanpur Chapter

(i) Materials Camp at IIT Kanpur (May 3-6, 2024)

The Materials Camp at IIT Kanpur was held from May 3-6, 2024, in collaboration with the ASM International Kanpur Chapter, INAE Kanpur Chapter, and IIM Kanpur Chapter. This camp brought together students for an immersive experience featuring hands-on workshops, interactive lectures, and collaborative projects. Attendees explored the latest advancements in materials research and their practical applications through real-world problem-solving activities. The collaboration with INAE emphasized the importance of bridging academic research with industry needs, promoting knowledge exchange, and preparing participants for future technological challenges. This event not only enhanced technical skills but also fostered networking and collaboration among the next generation of engineers and scientists. A total of 37 students and 8 faculty members participated in the workshop.

Photographs during the Camp

(ii) Virtual Lab Workshop at IIT Kanpur

The Virtual Lab Workshop at IIT Kanpur was held on May 5, 2024, in collaboration with the ASM International Kanpur Chapter, INAE Kanpur Chapter, and IIM Kanpur Chapter and Materials Science and Engineering, IIT Kanpur. This workshop aimed to demonstrate the cutting-edge applications of virtual reality in enhancing the educational experience for science and engineering students. Participants engaged in hands-on sessions where they navigated through VR simulations. A total of 37 students and 8 faculty members participated in the workshop. Expert speakers from IIT Kanpur shared insights on the latest VR technologies, best practices for integration into academic curricula, and the potential of VR to revolutionize traditional laboratory education. This collaborative event underscored the commitment to leveraging advanced technologies to improve learning outcomes and prepare students for future challenges in the technological landscape.

Virtual Lab Workshop at IIT Kanpur

Student Demonstration during the event

(iii) Regional Nodal Centre Coordinator Meet

The Regional Nodal CENTRE Coordinator Meet was organized on 13th July 2024 by INAE Kanpur Chapter in collaboration with Virtual Labs IIT Kanpur. This meeting aimed to bring together virtual labs nodal coordinators from various regional centres to discuss the progress, challenges, and future directions of the Virtual Lab initiative. It was an excellent opportunity to share experiences, exchange ideas, and foster collaborations to enhance the effectiveness and reach of the Virtual Lab project. The agenda for the meet included discussion on recent developments, interactive sessions, and brainstorming discussions. The inauguration was graced by the presence of PI of Virtual Labs Prof. Kantesh Balani and all regional coordinators Dr. Ashutosh Tiwari REC Banda, Dr. Aparna Dixit PSIT Kanpur, Dr, Anupam Vyas, Dr. Anjali Srivastava, Dr. Sanjeev Srivastava Bundelkhand University, Jhansi and virtual Labs IIT Kanpur Team.

(iv) **Talk on "Multifunctional Coatings and Composite Materials for Lunar and Space Missions".**

A Talk on "Multifunctional Coatings and Composite Materials for Lunar and Space Missions" by Prof. Arvind Agarwal was organized by INAE Kanpur Chapter in collaboration with Materials Science and Engineering, Material Advantage & Virtual Labs IIT Kanpur on 19th July 2024.

Bio-Data: Prof. Arvind Agarwal is a Distinguished University Professor in the Department of Mechanical and Materials Engineering at Florida International University (FIU), Miami, FL, USA. Prof. Agarwal obtained his B.Tech. from the Indian Institute of Technology (IIT) Kanpur and a Ph.D. in Materials Science and Engineering from the University of Tennessee at Knoxville. Prof. Agarwal's current research interests include advanced materials processing, cold spray, plasma spray, spark plasma sintering, ultrahigh-temperature ceramics, boron nitride nanotube (BNNT), graphene reinforced composites and coatings, and mechanical properties of biological materials. He has published over 450 technical articles, including three books. Prof. Agarwal is the inventor of 27 U.S. patents and 8 more pending. His patents have been licensed at both National and International levels. Prof. Agarwal has mentored 50 doctoral and post-doctoral, 20 masters, and 65 undergraduate researchers in his lab. Prof. Agarwal is an elected Fellow of ASM International, the American Ceramic Society (ACerS), the American Association for Advancement of Science (AAAS), the National Academy of Inventors (NAI) and the Indian Institute of Metals (IIM).

Abstract of Talk: There is a global race to reach the Lunar surface. Spacecraft landings and take-offs on the lunar surface, along with extreme temperature variations between day and night, cause wear and erosion by highly abrasive lunar regolith, resulting in the premature failure of structures. This talk was focused on novel multi-functional Ti-hBN composite coatings that were developed using atmospheric and vacuum plasma spray techniques to protect aerospace structures. Ball-on-disk tribological tests were conducted in the presence of JSC-1A lunar regolith simulant to evaluate the wear performance of coatings. The erosion performance of coatings at extreme lunar temperature regimes (-196 to 150°C) was evaluated in a custom-made planetary erosion test rig (PETR) at high speeds up to 250 mph. Neutron shielding tests were performed to evaluate the efficiency of the coating's neutron shielding properties. Further, coatings were exposed to space irradiation and atmospheric oxygen at the International Space Station (ISS) for 171 days as part of the MISSE-17 (Materials in International Space Station Experiments) program.

(v) 11th Annual Virtual Labs Nodal Centre Coordinator's Meet 2024

The 11th Annual Virtual Labs Nodal Centre Coordinators Meet 2024 was held on October 26, 2024, at IIT Kanpur, bringing together Nodal Centre Coordinators (NCs) to discuss advancements and challenges in Virtual Labs. The event was inaugurated by Prof. Tarun Gupta, Prof. Kantesh Balani, and Prof. Abheejeet Mohapatra, followed by a networking session. A panel discussion on "World from the Eyes of Virtual Labs" addressed key challenges in lab development, including mentorship, technical skills, and integration into education. Experts discussed strategies for improving lab design, recruiting student interns, and using Virtual Reality (VR) for industrial training. The discussion also highlighted gap area analysis and proposal submission for new Virtual Labs development with technical guidance provided by VLabs IIT Kanpur.

The meet included presentations from Nodal Centre Coordinators, sharing insights and updates on their respective centres. An expert talk by Mr. Vishal Pandey emphasized VR applications in industry and education. Certificates were distributed to participants, and the event concluded with a vote of thanks by Prof. Kantesh Balani and a networking session over high tea. Key action strategies included conducting workshops in two phases: one focusing on training educators in Virtual Labs integration and the other on developing new Virtual Labs. The meet also stressed mapping university courses to existing Virtual Labs, identifying gaps, and developing new experiments. IIT Kanpur committed to supporting lab development and offering certifications for VLabs developers, reinforcing Virtual Labs as a transformative tool in education and industry.

Glimpses of Virtual Lab Meet

INAE Digital Platform

The INAE Digital Platform was instituted in the year 2018 and there was in place an INAE Digital Platform Committee with Dr Pradip, Vice-President, INAE as Chairman and a Review Committee of INAE Digital Platform, chaired by Mr. K Ananth Krishnan. In the year 2020, the INAE Digital Platform Committee was re-constituted to look at new requirements of the platform, review the development and plan future initiatives, with Mr. K Ananth Krishnan, Executive Vice President and Chief Technology Officer, TCS as Chairman; Mr. Vinay Vasant Kulkarni, Chief Scientist, Tata Research Development and Design Centre, TCS; Dr. Manish Gupta, Director of Google Research India; Co-founder & CEO VideoKen Software and Infosys Foundation Chair Professor, IIIT Bangalore; Dr. Sriram K Rajamani, Distinguished Scientist and Managing Director, Microsoft Research India Lab and Prof Sukumar Nandi, Senior Professor, IIT Guwahati as Members.

The Platform provides with list of features such interactive website, Expert Pool; Social media Integration (YouTube, LinkedIn), Quick Glance: News, Announcement, Flagship Events, Publications, Memberships etc.

Some of the Platform features which are exclusively meant for INAE Fellows and Young Associates are given below:

- Secured Login to Profile page with unique username and password generated by INAE
- Dashboard with editable profile page with option for Expert Pool
- Online submission of Nominations for INAE Fellowship (*Fellows Only*)
- Access to articles published in 'Transactions of INAE'

Profile pages for each INAE Fellow and Young Associate have been created which can be updated by them, as and when required. The username and password for accessing the profile pages have been shared with INAE Fellows and Young Associates. All the INAE Fellows and Young Associates have been requested to please login to their home page and complete their profile.

In case the login credentials (username and password) is not known, INAE Fellows and Associates may please contact INAE Secretariat at email id: inaehq@inae.in or at 011-26582475: Monday- Friday (10:00 am to 5:00 pm)

INAE on Social Media

INAE has a LinkedIn Account to post the news of recent INAE activities in the social media. The same can be viewed at the link below.

(a) LinkedIn https://in.linkedin.com/company/indian-national-academy-of-engineering-inae-

International Affairs

(a) CAETS 2024 Annual Meeting and Convocation

CAETS Annual Meeting was held in Helsinki, Finland from July 1-3, 2024 in which INAE Delegation led by Prof Indranil Manna, President, INAE participated. Prof Indranil Manna made presentations to the CAETS Board of Directors and CAETS Council to inform them about the progress and recommendations made by the CAETS Engineering Education Working Group (EEWG) Co-Chaired by President, INAE and the efforts were much appreciated. The EEWG meeting was also held on July 1, 2024 in hybrid mode. Some of the recommendations and suggestions are as follows: Engineering education (EE) must have inbuilt components of flexibility and inter-disciplinarity to converge on a system engineering approach; Need for adult education through refresher courses; Emphasis on design and problem-solving ability in the curriculum; Accreditation should not make teaching very rigid and strait-jacketed and EEWG should collaborate with the Working Group on AI. The CAETS Communication Committee meeting was also held on July 1, 2024 in hybrid mode which has representation from INAE Fellowship. The theme of CAETS 2024 conference was Carbon Neutral Technologies and Society, that is, carbon neutral society, its prerequisites, and technical solutions and the presentations made by the international experts were informative and rich in technical content. The meeting was a success in meeting the objectives and the contributions of INAE in CAETS Working Groups and important meetings were well appreciated.

Group photograph during CAETS 2025 featuring the fellows from academies across the world

Meeting on sidelines of CAETS 2024 Convocation with Other Academies

Meeting with Royal Academy of Engineering, UK

Meeting with National Academy of Engineering, Korea

Meeting of Prof Indranil Manna, (second from left) and Mr JD Patil (centre) with delegation from Australian Academy of Technological Sciences and Engineering (ATSE) on the sidelines of the CAETS 2024 Annual Meeting

(b) CAETS Engineering Education Working Group

International Council of Academies of Engineering and Technological Sciences CAETS is an independent non-political, non-governmental, international organization of engineering and technological sciences

academies, one-member Academy per country. INAE being the only engineering academy of the country represents India at CAETS. The CAETS Engineering Education Working Group (EEWG) has been created to help CAETS in contributing to continuous improvement and modernization of engineering education and practice internationally and promoting ethics in engineering education, research and practice. Prof Indranil Manna, Immediate Former President, INAE, has been entrusted with the responsibility to Chair the Working Group along with Vice-Chair Dr Katherine Frase of USA-NAE at the behest of CAETS. Representatives from twenty-two-member countries are the members of this Working Group. Meetings of the CAETS EEWG, comprising of representatives from 22 Member Academies have been held online. One of the activities of CAETS, chaired by the President, INAE, is the CAETS Engineering Education Working Group (EEWG).

The meetings of this working group are held quarterly. The objective of EEWG is to contribute to continuous improvement and modernization of engineering education and practice internationally and bring out a report on the subject. The representatives from the Member Academies of CAETS presented an abstract on each country specific inputs pertaining to specific topic. The information and status of each of the member countries enabled the Members to appreciate the status, lacunae, best practices, and advantages better to be included in the report under preparation by the Working Group. So far nine meetings have been organized for CAETS EEWG. The ninth meeting of CAETS EEWG was held on February 27, 2025 online where 14 Representatives from 10 Member Academies participated and following two topics were discussed– (i) Intellectual Property Rights (IPR), and (ii) Accreditation of engineering degree courses.

Prof Indranil Manna, Presisdent, INAE and Chair, CAETS Engineering Education Working Group making a presentation during CAETS 2024 Annual Meeting and Convocation

(c) CAETS Communication Committee

INAE being an only engineering academy in the country represents the Country at the CAETS as one of its member academies. INAE actively participates in CAETS activities and INAE Fellows are invited to represent in various committees. One such committee is the CAETS Communication Committee which is constituted with an objective of the Committee is to develop and maintain a CAETS Style Guide that sets content and style guidelines and defines templates for all CAETS Communications (statements,

reports, videos, website, etc.). The committee also supports review of draft documents. Prof Amit Agrawal, IIT Bombay, *FNAE* is INAE representative at the CAETS Communication Committee. CAETS Communications Committee quarterly meeting was held online on March 25, 2024 to discuss updates on the status of nominations for the CAETS Communications Prize.

The CAETS Communication Committee was constituted with an objective of the Committee is to develop and maintain a CAETS Style Guide that sets content and style guidelines and defines templates for all CAETS Communications (statements, reports, videos, website, etc.). The committee also supports review of draft documents. Prof Amit Agrawal, *FNAE*, IIT Bombay, is INAE representative at the CAETS Communication Committee and participated in the meeting held on June 11, 2024 in virtual mode. The Agenda of the meeting was to review the submissions for the Communications Prize by the judges and for the Members to provide Academy style guides for reports prepared by CAETS. The contributions by INAE Representatives in CAETS Committee meetings are always well appreciated.

(d) 7th INAE-NAEK Workshop on "Current Status and Cooperation Plan of the Satellites for Observing the Earth" held on August 19-20, 2024

The 7th INAE-NAEK Workshop on "Current Status and Cooperation Plan of the Satellites for Observing the Earth," held online from August 19-20, 2024, successfully gathered leading experts from India and South Korea to discuss the latest advancements in satellite technology and explore avenues for international collaboration. The workshop opened with welcome addresses by Prof. Indranil Manna, President INAE, and Dr. Kinam Kim, President of NAEK, setting the tone for two days of engaging discussions on the importance of satellite technology in addressing global challenges. Prof Indranil Manna highlighted the wide-ranging scope of applications of remote sensing satellites. He recalled that the two academies have been collaborating steadily for several years and proposed developing further collaborations among the two countries such as joint student supervision or exchange programs. Dr Kinam Kim highlighted the technological feasibility of cooperation among the countries in the Aerospace sector and expressed his confidence that fruitful collaborations would materialize between the two countries.

Inauguration Session

The keynote speeches provided deep insights into the benefits of observing Earth from space and the status of satellite development worldwide, with a particular focus on climate monitoring. The Keynote speech by Dr Shailesh Nayak, Director, National Institute of Advanced Studies (NIAS), Bengaluru & Chancellor, TERI School of Advanced Studies, Delhi highlighted the importance of standardisation of sensor specifications, use of satellite image analytics and the necessity of developing models combining

satellite information and physical models for coastal zone management, hazard assessment and climate study and the Indian efforts in this regard. The keynote speaker from Korea, Dr. Joojin Lee, Chair, Advisory Committee on Science and Technology Diplomacy, Previous President of Korea Aerospace Research Institute (KARI) gave an overview of the global trends in satellite development as well as the status of Earth observation and climate monitoring and summarised the efforts of KASA and KARI in developing satellites for climate monitoring mission and upcoming missions such as Luna Lander and Mars Lander.

The technical sessions that followed were chaired by esteemed professionals from both countries and covered a wide range of topics, including the development of core technologies for satellite image utilization, AI technology applications, and policy frameworks for accessing and utilizing satellite data in the private sector. Dr BN Suresh, *FNAE*, Former President, INAE & Chancellor, Indian Institute of Space Science & Technology (IIST) and Honorary Distinguished Professor, ISRO Headquarters, Bengaluru and Prof Jai-ick Yoh, Department of Aerospace Engineering, Seoul National University acted as the session chairs on the first day while Prof. RI Sujith, FNAE, Department of Aerospace Engineering, Indian Institute of Technology Madras and Dr. Changjin Lee, Research Fellow, Korea Association for Space Technology Promotion were the session chairs on the second day of the workshop.

Technical Session in Progress

The first day of the technical sessions commenced with Dr. Taegyun Jeon, CEO & Founder, SI Analytics who briefed about the space partnership between India and Korea exploring the joint satellite applications. The potential and realized benefits of a strategic partnership in space exploration and satellite technology were dwelt upon and key areas such as historical and current collaborations, technological synergies, joint satellite applications, and the economic and social impacts were discussed. The second speaker, Dr Nilesh Desai, Distinguished Scientist and Director, Space Applications Centre, ISRO, Ahmedabad discussed India's Spaceborne payloads and associated technologies for product generation. The future trends in various space technologies, which are fed into the design and realisation of space-borne advanced remote sensing payloads and instrumentations for various Electro-optical and Microwave remote sensing satellite missions were touched upon. The various indigenous space and ground segment technologies and their applications for satellite product generation for earth observation and societal benefits were also elucidated.

The third speaker, Dr. Young-Je Park, CRO, TelePIX demonstrated the importance of leveraging high-resolution optical imagery to address coastal water issues. His presentation explored the importance of satellites in addressing critical coastal ocean issues in Korea such as harmful algal blooms (HABs), floating

algae, and floating marine debris. The uncertainties in the satellite products, lack of timely satellite data or insufficient spatial and temporal resolutions were discussed and an integrated approach utilizing both high-resolution satellite imagery and high-frequency images from geostationary ocean colour sensor was proposed to effectively monitor and manage these coastal ocean issues.

Mr Suyash Singh, CEO & Co-founder, GalaxEye Space, Bengaluru spoke about bringing consistency in satellite imaging world through Drishti satellite (Multi-Sensor Satellite). His talk included the inconsistencies observed in satellite imagery and the adoption of Multi-sensor satellites in overcoming them for widespread commercial adoption. He stated that Generative AI is the way forward towards consistent, highly available and easily interpretable imagery.

The technical sessions on the second day commenced with Dr. Il-Seok Oh, Vice President, Korean Academy of Space Security who summarised the law and policy that are being utilized for satellite data and images in Korea. He highlighted the increased utilization of satellites by Korean government ministries and agencies and the promotion of legislation and policies to meet specialized and diverse demands for satellite information and to prevent inefficiencies in satellite operations operated by diverse governmental and public stakeholders. He dwelt upon the concepts of openness and security of satellite information and emphasised that sustainable growth emerged due to the paradigm shift from the concept of "growth of people" to "growth with people" to solve the global problems.

The second speaker, Mr Ganesh Mohan, Assistant Director, Indian National Space Promotion and Authorisation Centre (IN-SPACe), Department of Space, Government of India, Ahmedabad addressed the audience on behalf of Mr Vinod Kumar, Director, IN-SPACe. He briefed about the role of IN-SPACe under Department of Space (DOS), to promote, enable, authorize and supervise Non-Government Entities (NGEs) and academia to undertake space related activities. He also stated that IN-SPACe acts as a bridge, connecting user needs with private companies and ISRO's technical expertise. This talk delved into how IN-SPACe, is translating Government of India's vision into reality. The third speaker, Dr Tae-Byeong Chae, Executive Director, National Satellite Operation & Application Center, Korea Aerospace Research Institute (KARI), shared information on satellite data distribution policy & utilization in Korea. He mentioned the initiatives undertaken by Korean Government to organize a national satellite information utilization council to provide satellite data for public purposes. The fourth speaker, Mr Prateep Basu, Chief Executive Officer, Satsure, Bengaluru, gave a talk on the Earth Observation: The Commercialisation Paradigm from Imagery to Intelligence. He briefed regarding the software and analytical applications built using Earth Observation data that bridges advanced space technology with practical, real-world needs, supporting industries such as agriculture, disaster management, environmental monitoring, and defense. The shift from imagery to insights, transforming the Earth observation industry, making satellite data more valuable and integral to solving real-world challenges was also highlighted.

The fifth speaker, Dr Hyo Jin Yang, Senior Researcher, National Land Satellite Center of Ministry of Land, Infrastructure and Transport spoke about the first satellite mission for public application and service in South Korea, CAS500-1/2. In her presentation, she shared the status of satellite operation, research and development for the utilization of products, and also about the achievements on data utilization and distribution since October, 2021. The last speaker for the session, Dr Saptarshi Mondal, Manager, Vassar Labs, Hyderabad spoke in the session on behalf of Mr Nikhilesh Kumar, Co-founder & CEO, Vassar Labs, Hyderabad. He touched upon cloud-based processing and analytical platform for agriculture, water, urban, and forest Monitoring using EO data. The adoption of cloud based automated satellite data processing and

analytical platforms was proposed to be a possible solution for the challenges in operational monitoring using satellite data. He demonstrated the fieldWISE, aquaWISE and cityWISE platform developed for the monitoring agriculture, water and urban landscape changes. He stated that the WISE platform significantly enhances the efficiency and effectiveness of monitoring and management processes across various domains.

Throughout the workshop, experts presented on various aspects of satellite technology, such as the commercialization of earth observation data, the role of public satellite missions, and the development of cloud-based platforms for processing environmental data. The sessions underscored the critical role that satellite technology plays in fields like climate monitoring, agriculture, and urban planning. The event concluded with a series of productive Q&A sessions and closing remarks from the session chairs, reinforcing the importance of continued cooperation between India and South Korea. The workshop not only facilitated the exchange of innovative ideas but also laid the groundwork for future collaboration, highlighting the shared commitment of both countries to advancing satellite technology for the benefit of humanity.

The Fellowship

The selection process for election to the Fellowship is the two stage selection process wherein comments from the Fellowship on the nominations received are also obtained prior to the first meeting of the Sectional Committees. In the first stage, the nominations are initially shortlisted to seek peer review reports from the recommended Fellows/domain experts. In the second stage, the peer review reports received are considered by the Sectional Committees to recommend nominations for election to the Fellowship for approval of the Governing Council.

Nominations for Fellowship, Foreign Fellowship and Young Associates were invited in January 2024 with last date of April 15, 2024. A total of 369 valid nominations for Fellowship (134 New and 235 carried forward from 2022 and 2023) and 25 valid nominations for Foreign Fellowship (10 New and 15 carried forward) were considered by the Sectional Committees during their meetings from May 15, 2024 to May 31, 2024 to shortlist nominees for "Peer Review" and identify suitable domain experts to carry out the review. Based on the recommendations of the Sectional Committees during their meetings held in the months of July/Aug 2024 over WebEx, the Conveners of all Sectional Committees made presentations to the Council on the nominations recommended for Election of Fellows. The details of nominees elected as Fellows/Foreign Fellows have been uploaded on INAE website and can be viewed at the link https://www.inae.in/nomination-information/

The details of the Fellows and Foreign Fellows of the Academy elected w.e.f. November 1, 2024 are given below.

Newly Elected Fellows

Engineering Section-I (Civil Engineering)		
	1.	**Prof. Manu Santhanam**, Professor, Civil Engineering, and Dean, IC&SR, Indian Institute of Technology Madras, Chennai.
	2	**Prof. Subimal Ghosh**, Professor, Department of Civil Engineering, Indian Institute of Technology Bombay, Mumbai.
	3	**Prof. Dipti Ranjan Sahoo**, Professor, Civil Engineering and Dean (Infrastructure), Indian Institute of Technology Delhi.

	4	**Prof. Madhavi Latha Gali**, Professor, Department of Civil Engineering and Chair of the Centre for Sustainable Technologies, Indian Institute of Science, Bengaluru.
Engineering Section-II (Computer Engineering and Information Technology)		
		**Prof. Mausam**, Professor, Department of Computer Science and Engineering, Indian Institute of Technology Delhi.
		**Prof. Vineeth N Balasubramanian**, Professor, Department of Computer Science and Engineering, Indian Institute of Technology Hyderabad and Principal Researcher, Microsoft Research India.
		**Prof. Richa Singh**, Professor, Department, Computer Science and Engineering, Indian Institute of Technology Jodhpur.
		**Dr. Geetha Manjunath**, Founder, CEO and CTO, Niramai Health Analytix, Bengaluru.
		**Dr. Partha Pratim Talukdar**, Senior Staff Research Scientist, Google DeepMind and Associate Professor, Indian Institute of Science, Bengaluru.
		**Mr. Puneet Chandok**, President, Microsoft India and South Asia.

		**Mr. Bhavish Aggarwal**, founder of Ola.
		**Dr. Anand Deshpande**, Founder and Chairman, Persistent Systems Ltd., Pune.
		**Mr. Shantanu Narayen**, Chair & CEO of Adobe.
Engineering Section-III (Mechanical Engineering)		
		**Prof. Amitava De**, Professor, Department of Mechanical Engineering, Indian Institute of Technology Bombay, Mumbai.
		**Prof. Ramesh Babu Nimmagadda**, Professor Emeritus, Indian Institute of Technology Madras, Chennai.
		**Prof. Anandaroop Bhattacharya**, Prem Prakash Verma Chair Professor, Mechanical Engineering Department, Indian Institute of Technology Kharagpur.
		**Mr. Sudarshan M Saraf**, Co-Chairman and Managing Director, Technocraft Industries (India), Ltd, Mumbai.

		**Mr. Sanjay Kirloskar**, Chairman & Managing Director, Kirloskar Brothers Ltd., Pune.
Engineering Section-IV (Chemical Engineering)		
		**Prof. Siddhartha Panda**, Professor (HAG), Department of Chemical Engineering, Indian Institute of Technology Kanpur.
		**Prof. Jitendra Shital Sangwai**, Professor, Department of Chemical Engineering, Indian Institute of Technology Madras, Chennai.
		**Dr. Virendra Kumar Gupta**, Head, R&D, Polymer & Senior Vice President, Reliance Industries Ltd, Navi Mumbai.
		**Mr. Dilip Shanghvi**, Chairman & Managing Director, Sun Pharmaceutical Industries Ltd., Mumbai.
Engineering Section-V (Electrical Engineering)		
		**Prof. Abhijit R Abhyankar**, Professor, Electrical Engineering Department, Indian Institute of Technology Delhi.
		**Prof. Janardhanan Sivaramakrishnan**, Department of Electrical Engineering, Indian Institute of Technology, Delhi.

		**Prof. Siva Kumar Keerthipati**, Professor & Head, Department of Electrical Engineering, Indian Institute of Technology, Hyderabad.
		**Mr. Arun Kumar Paul**, Technical Director, M/s. Electronics Devices Worldwide Pvt. Ltd, Mumbai.
		**Dr. Sharad Kumar Saraf**, Chairman & Managing Director, Technocraft Industries (India) Ltd.
Engineering Section-VI (Electronics & Communication Engineering)		
		**Prof. Nagendra Krishnapura**, Professor & Head, Department of Electrical Engineering, Indian Institute of Technology Madras, Chennai.
		**Dr. Arundhati Misra,** Former Group Director, Space Application Centre, ISRO Ahmedabad.
		**Dr. Binoy Kumar Das**, Director General (Electronics & Communication Systems), DRDO, Bengaluru.
		**Mr. Manu Saale**, Managing Director & CEO, Mercedes-Benz Research and Development India Private Limited, Bengaluru..

Engineering Section-VII (Aerospace Engineering)		
		**Prof. Suresh Sundaram**, Professor, Department of Aerospace Engineering, Indian Institute of Science, Bengaluru.
		**Dr. Anil Kumar AK Nair**, Director, ISTRAC, ISRO, Bengaluru.
		**Mr. Sajal Prakash**, Former Chief Executive Officer, HAL; Former General Manager, Hindustan Aeronautics Limited, Transport Aircraft Division, Kanpur.
Engineering Section-VIII (Mining, Metallurgical and Materials Engineering		
		**Prof. Shiv Brat Singh**, Professor & Head, Department of Metallurgical and Materials Engineering; Chairman, Steel Technology Centre; Indian Institute of Technology Kharagpur.
		**Prof. R Jayaganthan**, Professor (HAG), Department of Engineering Design, Indian Institute of Technology Madras, Chennai.
		**Dr. Raghvendra Tewari**, Outstanding Scientist, Director, Materials Group, Bhabha Atomic Research Centre, Mumbai.
		**Dr. Tata Narasinga Rao**, Adjunct Professor, Department of Materials Science and Metallurgy, IIT Hyderabad.

		**Dr. Komal Kapoor**, Outstanding Scientist, Chairman and Chief Executive, Nuclear Fuel Complex, Hyderabad.
Engineering Section-IX (Energy Engineering)		
		**Prof. Pratibha Sharma**, Cummins Chair Professor, Associate Dean (Academic Programmes), Department of Energy Science and Engineering, Indian Institute of Technology Bombay, Mumbai.
		**Mr. UD Malshe**, Distinguished Scientist & Director, Multidisciplinary Research Group, Bhabha Atomic Research Centre (BARC) and Director, Raja Ramanna Centre for Advanced Technology (RRCAT), Indore.
		**Mr. Sudhir M. Ingole**, Former Associate Director; Nuclear Power Corporation of India Limited.
Engineering Section -X (Interdisciplinary and Special Engineering Fields and Leadership in Academia, R&D and Industry)		
		**Prof. V Kamakoti**, Director, Indian Institute of Technology Madras, Chennai.
		**Prof. Vandana Bharat Patravale**, Senior Professor of Pharmaceutics, Department of Pharmaceutical Sciences and Technology, Institute of Chemical Technology, Mumbai.
		**Prof. Ashok Kumar**, Endowed Chair Professor of Bioengineering, Department of Biological Sciences and Bioengineering, Indian Institute of Technology Kanpur.

		**Dr. Shankar V Nakhe**, Distinguished Scientist and Former Director, Raja Ramanna Centre for Advanced Technology, Indore.
Newly elected Foreign Fellows		
Engineering Section-II (Computer Engineering and Information Technology)		
		**Prof. Ramalingam Chellappa**, Bloomberg Distinguished Professor, Johns Hopkins University, USA.
Engineering Section-III (Mechanical Engineering)		
		**Prof. Guruswami Ravichandran**, John E. Goode, Jr. Professor of Aerospace & Mechanical Engineering, California Institute of Technology, USA.
Engineering Section-IV (Chemical Engineering)		
		**Prof. Yannis C Yortsos**, Dean, Viterbi School of Engineering, University of Southern California, USA.
Engineering Section-VI (Electronics and Communication Engineering)		
		**Dr. Mallikarjun Tatipamula**, CTO, Ericsson, Group Function Technologies, USA.
Engineering Section-VIII (Mining, Metallurgical and Materials Engineering)		
		**Prof. Horst Hahn**, Distinguished Materials Visiting Professor, University of Oklahoma, USA and Distinguished Senior Fellow, Karlsruhe Institute of Technology (KIT), Germany

Padma Awards

1. Dr. Pawan Kumar Goenka, *FNAE*, Chairman, IN-SPACe, Department of Space, Government of India has been conferred with the prestigious "Padma Shri" Award in the field of "Trade and Industry" by President of India on Republic Day January 26, 2025.
2. Prof Ashutosh Sharma, *FNAE*, Institute Chair Professor, Department of Chemical Engineering, IIT Kanpur has been conferred with the prestigious "Padma Shri" Award in the field of "Science and Engineering" by President of India on Republic Day January 26, 2025.

Honours and Awards (covering the period April 1, 2024 to March 31, 2025)

1	Dr BN Suresh, *FNAE*, Former President, INAE; Chancellor, Indian Institute of Space Science & Technology (IIST) and former Director of Vikram Sarabhai Space Centre was named among Asia's top 100 most outstanding researchers during April 2024. Every year since 2016, Asian Scientist Magazine compiles a list of Asia's most outstanding researchers. Now into its eighth edition, the Asian Scientist 100 list celebrates the success of the region's best and brightest, highlighting their achievements across a range of scientific disciplines. For details click on the link https://www.asianscientist.com/as100/
2	Prof Suman Chakraborty, *FNAE*, Professor of Mechanical Engineering, Indian Institute of Technology Kharagpur was named among Asia's top 100 most outstanding researchers during April 2024. For details click on the link below: https://www.asianscientist.com/as100/ Prof Suman Chakraborty was also recognized with the 2026 TWAS Award in Engineering and Computer Sciences by UNESCO on March 7, 2025.
3	Mr Ratan N Tata, *FNAE*, Chairman of Tata Trusts, was conferred with the prestigious KISS Humanitarian Award 2021, in recognition of his unwavering commitment to social development and exemplary leadership at an award ceremony held on April 22, 2024, at his residence in Mumbai. Established in 2008 by the KISS Humanitarian Award is the highest honour bestowed by Kalinga Institute of Industrial Technology (KIIT), and Kalinga Institute of Social Sciences (KISS).
4	Dr N Subramanian, *FNAE*, Consulting Engineer, Former Proprietor and Chief Executive, Computer Design Consultants, Chennai has been honoured with the ASCE 2024 Edmund Friedman Professional Recognition award for "exemplary conduct and services in the field of Civil Engineering, delivering vital and enduring projects, and for commitment to engineering education and helping young engineers from diverse backgrounds, and outstanding community leadership and philanthropy".
5	Prof. Rohit Srivastava, *FNAE*, Hemant Patel Chair Professor in Applied Biosciences and Former Head of Department of Biosciences and Bioengineering, IIT Bombay has been awarded the prestigious 'Rashtriya Vigyan Puraskar - Vigyan Shri' by the Government of India on August 22, 2024. The award was presented by the Hon'ble President of India, Smt. Droupadi Murmu, in recognition of his exceptional contributions to science and technology, particularly in the field of Technology and Innovation.

6	Prof. Bhim Singh, *FNAE,* IIT Delhi has been honoured with Rashtriya Vigyan Puraskar 2024 - Vigyan Shri presented by the Hon'ble President of India, Smt. Droupadi Murmu on August 22, 2024 for his work in advancing power electronics for renewable energy sources and e-mobility.
7	Dr. Avesh Kumar Tyagi, *FNAE,* Director, Chemistry Group, Bhabha Atomic Research Centre (BARC), Mumbai has been honoured with Rashtriya Vigyan Puraskar 2024 - Vigyan Shri presented by the Hon'ble President of India, Smt. Droupadi Murmu on August 22, 2024 for his contribution in the field of atomic energy.
8	Prof Mahesh C Tandon, *FNAE,* Chairman, Tandon Consultants Pvt., New Delhi has been conferred Lifetime Achievement Award by "Civil Engineering & Construction Review".
9	Dr Sanak Mishra, former President, INAE and Member of the Governing Board of the Steel Research & Technology Mission of India; Formerly Managing Director, Rourkela Steel Plant and Director, Steel Authority of India Ltd. (SAIL); Vice-President, ArcelorMittal and CEO India Projects; Secretary General, Indian Steel Association; President, Indian Institute of Metals chaired one of the 14 Task Forces, i.e. on the use of Biochar as a reductant in the primary stage of ironmaking. Last year, the Ministry of Steel had constituted 14 Task Forces to address the urgency of decarbonisation of the Indian steel industry. Based on the reports submitted by the 14 Task Forces, the Ministry of Steel prepared a consolidated and comprehensive position paper titled "Greening the Steel Sector in India; Road Map and Action Plan". The document was released by the Hon'ble Minister of Steel, Mr HD Kumaraswamy in an event organized by the Steel Ministry on September 10, 2024 at the India International Centre, New Delhi. On this occasion the Dr Sanak Mishra, FNAE and other Chairmen of the Task Forces, were felicitated by the Hon'ble Minister.
10	Prof. M.R. Madhav, *FNAE,* Professor Emeritus, JNT University; Visiting Professor, IIT, Hyderabad was selected as a recipient of the first ISSMGE Asian Lifetime Service Awards which is a testament to his remarkable contributions and achievements in the field. The award will be given during the 1st Geotech Asia 2025 to be held in Goa.
11	Dr Vallam Sundar, *FNAE*, Advisory Consultant and formerly Professor Emeritus, Department of Ocean Engineering, Indian Institute of Technology Madras, Chennai was presented the Hamaguchi Award in recognition of his outstanding achievement and contribution to tsunami /Coastal Disaster Resilience technology on the occasion of World Tsunami Awareness Day (November 5) presented by the Minister of Land, Infrastructure, Transport & Tourism, Japan, on October 30, 2024.
12	Prof Mahesh Tandon, *FNAE*, Chairman of Tandon Consultants Pvt Ltd has been conferred with the Lifetime Achievement Award of Consulting Engineers Association of India on January 10, 2025 in recognition of his innovative, aesthetic and environmentally sensitive designs in projects acclaimed both in India and internationally.
13	Mr S Somanath, *FNAE,* former Chairman, ISRO received the International Astronautical Federation's (IAF) prestigious World Space Award for Chandrayaan-3's remarkable achievement during a ceremony, in Milan, Italy in October 2024 to celebrate India's contributions to space exploration.
14	Mr VN Heggade, *FNAE* Founder & CEO of DECon Complete Solutions received the "First S D Limaye award for excellence in structural engineering" by Indian Concrete Institute (Pune Centre) at NICMAR University Pune on March 21, 2025.

15	Professor Cato Thomas Laurencin, *FNAE*, a Foreign Fellow of INAE, CEO, The Cato T. Laurencin Institute for Regenerative Engineering; Professor of Chemical & Biomolecular Engineering; Material Science & Engineering; Professor of Biomedical at University of Connecticut and Professor of Orthopaedic Surgery at University of Connecticut School of Medicine; USA is now Professor Sir Cato Thomas Laurencin. He was appointed Knight Commander of the Order of Saint Lucia, an Order Established by Queen Elizabeth II in March 2025. Prof Laurencin is internationally recognized for his groundbreaking contributions to the field of regenerative engineering that he founded, along with groundbreaking work in orthopaedic surgery, polymer science chemistry and engineering, and musculoskeletal repair and regeneration. Further details are available at the link given below. https://today.uconn.edu/2025/03/dr-cato-t-laurencin-appointed-knight-commander-of-the-order-of-st-lucia/

News of Fellows

1.	Prof. K Ramesh, *FNAE,* Department of Applied Mechanics and Biomedical Engineering, IIT Madras is Conference Chair for the International Conference on Experimental Mechanics 2024 organized by IIT Madras in association with Asian Society of Experimental Mechanics (ASEM) and Indian Society for Applied Mechanics. This will be held at IC&SR conference facilities, IIT Madras. The conference will be from 20th to 23rd October 2024 with a pre-conference workshop on Digital photoelasticity - Advances and Applications. For further details click on the link https://ge.iitm.ac.in/icem-2024/
2.	Prof Prem Vrat, *FNAE,* Pro-Chancellor; Professor of Eminence and Chief Mentor, The Northcap University, Gurgaon and formerly Former Founder Director, IIT Roorkee; Former VC, UPTU, Lucknow; Former Professor & Director-in-Incharge, IIT Delhi; Former Vice-Chancellor and Professor of Eminence, ITM University, Gurgaon has been featured in the prestigious publication "100 Great IITians Dedicated to the Service of the Nation" edited by Commander VK Jaitly. His profile was titled "An Academician par Excellence".
3.	Three INAE Fellows out of the six Professors appointed as IIT Directors in April 2024 are INAE Fellows. Prof Manindra Agrawal, *FNAE*, Professor from the Department of Computer Science and Engineering at IIT Kanpur, has been appointed as the Director of IIT Kanpur; Prof Avinash Kumar Agarwal, *FNAE* professor at IIT-Kanpur's Department of Mechanical Engineering, has been appointed as the Director of IIT-Jodhpur and Prof Sukumar Mishra, FNAE has been appointed as the Director of IIT Dhanbad.
4.	Prof. Dr. S.N. Mukhopadhyay, *FNAE*, Former Professor, DBEB, IIT Delhi; Former Professor & Head, BERC, IIT Delhi with wife Mrs Sakuntala jointly has contributed a hand written article in Bangla medium on "Amader Anander o Goa Bhramaner Katokatha" in ABHIDHA 2024 Magazine of BUS, I.I.T. Delhi in Barsobaran lssue, 2024, p4-11 which has been highlighted in May Newsletter of C.R. Park. He is also Life Member of C.R. Park KMS and along with his wife Mrs Sakuntala has written their biography book "Anande Jeebansrote" in Bangla medium printed by SR Print Studio, New Delhi associated with KMS New Delhi in September 2024.
5.	Prof Sandeep Verma, *FNAE* Professor of Chemistry, IIT Kanpur and his team have developed an indigenous solution for diabetes viz synthetic insulin that offer high thermal stability.
6.	Mr Jitendra J Jadhav, *FNAE* has been appointed as the new Director General of Aeronautical Development Agency (ADA).
7.	Dr Rajeev Shorey, *FNAE*, former CEO of the University of Queensland - IIT Delhi Academy of Research (UQIDAR) at IIT Delhi took charge as the Director of the Indian Institute of Information Technology (IIIT), Surat, Gujarat on the 12th June 2024.

8.	Dr. V Narayanan, *FNAE*, Director and Outstanding Scientist, Liquid Propulsion Systems Centre, ISRO, Thiruvananthapuram assumed the office of the Secretary, Department of Space (Government of India) and Chairman, Space Commission beginning 14th January 2025. With nearly four decades of experience in the Indian space sector, he has held several pivotal positions within the organization, specializing in rocket and spacecraft propulsion. Among his notable achievements, Dr. Narayanan served as the Project Director for the C25 Cryogenic Project of the GSLV Mk III vehicle. Under his leadership, the team successfully developed the C25 Stage, a crucial component of the GSLV Mk III.
9.	Prof GD Yadav, *FNAE*, National Science Chair, Govt. of India and Emeritus Professor of Eminence, ICT and JC Bose National Fellow, Institute of Chemical Technology, Mumbai, Former Vice Chancellor & R.T. Mody Distinguished Professor, Institute of Chemical Technology; Former Tata Chemicals Darbari Seth Distinguished Professor of Leadership and Innovation; Conjoint Professor, University of New Castle, Australia; Adjunct Professor, RMIT University, Australia and Adjunct Professor, University of Saskatchewan, Canada has been approved for the conferment of the award of CSIR Bhatnagar Fellowship for the year 2024 by the Council of Scientific and Industrial Research (CSIR) in recognition of his outstanding work in science and technology. Prof GD Yadav was also conferred the Prestigious Eminent Engineer award by the Engineering Council of India (ECI).
10.	Prof. Dr. S.N. Mukhopadhyay, *FNAE*, Former Professor, DBEB, IIT Delhi; Former Professor & Head, BERC, IIT Delhi with wife Mrs Sakuntala have jointly written their biopic book Anande Jeebansrote in Bangla medium printed by SR Print studio associated with KMS, C.R. Park, New Delhi where he is a life member. They also jointly contributed the article "Our Goa Visits" in Souvenir Durga Puja 2024 which has been printed by KMS, C.R. Park, New Delhi in January 2025
11.	Dr. Raksh Vir Jasra, *FNAE,* Senior Vice-President (R&D), R&D Centre, Vadodara Manufacturing Division, Reliance Industries Limited, Vadodara, Gujarat has been listed at number 34 in top 50 inventers of India published by Insights GREYB. For details click on links below. https://insights.greyb.com/top-50-indian-inventors-leading-the-patent-filing-in-india/ https://insights.greyb.com/raksh-vir-jasra-patents/
12.	Dr. S. Venkata Mohan, *FNAE*, Chief Scientist at the CSIR-Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad took over as Director of the CSIR-National Environmental Engineering Research Institute (CSIR-NEERI) on January 30, 2025.
13.	Prof Subhasis Chaudhuri, *FNAE*, Former Director, Indian Institute of Technology Bombay, Mumbai- has been appointed as Chairman of the Board of Directors of BSE Limited.
14.	Dr. Jaiteerth R Joshi, *FNAE,* Outstanding Scientist & Former Programme Director, Programme LRSAM, Defence R&D Laboratory, Hyderabad has assumed charge as Director-General of BrahMos, DRDO and CEO & Managing Director, BrahMos Aerospace from Dec 1, 2024.
15.	Prof Manoj Kumar Tiwari, *FNAE* was reappointed as IIM Mumbai Director in March 2025.

Fellows Deceased in Last One Year

During the period April 1, 2024 to March 31, 2025, it was learnt about the sad demise of the following INAE Fellows. Deepest Condolences have been expressed to the families of the deceased Fellows on behalf of INAE and prayers were offered for their souls to rest in peace. Brief Obituaries as a mark of respect for the departed INAE Fellows are given below.

Dr. CR Prasad

(January 14, 1941 - July 13, 2024)

Dr. CR Prasad, *FNAE*, Chairman, Patikari Power Private, Gurgaon and Former Chairman & Managing Director, GAIL (India) Limited, born on January 14, 1941 passed away on 13th July 2024. Dr Prasad was affiliated to Engineering Section – IV (Chemical Engineering) and elected to INAE Fellowship in the year 1999.

Dr. CR Prasad joined (Gas Authority of India Limited) GAIL as Director (Planning) in 1994 and rose to the position of CMD in 1996. He was instrumental in transforming GAIL into a company strategically positioned for forward and backward integration, thereby unlocking the full potential of the gas value chain. His visionary leadership established a robust foundation, characterized by the core values and competencies. He was instrumental in steering GAIL towards becoming a pivotal layer in the Indian public sector. He consistently delivered projects on time and within budget, solidifying his reputation in the LPG, Liquid Hydrocarbons, and Petrochemicals sectors. His tenure saw the implementation of the Pata petrochemical complex, JLPL, HBJ Upgradation and many other important projects.

May God bless his soul to Rest in Peace

Dr. MS Valiathan

(May 24, 1934 - July 17, 2024)

Dr. MS Valiathan, *FNAE*, National Research Professor, Manipal University, Manipal; Founder Director, Sree Chitra Tirunal Institute for Medical Sciences & Technology (SCTIMST), Trivandrum and formerly VC, Manipal Academy of Higher Education, born on May 24, 1934 passed away on 17th July 2024. Dr Valiathan was affiliated to Engineering Section – X (Interdisciplinary and Special Engineering Fields and Leadership in Academic Institutions, R&D and Industry) and elected to INAE Fellowship in the year 1987.

Dr Valiathan had made outstanding contributions as a renowned cardiac surgeon and in the field of Prosthetic Materials. His significant contributions to laying the foundation for the nation's Indigenous medical technology development are well recognized. He was responsible for the Indigenous development of the first-ever mechanical heart valve prosthesis of the nation, the TTK-Chitra valve - a product that took 12 years to develop and he and his team implanted the first valve at SCTIMST in 1990. The Chitra Heart Valve Prosthesis stands as a true testament to an Indigenous, resource-intensive and cost-effective biomedical device in the nation. The low-cost, fully-indigenous mechanical valve has since been a life-saver for millions of poor in India who suffered heart valve damage at a young age due to rheumatic heart disease. Dr Valiathan received the Padma Bhushan in 1990 and Padma Vibhushan in 2005 from President of India.

May God bless his soul to Rest in Peace

Dr. Ram Narain Agarwal

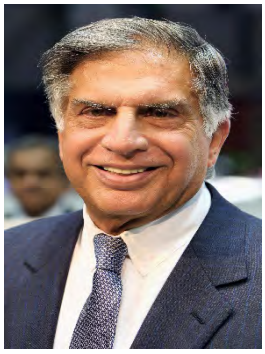
(July 24, 1941– August 15, 2024)

Dr RN Agarwal, *FNAE*, Formerly Director, Advanced Systems Laboratory and Programme Director (AGNI), Defence Research & Development Laboratory (DRDO), Hyderabad born on July 24, 1941 passed away on August 15, 2024. Dr Agarwal was affiliated to Engineering Section – VII (Aerospace Engineering) and elected to INAE Fellowship in the year 2000.

Dr Agarwal had made outstanding contributions to the fields of Aero-Missiles, Re-entry and made significant contributions to the Agni missile program, launched in 1983, and served as its first program director. He was instrumental in India's Agni missile development programme right from its inception in 1983 till 2005. He inspired the team to successfully test the Technology demonstrator missile in May 1989. Thereafter, various versions of the missile were developed and inducted into the defence forces. Today, Agni V, the nuclear-capable, intermediate-range ballistic missile has the capability to strike targets beyond 5000 kms. Dr Agarwal retired as the founder and director of the Advanced Systems Laboratory (ASL), Hyderabad in 2005. Dr Agarwal played a key role in establishing the re-entry technology, all composite heat shield, onboard propulsion system, guidance and control etc for missiles during a distinguished tenure of 22 years. He was conferred the Padma Shri in 1990 and Padma Bhushan in 2000 by the President of India.

May God bless his soul to Rest in Peace

Mr Ratan Tata



28 December 1937 – 9 October 2024)

Mr Ratan Tata, *FNAE* born on 28 December 1937 passed away on 9 October 2024. He was elected to INAE Fellowship in the year 1992 and affiliated to Engineering Section X (Interdisciplinary and Special Engineering Fields and Leadership in Academia, R&D and Industry).

Mr Ratan Tata, Chairman Emeritus, Tata Industries Ltd, Mumbai; former Chairman, Tata Sons was a doyen of Indian Industry who took the reins of the Tata Group in 1991 and over his two-decade-long leadership, he oversaw the diversification and expansion of the group into sectors such as IT, steel, automobiles, and hospitality. Mr Tata had serves as the chairman of major Tata companies, including Tata Motors, Tata Steel, Tata Consultancy Services, Tata Power, Tata Global Beverages, Tata Chemicals, Indian Hotels and Tata Teleservices and took them to greater heights of excellence. The introduction of the Tata Nano in 2008, aimed at providing affordable cars for the masses, stands out as one of his important accomplishments. Under his guidance, the Tata Group also made key global acquisitions, including Tetley, Jaguar Land Rover, and Corus. Tata also championed startups and entrepreneurship, investing in young innovators and fostering a spirit of innovation in India through ventures like Tata Capital and Tata Start-up Hub.

Mr Tata was conferred the INAE Life Time Contribution Award in Engineering in the year 2008 for his outstanding contributions to the growth of the Indian Industry and for being a visionary business leader, par excellence. He was also inducted as a Member of the National Academy of Engineering, USA in recognition of his outstanding contributions to industrial development in India and across the world. He was honored with the Padma Bhushan in 2000 and the Padma Vibhushan in 2004 by the Hon'ble President of India for his contributions to Indian industry.

Mr Tata was recognized not only for his outstanding contributions to Indian Industry, corporate sector and engineering community but for his grace, eminence and philanthropy. He leaves behind a profound legacy of business leadership, global expansion, and a deep commitment to societal betterment, having donated generously to charitable causes. He was a supporter of education, medicine and rural development and recognized for his deep commitment as a philanthropist. In his demise, the country and the engineering fraternity have lost one of the greatest icons and inspiration for excellence.

May God bless his soul to rest in peace

Dr R Chidambaram

(November 11, 1936 - January 4, 2025)

Dr R Chidambaram, *FNAE* born on November 11, 1936 passed away on January 4, 2025. He was elected to INAE Fellowship in the year 1998 and affiliated to Engineering Section IX (Energy Engineering).

Dr R Chidambaram, *FNAE*, Chairman (Honorary), School for Advanced Studies in Nuclear Science & Technology, Bhabha Atomic Research Centre (BARC), Mumbai and Formerly Director, BARC; Formerly Chairman, Atomic Energy Commission and Secretary, Department of Atomic Energy and Formerly Principal Scientific Adviser to the Govt. of India & DAE Homi Bhabha Professor, Bhabha Atomic Research Centre, Mumbai was an eminent physicist who is known for his integral role in India's nuclear weapons program. He was a part of the team conducting the first Indian nuclear test (Smiling Buddha) at Pokhran Test Range in 1974. He also led and represented the team of the Department of Atomic Energy (DAE) while observing and leading efforts to conduct the second nuclear tests in May 1998.

Some of Dr Chidambaram's initiatives as Principal Scientific Adviser to the Govt. of India including the setting up of the Core Advisory Group for R&D in the Automotive Sector (CAR) to increase academia-industry interaction, the creation of RuTAGs (Rural Technology Action Groups) for effective need based technology delivery in rural areas and the establishment of SETS (Society for Electronic Transactions and Security) are making significant impact. He jointly with the National Informatics Center helped conceptualise and supervise the setting up of the high-speed 'National Knowledge Network' to connect about 1,500 educational and research institutions in India. He also had emphasized the need for 'Coherent Synergy' (a phrase he had coined) in India's Science & Technology (S&T) efforts to take India on a sustained fast-growth path. He had also focused on the importance of 'Directed Basic Research' as an addition to self-directed basic research. As Chair of the Scientific Advisory Committee to the Cabinet, he championed advancements in energy security, materials science, supercomputing, and nanotechnology. Dr Chidambaram was conferred with several distinguished awards and honours including the Padma Shri in 1975 and the Padma Vibushan in 1999 by President of India. He was conferred the INAE Life Time Contribution Award in Engineering during the year 2009.

May God bless his soul to rest in peace

Prof R Subbayyan

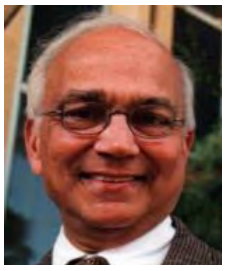
(**June 08, 1925- May 2, 2023)**

Prof R Subbayyan, *FNAE*, Former Vice-Chancellor, Bharathiar University, Coimbatore, born on June 08, 1925 passed away on May 2, 2023. He was affiliated to Engineering Section – V (Electrical Engineering) and elected to INAE Fellowship in the year 2013.

Prof R Subbayyan had made significant research contributions in the areas of Electric Machines & Power Systems and Systems Engineering. He was the first Vice- Chancellor of Bharathiar University and served from 1982 to 1988. An Emeritus Professor of University Grants Commission from 1988 to 1990, he was an executive committee member of AICTE from 1994 to 1997. He contributed significantly to the development of PSG College of Technology, Coimbatore and served as Member of several educational committees, and also was on the board of numerous institutions. He was an advisor and consultant for joint projects with industry. He published more than 50 research papers in national and international technical journals, seminars and conferences proceedings. He was the education consultant for Asian Development Bank and Chairman of Assessment Committee and Consultant for Defence Research and Development Laboratories.

May God bless his soul to Rest in Peace.

Prof. Subhash Mahajan



(**October 04, 1939- August 17, 2023)**

Prof Subhash Mahajan, *FNAE*, Distinguished Professor and Special Adviser to the Chancellor, University of California, USA born on October 04, 1939 passed away on August 17, 2023. He was affiliated to Engineering Section – VIII (Mining, Metallurgical and Materials Engineering) and elected to INAE Foreign Fellowship in the year 2014.

Prof Subhash Mahajan had made significant research contributions in the areas of Functional Materials and Deformation behaviour of solids. His research focused on understanding the origins of defects in semiconductors and their influence on device behaviour and deformation behaviour of solids. He joined Bell Laboratories in 1971 and served for 12 years, working on twinning and perfecting silicone for crystals for the rapidly advancing electronics technology. He then joined as Professor of Materials Science at Carnegie-Mellon University in Pittsburgh and later joined Arizona State University, USA, where he served Regents and Emeritus Professor and was former director of the School of Materials Engineering before joining University of California. He was a member of several professional societies, received several awards, and mentored generations of material scientists. He was a dedicated educationist and researcher in the area of Materials Engineering.

May God bless his soul to Rest in Peace.

Prof. AP Kudchadker

(February 16, 1934 - August 13, 2024)

Prof. AP Kudchadker, *FNAE*, Professor Emeritus, Indian Institute of Technology Bombay, Mumbai born on February 16, 1934 passed away on August 13, 2024. He was affiliated to Engineering Section – IV (Chemical Engineering) and elected to INAE Fellowship in the year 1994.

Prof. AP Kudchadker had made significant research contributions in the area of Process Engineering. He was a faculty of Chemical Engineering at IIT Kanpur, prior to joining IIT Bombay and after retirement was founding Director of Dhirubhai Ambani Institute of Information and Communication Technology and Pandit Deendayal Upadhyay Petroleum University in Gujarat. He made outstanding contributions to the growth of engineering education, research and academic administration. He was a mentor to several generations of students and served as Deputy Director at IIT Bombay from 1986-1994. He worked in the area of Thermodynamics, and developed a laboratory in thermodynamics research at IIT Bombay. He was among the first to recognize the importance of sustainable chemical processing, and initiated programs with a broad vision for shifting the focus to bio-based raw materials from fossil-based ones.

May God bless his soul to Rest in Peace.

INAE Young Associates 2024

The INAE Governing Council, during its 146th Meeting on March 27, 2023 instituted an "INAE Young Associate" recognition in lieu of the erstwhile INAE Young Engineer Award with no prize money and similar guidelines due to directives from DST to suspend awards. Accordingly, nominations were invited from INAE Fellows; Directors of IITs, NITs and VC of Central Universities; and Heads of R&D organizations and Industry. Out of a total of 110 nominations considered, 46 were shortlisted by the Sectional Committees during their meetings held between 15th to 31st May 2024 for making presentation before the Selection Committee for Young Associate. Twenty nine candidates for INAE Young Associate 2024 were recommended by Selection Committee for Young Associate during meetings held on 8th and 9th August 2024 as per details given at the link https://www.inae.in/young-criteria/

The INAE Young Associates selected for 2024 are given below.

1. **Dr. Anindya Pain**, Principal Scientist, CSIR – CBRI, Roorkee. (ES-I – Civil Engineering).
2. **Dr. Debdutta Ghosh**, Senior Scientist, CSIR-Central Building Research Institute, Roorkee (ES-I – Civil Engineering).
3. **Dr. Salil Goel**, Assistant Professor, IIT Kanpur. (ES-I – Civil Engineering).
4. **Dr. Surender Singh**, Assistant Professor, IIT Madras. (ES-I – Civil Engineering).
5. **Dr. Preethi Jyothi**, Associate Professor, IIT Bombay. (ES-II-Computer Engineering and Information Technology).
6. **Dr. Obbattu Sai Lakshmi Bhavana**, Assistant Professor, IIT (BHU), Varanasi. (ES-II-Computer Engineering and Information Technology).
7. **Dr. Mayank Baranwal**, Senior Scientist, Tata Consultancy Services. (ES-II-Computer Engineering and Information Technology).
8. **Dr. Shrutidhara Sarma**, Assistant Professor, IIT Jodhpur. (ES-III- Mechanical Engineering).
9. **Mr. Baibhaw Prakash**, Scientific Officer (E), BARC, Mumbai. (ES-III- Mechanical Engineering).
10. **Dr. Chandan Pandey**, Assistant Professor, IIT Jodhpur. (ES-III- Mechanical Engineering).
11. **Dr. Muvvala Gopinath**, Assistant Professor, IIT Hyderabad. (ES-III- Mechanical Engineering).
12. **Dr. Dipin S Pillai**, Assistant Professor, IIT Kanpur. (SC-IV – Chemical Engineering).
13. **Dr. Udita Uday Ghosh**, Assistant Professor (Grade I), IIT (BHU), Varanasi. (SC-IV – Chemical Engineering).
14. **Dr. Vineet Aniya**, Senior Scientist & Associate Professor, CSIR – IICT, Hyderabad. (SC-IV – Chemical Engineering).
15. **Dr. Nasirul Haque**, Assistant Professor, Grade-II, NIT Calicut. (SC-V – Electrical Engineering).

16. **Dr. Deepak Reddy Pullaguram**, Assistant Professor, IIT Kharagpur. (SC-V – Electrical Engineering).

17. **Dr. Shakthi Prasad D**., Assistant Professor, IIT Goa. (SC-V – Electrical Engineering).

18. **Dr. Debdeep Sarkar**, Assistant Professor, IISc, Bangalore. (SC-VI- Electronics and Communication Engineering).

19. **Dr. Suraj Srivastava**, Assistant Professor, IIT Jodhpur. (SC-VI- Electronics and Communication Engineering).

20. **Dr. Tushar Sandhan**, Assistant Professor, IIT Kanpur. (SC-VI- Electronics and Communication Engineering).

21. **Dr. Tanmay Dutta**, Assistant Professor, IIT Guwahati. (SC-VI- Electronics and Communication Engineering).

22. **Dr. Rajesh Chaunsali**, Assistant Professor, Indian Institute of Science, Bangalore. (ES-VII – Aerospace Engineering).

23. **Dr. Duvvuri Subrahmanyam**, Assistant Professor, Indian Institute of Science, Bangalore. (ES-VII – Aerospace Engineering).

24. **Ms. Tanvi Prakash**, Assistant General Manager, Larsen & Toubro, Mumbai. (ES-VII – Aerospace Engineering).

25. **Mr. Harish Donthula**, Scientific Officer 'E', BARC, Mumbai. (SC-VIII- Mining, Metallurgical & Materials Engineering).

26. **Dr. Arka Jyoti Das**, Senior Scientist, CSIR-Central Institute of Mining and Fuel Research, Dhanbad. (SC-VIII- Mining, Metallurgical & Materials Engineering).

27. **Dr Kaushik Parida**, Assistant Professor, IIT Roorkee. (SC-IX- Energy Engineering).

28. **Dr. Jayeshkumar Sevantilal Mevada**, Post-Doctoral fellow, ICT, Mumbai. (SC-X- Interdisciplinary & Special Engineering Fields and Leadership in Academia, R&D and Industry).

29. **Dr. C Bharathi Priya**, Principal Scientist, CSIR-Structural Engineering Research Centre, Chennai. (SC-X- Interdisciplinary & Special Engineering Fields and Leadership in Academia, R&D and Industry).

INAE Annual Convention 2024

The Indian National Academy of Engineering (INAE) Annual Convention 2024 was held on December 19-21, 2024 hosted at Indian Institute of Technology Delhi, New Delhi. The Convention of the Academy was mega event attended by Fellows, Foreign Fellows, Young Associates, Scientists, Faculty and students of IIT Delhi and Invitees. This year's Annual Convention was made even more memorable as the Chief Guest of the Inaugural Session was Shri Rajnath Singh, Hon'ble Raksha Mantri, Ministry of Defence, Government of India. The Convention started with the traditional lighting of the lamp and invocation followed by the Welcome Addresses by Prof Indranil Manna, President, INAE and Prof. Rangan Banerjee, Director, IIT Delhi. A Visual Presentation on INAE was featured which gave a brief overview of Indian National Academy of Engineering (INAE) since inception and highlighted some of the major technical activities and contributions that have increased the visibility and outreach of the Academy in the National and International engineering domain. This was followed by release of Convention Souvenir featuring brief profiles of the newly elected Fellows, Foreign Fellows and Young Associates and it also contained details of the newly Instituted Memberships- Institutional, Corporate and Individual that has helped bring a larger section of the engineering community under the folds of the Academy.

Dignitaries on the Dais during Visual presentation on INAE in Inaugural Session: Left to Right – Prof Indranil Manna, FNAE, President, INAE; Guest of Honour – Mr SN Subrahmanyan, FNAE, Chairman & MD, Larsen & Toubro Ltd; Chief Guest - Shri Rajnath Singh, Hon'ble Raksha Mantri, Ministry of Defence, Government of India; Guest of Honour -Dr Samir V Kamat, FNAE, Secretary DDR&D and Chairman DRDO and Prof Rangan Banerjee, FNAE, Director, IIT Delhi.

The much awaited address by the Chief Guest Shri Rajnath Singh, Hon'ble Raksha Mantri was inspirational and though provoking and enthralled the august audience with his deep words of wisdom. During his speech he brought out that India is passing through a defining moment and will soon achieve a formidable technical edge in international arena. He exhorted scientists and engineers to specialise in high-end technologies for strengthening India's position in cutting-edge innovation. He also emphasized the calls to stay connected with the country's heritage while forging ahead and accentuated the need to establish better organic relationship among industry, R&D organisations and academia to achieve progress

in disruptive technologies. The Chief Guest – Shri Rajnath Singh, Hon'ble Raksha Mantri, Ministry of Defence, Government of India and Guests of Honour –Dr Samir V Kamat, Secretary DDR&D and Chairman DRDO and Mr SN Subrahmanyan, Chairman & MD, Larsen & Toubro Ltd were felicitated by Prof Indranil Manna, President, INAE and Prof Rangan Banerjee, Director, IIT Delhi.

Release of INAE Annual Convention 2024 Souvenir by the Dignitaries on the Dais

Presentation of Memento to the Chief Guest- Shri Rajnath Singh, Hon'ble Raksha Mantri, Ministry of Defence, Government of India by Prof Indranil Manna, President, INAE

Chief Guest –Hon'ble Raksha Mantri Shri Rajnath Singh Delivering Inaugural Address

Presentation of Memento to the Guest of Honour - Mr SN Subrahmanyan, FNAE, Chairman & MD, Larsen & Toubro Ltd by Prof Indranil Manna, President, INAE

Presentation of Memento to the Guest of Honour - Dr Samir V Kamat, FNAE, Secretary DDR&D and Chairman DRDO by Prof Rangan Banerjee, FNAE, Director, IIT Delhi.

The highlights of the INAE Annual Convention 2024 on Day 1were the Lectures by eminent leaders in the field of engineering & technology: Plenary Lectures by Mr SN Subrahmanyan, Chairman & MD, Larsen & Toubro Ltd and Dr. SV Kamat, Secretary DDR&D and Chairman DRDO, Ministry of Defence, New Delhi; Key-note Lectures by Dr Ajay Kumar, former Secretary Defence (Production) and Defence Secretary, Ministry of Defence, New Delhi and Dr. Ajay Mathur, DG, International Solar Alliance and Distinguished Lectures by Dr Manish Gupta, Director, Google Research India, Bangalore and Dr. SK Sarin, Director, ILBS and Former President, NAMS, a medical practitioner who highlighted the interface of engineering with medicine.

Plenary Lecture being delivered by Mr SN Subrahmanyan, FNAE, Chairman & MD, Larsen & Toubro Ltd and Dr BN Suresh, Former President, INAE Presenting a Token of Gratitude to him on behalf of INAE

Plenary Lecture being delivered by Dr. SV Kamat, Secretary DDR&D and Chairman DRDO, Ministry of Defence, New Delhi and Dr Sanak Mishra, Former President, INAE Presenting a Token of Gratitude to him on behalf of INAE

Keynote Lecture being delivered by Dr Ajay Kumar, former Secretary Defence (Production) and Defence Secretary, Ministry of Defence, New Delhi and Mr JD Patil, President Designate, INAE Presenting a Token of Gratitude to him on behalf of INAE

Key-note Lecture being delivered by Dr. Ajay Mathur, DG, International Solar Alliance and Prof Rangan Banerjee, FNAE, Director, IIT Delhi Presenting a Token of Gratitude to him on behalf of INAE

Distinguished Lecture being delivered by Dr. SK Sarin, Director, ILBS and Former President, NAMS and Prof Sivaji Chakravorti, Vice President, INAE Presenting a Token of Gratitude to him on behalf of INAE

Distinguished Lecture being delivered by Dr Manish Gupta, Director, Google Research India, Bangalore and Dr Rajeev Shorey, FNAE Presenting a Token of Gratitude to him on behalf of INAE

The INAE Governing Council Meeting was held on the evening of Dec 19, 2024 as per practice each year in the month of December 2024. An "Elevating Program" by SPIC MACAY was organized before the dinner on Day 1 featuring an entertaining Kathak recital by the famous artiste Vidushi Shovana Narayan.


Kathak recital by SPIC MACAY by artiste Vidushi Shovana Narayan and the troupe.

The second day of the INAE Annual Convention i.e. Dec 20, 2024 commenced with the brief presentations on Technical Reports by the Conveners of the 10 INAE Sectional Committees based on the 10 broad based INAE Engineering Sections covering the entire spectrum of engineering disciplines. The genesis of this initiative is that the INAE Sectional Committees were requested to prepare 1-2 reports as a Technology Forecast/Review/Gap Analysis/Databases/analytics Document which is unique so as to make a marked difference in the respective domains and serve as a reference document for Government Departments/ Agencies and other stakeholders as a roadmap for advancing the technology area in the country. The presentations highlighted the roadmap documents under preparation and were well appreciated.


Presentation by Prof KK Pant, FNAE for SC IV *Presentation by Prof L Umanand, FNAE for SC V*

Presentation by Prof Suddasatwa Basu, FNAE for SC IX

Presentation by Prof Sandeep Verma, FNAE for SC X

The main technical features of Day 2 were the technical presentations by the newly elected Fellows and Young Associates on their engineering contributions that have brought them acclaim and have led to their election as Fellows and selection as Young Associates. The lectures were followed by Q&A and were illuminating and inspired the audience and also guided the student attendees who were enthused in their research work by the depth of knowledge and skills of the presenters.

Presentations by Newly Elected Fellows

Presentations by Young Associates

The evening session commenced with a Panel Discussion on “Road Map for Viksit Bharat” moderated by Prof Indranil Manna, President, INAE and the panellists were eminent experts from Academia/R&D organizations and Industry viz Dr. Tapan Sahoo, Executive Director (Engineering), Maruti Suzuki India Limited who covered the topic “Mobility” Dr. Mahesh Gupta, Chairman & MD, Kent RO Systems Ltd. Who touched upon “Water & Sanitation”; Prof. Manindra Agrawal, Director, IIT Kanpur who spoke on

"Cyber Security" and "Renewable Energy" was covered by Dr. Ajay Mathur, DG, ISA, New Delhi. The Panellists responded to pertinent questions and expounded the challenges and opportunities on the path to a Viksit Bharat as envisaged by the Hon'ble Prime Minister by 2047. The deep insight and perception of the panellists added value to the rich technical content of the programme and were much appreciated by the eminent audience and students alike.

Panel Discussion on "Road Map for Viksit Bharat" (Left to Right) –Prof Manindra Agrawal, FNAE, Director, IIT Kanpur; Dr. Ajay Mathur, DG, ISA; Prof Indranil Manna, President, INAE; Dr. Mahesh Gupta, Chairman & MD, Kent RO Systems Ltd and Dr. Tapan Sahoo, Executive Director (Engineering), Maruti Suzuki India Limited.

This was followed by a motivational Fireside Chat in the areas of "Manufacturing" and "AI" with Mr. Bhavish Aggarwal, Founder & Chairman of Ola Consumer, Ola Electric, and India's first AI unicorn Ola Krutrim as the Guest. The Session was moderated by Prof UB Desai, Vice-President, INAE who asked pertinent questions and the session was interesting, informative and the interactive part much appreciated by one and all. The essence of the Fireside Chat was that not only the technical issues were highlighted but the informal discussions and questions by the students of IIT Delhi enthused them and brought out the importance and success of entrepreneurship of the Guest, as an example to be emulated. The Networking Dinner was a befitting closure to Day 2 after a day filled with technical inputs and provided a platform for meaningful interactions.

Fireside Chat Moderated by Prof UB Desai, Vice-President, INAE (Left) with Mr. Bhavish Aggarwal, Founder & Chairman of Ola Consumer, Ola Electric, and India's first AI unicorn Ola Krutrim (Right) as the Guest.

The third day of the INAE Annual Convention 2024 commenced with the Session on Follow-up discussion on "AI/ML: Future Directions, Threats, and Way Forward" moderated by Prof. UB Desai, Former IIT Hyderabad Director and Vice-President, INAE. The Panellists were eminent industry experts viz: Dr. Anand Deshpande, Founder, Chairman and Managing Director of Persistent Systems; Prof. Vineeth N Balasubramanian, IIT Hyderabad; Dr. Rajeev Rastogi, VP ML Amazon India; Dr. Harish Iyer, Melinda and Bill Gates Foundation and Dr. Shubhashis Gangopadhyay, Vice Chairperson, Center for Digital Future, and Founding Dean of ISPP, Economics, Law, Policy Praxis Lab. The relevant issues in the field of Artificial Intelligence and Machine Learning and the challenges and opportunities for advancement in this field that shall help progress of the nation and also ensure a better life for the citizens were deliberated during the discussion.

Session on AI/ML: Future Directions, Threats, and Way Forward" moderated by Prof. UB Desai, Vice-President, INAE (Left to Right) Prof. Vineeth N Balasubramanian, IIT Hyderabad; Dr. Rajeev Rastogi, VP ML Amazon India; Prof. UB Desai, Vice-President, INAE; Dr. Anand Deshpande, Founder, Chairman and Managing Director of Persistent Systems; Dr. Shubhashis Gangopadhyay, Vice Chairperson, Center for Digital Future, and Founding Dean of ISPP, Economics, Law, Policy Praxis Lab and Dr. Harish Iyer, Melinda and Bill Gates Foundation.

The Annual General Meeting and Special General Meeting of the Fellows brought an end to the technical events and deliberations and the Induction Ceremony of newly elected Fellows, Foreign Fellows and Young Associates was a memorable moment for the new inductees, as well as their peers and parent organizations to whom they have brought glory by advancing the growth of engineering and technology in their respective domains. After the Networking Lunch the delegates bade farewell and would look forward to the Conventions in future years, as a Calendar event that would be eagerly awaited with meaningful outcomes.

AGM in Progress: (Left to Right) Mr JD Patil, President, Designate, INAE; Prof Indranil Manna, President, INAE; Prof Sivaji Chakravorti, Vice-President, INAE and Prof UB Desai, Vice-President, INAE

A few Glimpses of Induction Ceremony of Fellows and Young Associates

Mr Sanjay Kirloskar being felicitated during Induction Ceremony by Mr JD Patil, President Designate, INAE and Prof Sivaji Chakravorti, Vice - President, INAE

Dr C Bharathi Priya Being Inducted as a Young Associate by Prof Indranil Manna, President, INAE in presence of Prof Sivaji Chakravorti, Vice-President, INAE

(To view all photographs of the INAE Annual Convention 2024 click on the link https://www.dropbox.com/home/INAE%20Annual%20Convention%202024-%20Photos)

The INAE Governing Council Meeting was held on Dec 19, 2024 at IIT Delhi on the sideleines of the INAE Annual Convention 2024. During the meeting, besides deliberations on the Agenda, Prof Indranil Manna, the outgoing President, INAE was felcicitated and Mr JD Patil the new President of INAE w.e.f. January 1, 2025 was welcomed by the Members of the Governing Council.

INAE Governing Council Meeting in Progress

The INAE Annual Convention 2024 was supported by Department of Science and Technology (DST), Government of India and Anusandhan National Research Foundation (ANRF) and partly sponsored by Maruti Suzuki Innovation and Ola.

INAE Publications

(i) Transactions of Indian National Academy of Engineering – An International Journal of Engineering and Technology"

INAE is currently publishing a Journal named "Transactions of Indian National Academy of Engineering – International Journal of Engineering and Technology" published by M/s Springer which was earlier named INAE Letters. **Transactions of INAE Volume 9, Issue 2, June 2024; Issue 3, September 2024; Volume 9, Issue 4, December 2024 and Volume 10, Issue 1 March 2025** were published through Springer Publishers during the period April 1, 2024 to March 31, 2025.

(ii) Technical Reports on "Technology Review / Forecasting / Gap Analysis" by Sectional Committees

Engineering Academies abroad routinely publishes important Documents/Reports as an outcome of deeply researched studies or surveys on contemporary challenges in engineering and technology that are neither published anywhere nor available in any public domain but are of immense value to an entrepreneur, a government department, an industrial organization, or a policy making unit.

As per practice being followed by INAE since 2023, at least one topic or theme every calendar year, selected by the Engineering Section itself, to research, deliberate and eventually generate a Technology Forecast/Review/Gap Analysis/Databases/analytics Document which is unique in its kind prepared by specialists from the Sectional Committee jointly with other experts from the Fellowship or outside from other organizations including industry. The purpose of bringing out such valuable documents to showcase INAE's initiative of maintaining a quality and regularity and offering valuable intellectual input to the engineering industries, governmental departments, policy think tanks, research organizations, and entrepreneurs, which in turn cement INAE's position as a thought leader in the field of engineering and technology. The Final Report to be prepared as a policy document of about 8-10 pages may be a free formatted document containing figures, diagrams, schematics, tables, references and names of authors and co-authors as deemed fit.

In the year 2023, the following six such documents produced are being published by M/s Springer in a special issue of Transactions of the INAE Journal titled "Status and Forecasting of Selected Contemporary Technologies – Vol 1".

2023 - Report on Technology Forecast/Review/Gap Analysis/Databases /analytics

Sectional Committee	Topic of the Report
I	Sustainable Coastal Zone Management of river mouths
III	Hydrogen Economy: An India Specific Approach
V	Action Plan for Drone Technology: A Strategy Paper
VI	Tri-structural Isotropic (TRISO) particle fuels: Possibility of their usage in day-to-day applications
VII	UAV Indigenization - A Way Forward
IX	Green Technologies from Plasmas

Similarly, six such documents were also produced during the year 2024 as under, which will also be taken forward by INAE for necessary action.

2024 - Report on Technology Forecast/Review/Gap Analysis/Databases /analytics

Sectional Committee	Topic of the Report
SC-I	Climate Change Adaptation in Coastal Cities: Water and Maritime Infrastructure
SC-III	Challenges and Roadmap for Market Uptake in Metal Additive Manufacturing
SC-V	EV or HEV – Which is preferred for the Indian Ecosystem?
SC-VI	Sensing and transducer technologies – India
SC-VII	1) High Altitude Platforms (HAPs): Need, Status and Way Ahead 2) Aero Engine Development in the Country - Gap Areas
SC-VIII	Green Steel

INAE Membership Schemes

Update on Memberships of INAE, viz., Institutional Membership, Corporate Membership and Individual Membership and other initiatives for generation of INAE Corpus Fund

Following a directive from the Department of Science and Technology (DST) on 6th May 2022, INAE was required to attain financial and functional autonomy, with government Grant-in-Aid ending from 1st April 2025. As India's sole engineering academy and a member of the international body CAETS, INAE had initiated a strategic plan—endorsed by its Fellowship and approved by DST—to ensure sustainability through the creation of a Corpus Fund. This strategy, approved during key meetings in late 2023, outlined six primary funding sources: (i) Corporate Membership/Donations, (ii) Institutional Membership, (iii) Individual Donations/Membership, (iv) Corporate Social Responsibility (CSR), (v) Government/Project Support, and (vi) Revenue from Publications.

It gives us great pleasure to formally acknowledge the generous contributions/commitments received by INAE from several esteemed corporate entities and institutions. Notable donors/contributors include L&T (25 Cr over a span of 5 years), Tata Sons (one-time donation of 25 Cr), Google (~13 Cr), Infosys Foundation (~38 Cr through CSR from 2024-2028), Microsoft (~40 Lakh), Google Research India ($20000), Excel Industries (7.5 Lakh) as well as memberships from premier educational and research institutions such as the IITs, top private universities, and DRDO laboratories. These contributions reflect a high level of trust and confidence in INAE's mission and have significantly strengthened our journey toward financial self-reliance.

INAE has a total of 31 Institutional members (Diamond-23; Sapphire-03; Ruby-01; Coral- 04) as on 31st March 2025, listed as below:

Diamond:

1. Indian Institute of Management Mumbai
2. SRM University-AP, Andhra Pradesh
3. Indian Institute of Technology Indore
4. Defence Institute of Advanced Technology (Deemed to be University), Pune
5. Indian Institute of Technology Bombay
6. Indian Institute of Technology Jodhpur
7. Indian Institute of Technology Delhi
8. Indian Institute of Space Science and Technology Thiruvananthapuram
9. Indian Institute of Technology Gandhinagar
10. National Institute of Advanced Manufacturing Technology (NIAMT), Ranchi
11. Indian Institute of Technology Mandi
12. Birla Institute of Technology Mesra
13. MVJ College of Engineering, Bengaluru
14. Indian Institute of Technology Roorkee
15. Indian Institute of Technology Kanpur
16. Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar
17. Indian Institute of Technology Madras
18. Indian Institute of Technology (Indian School of Mines) Dhanbad
19. Kalinga Institute of Industrial Technology (KIIT) Deemed to be University, Bhubaneswar
20. National Institute of Technology Hamirpur

21. Indian Institute of Technology Tirupati
22. Indian Institute of Technology Dharwad
23. Microwave Tube Research & Development Centre (MTRDC), Bengaluru

Ruby:

1. Indian Institute of Technology Jammu

Sapphire:

1. Jawaharlal Nehru Technological University, Anantapur
2. Birla Institute of Technology & Science, Pilani (BITS Pilani)
3. Defence Materials Stores and Research & Development Establishment (DMSRDE), Kanpur

Coral:

1. Indian Institute of Technology Goa
2. National Institute of Technology Mizoram
3. Puducherry Technological University, Puducherry
4. Indian Institute of Technology Bhilai

As of 31st March 2025, the Individual Membership base comprises 84 Senior Members and 34 Associate Members. Under the Corporate Membership category, Tata Steel, Tata Motors, and Kent RO have each subscribed for a one-year term with a contribution of ₹10 lakhs.

Furthermore, a substantial CSR contribution of ₹38 Crores by the Infosys Foundation has been earmarked for a four-year program aimed at upgrading engineering education in India. Of this, approximately ₹10 Crores will be allocated to program management and administrative overheads managed by INAE.

In terms of operational funding, we have received ₹8.3 crore through membership contributions (institutional, corporate, and individual). We also anticipate income of ₹55 lakh from overheads under schemes implemented in collaboration with DST/ANRF, and ₹57 lakh from interest earnings (excluding returns from the corpus fund).

These financial inflows collectively position INAE to comfortably meet its routine operational expenditures in the upcoming financial year.

Donations to INAE Corpus Fund

Mr. Jayant D. Patil, President, INAE along with Prof. Indranil Manna, Immediate Former President, and Dr. B.N. Suresh, Former President of INAE, have collectively issued several appeals to the Fellowship, encouraging contributions—both individual and corporate—in accordance with their capacities.

In their communications, it was emphasized that engineering, at its core, is about devising effective solutions to existing and future challenges. In this context, it is highlighted that the current crisis presents not merely a challenge but also an opportunity for INAE to emerge stronger and more resolute in pursuing its mission of advancing the engineering profession and serving the nation comprehensively.

Every Fellow would appreciate that overcoming such a crisis cannot be the responsibility of a few office bearers or a designated committee alone. Instead, it requires the collective support and commitment of every Fellow affiliated with INAE to contribute meaningfully and decisively during this critical period.

As of date, contributions to the INAE Corpus Fund from corporate and individual donors have reached approximately ₹32 Crores. In addition, further commitments totalling ₹21.50 Crores are anticipated over the next three years.

As a gesture of appreciation and recognition, INAE has instituted a **Wall of Donors** on its official website, honouring and acknowledging the invaluable contributions made by our Fellows and donors.

Bank Details for receipt of donation to INAE:

Name of beneficiary: **INAE Corpus Fund**

Account Number: **41790835603**

Bank Address: **Jawaharlal Nehru University, New Mehrauli Road, New Delhi**

Type of Account: **Savings**

IFSC: **SBIN0001624**

Tax benefits for donors

Contributions made to the INAE Corpus Fund are treated as donations and are eligible for a 50% tax deduction under Section 80G of the Income Tax Act, applicable to donors opting for the old tax regime. Donors will be issued a receipt and the corresponding 80G certificate within one quarter of the donation date.

INAE extends its sincere gratitude to all Fellows who have generously supported the Corpus Fund. We continue to welcome further contributions from Fellows, Young Associates, Awardees, Industry Leaders, and Corporate Entities. These contributions play a vital role in enabling INAE to move towards financial self-sufficiency and to continue fulfilling its mission effectively and independently.

A list of individual donors up to 31st March 2025 is as under:

S No	Name of Donor
1	Prof A N Rajagopalan
2	Dr A Raghu Upadhya
3	Prof A W Date
4	Mr A.K. Balasubrahmanian
5	Prof AB Pandit
6	Prof Ahindra Ghosh
7	Mr AK Anand
8	Mr AK Tripathy
9	Mr Alok Bhowmick
10	Dr Aloknath De
11	Prof Amlan J Pal
12	Dr Anand Deshpande
13	Mr Anantanarayanan Sanatkumar
14	Dr Anil Kakodkar
15	Prof Anindya Deb
16	Dr Archana Sharma
17	Prof Arindam Ghosh
18	Prof Arogyaswami J Paulraj
19	Prof Ashok Jhunjhunwala
20	Prof B Bandyopadhyay
21	Dr B K Nashine
22	Dr B S Rawat
23	Prof Baidurya Bhattacharya
24	Dr BC Roy
25	Prof Bhargab Bikram Bhattacharya
26	Dr BL Deekshatulu
27	Dr BM Reddy
28	Dr BN Suresh
29	Prof BVA Rao
30	Dr C Ranganayakulu
31	Prof C. Venkatesan
32	Dr CG Krishnadas Nair
33	Dr Chitra Rajagopal
34	Dr CP Ravikumar
35	Prof D Roy Chowdhury
36	Prof Damodar Acharya
37	Prof Debasish Ghose
38	Prof Debatosh Guha
39	Dr Debiprosad Roy Mahapatra
40	Dr Dheepa Srinivasan
41	Prof Dilip Kumar Pratihar
42	Dr DR Prasada Raju
43	Prof G Jagadeesh
44	Dr G Malakondaiah
45	Dr G Satheesh Reddy
46	Prof G V Anand
47	Prof GD Yadav
48	Dr Gopika Vinod
49	Dr Guruswamy
50	Dr. Harish C Barshilia
51	Dr H. S. Maiti
52	Prof HB Hablani
53	Prof HKD Bhadeshia
54	Prof Indranil Manna
55	Prof J Mukhopadhyay
56	Dr Jaiteerth R Joshi
57	Mr Jayarajan Kutuvan
58	Prof Juzer M. Vasi
59	Prof Jyotsana Dutta Majumdar
60	Prof K Gopakumar
61	Prof K Muralidhar
62	Prof K Ramesh
63	Prof Kamala Krithivasan
64	Prof Kantesh Balani
65	Prof KG Ranga Raju
66	Prof KJ Vinoy
67	Dr Kota Harinarayana
68	Dr Krishnan Jalpesan
69	Prof Krishnan P Madhavan
70	Mr Krishnaswami Ananth Krishnan
71	Mr KV Subramaniam
72	Dr Lalit Kumar
73	Prof Liang Shih Fan
74	Prof M Shojaei Baghini
75	Mr M. Gopalakrishnan
76	Prof MA Ramaswamy
77	Mr Madhukar Vinayak Kotwal

78	Prof Mahesh C Tandon
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81	Mr Manmath Kumar Badapanda
82	Prof Mannepalli Lakshmi Kantam
83	Prof Meenakshi Balakrishnan
84	Prof MR Madhav
85	Prof MS Ananth
86	Prof MSeetharama Bhat (Rtd)
87	Prof Munjal
88	Mr N Raghavan
89	Mr N Sitaram
90	Mr N Venkatesh
91	Prof N.K. Mukhopadhyay
92	Mr Nadir B Godrej
93	Mr Narayanaswami Ravichandran
94	Capt NS Mohan Ram (Retd)
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96	Dr PA Lakshminarayanan
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98	Dr Pawan Kumar Goenka
99	Prof Pidaparthy Subbayya Sastry
100	Mr Pinjala Siva Subramanyam
101	Prof PK Mishra
102	Mr Pradeep Chaturvedi
103	Dr Pradip
104	Prof Prasun Kumar Roy
105	Prof Prem Krishna
106	Dr PS Goel
107	Prof Purnendu Ghosh
108	Mr R Nagappa
109	Prof Rabindra Nath Ghosh
110	Dr Raghavan Gopalan
111	Mr Raghavan Muralidharan
112	Dr Rajappa Balasubramaniam
113	Dr Rajiv Kumar Tayal
114	Dr Rajkumar Prasad Singh
115	Dr Ramesh Datla
116	Dr Ravi Bhushan Grover

117	Dr Raymond S Stata
118	Mr RN Jayaraj
119	Dr S Mohan
120	Prof S N Mukhopadhyay
121	Prof S Narayanan
122	Mr S Pandian
123	Dr Sanak Mishra
124	Prof Sankar Kumar Pal
125	Dr Saswati B Roy
126	Dr Sathya Prasad Mangalaramanan
127	Mr Satinder S Bajaj
128	Dr Satyam Suraj Sahay
129	Prof SC Dutta Roy
130	Mr Senapathy “Kris” Gopalakrishnan
131	Prof Sirshendu De
132	Prof Sivaji Chakravorti
133	Prof SK Ray
134	Prof Soumitro Banerjee
135	Prof SR Samantaray
136	Prof. S Srinivasa Murthy
137	Prof Srinivasan Raghavan
138	Prof SS Chakraborty
139	Dr Subramanian Narayanan
140	Prof Subrata Chakraborty
141	Prof Subroto Mukherjee
142	Mr Sudhir Vasudeva
143	Dr Sugilal Gopalakrishnan
144	Prof Suresh Chandra Srivastava
145	Mr Suresh M S
146	Prof Sushmita Mitra
147	Prof SV Kulkarni
148	Dr T Bhaskar
149	Dr T K Alex
150	Prof Tapan Kumar Ghoshal
151	Dr Tapan Sahoo
152	Dr Tessy Thomas
153	Dr Tinku Acharya
154	Dr TS Prahlad
155	Mr TV Narendran

156	Prof U B Desai
157	Prof Udaya Kumar
158	Dr Ulrich L. Rohde
159	Dr V Bhujanga Rao
160	Mr V Chander
161	Prof V G Gaikar
162	Dr V Jayaraman
163	Dr V Narayanan
164	Dr V Prakash
165	Prof V Rajaraman
166	Prof V Ramgopal Rao

167	Prof Vasant A Matsagar
168	Dr Venkat A Padmanabhan
169	Dr Vijay Shah
170	Prof Vikram Jayaram
171	Mr Vinay V Kulkarni
172	Dr Vipparthi Adimurthy
173	Dr VK Aatre
174	Mr VN Heggade
175	Dr VR Lalithambika
176	Prof VS Raju

INAE Staff

INAE has a lean team of staff functioning at INAE Headquarters located in Technology Bhavan, DST Complex, New Delhi and a recent group photograph is given below.

Statement of Accounts

2024-25

Indian National Academy of Engineering

P K M B & Co.
Chartered Accountants

Suite#4G, Uppal's M6 Plaza,
Jasola District Centre,
New Delhi - 110025, India
Tel: +91 1140528391-92
pkmb.in

Independent Auditor's Report

To
The Members
Indian National Academy of Engineering
Ground Floor, Block-II,
Technology Bhavan,
New Mehrauli Road,
New Delhi-110016

Opinion

We have audited the financial statements of M/s Indian National Academy of Engineering, which comprises the balance sheet at March 31st, 2025 and also the income and expenditure accountfor the year ended and notes to the financial statements, including summary of significant accounting policies.

In our opinion and to the best of our information and according to the explanations given to us, the aforesaid financial statements give a true and fair view in conformity with the accounting principles generally accepted in India, of the state of affairs of the Society as at March 31, 2025, and its income over expenditure for the year ended on that date.

Basis of Opinion

We conducted our audit in accordance with the Standards on Auditing (SAs) issued by ICAI. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of Financial Statements section of our report. We are independent of the Society in accordance with the ethical requirements that are relevant to our audit of Financial Statements in [jurisdiction], and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Society's Governing Council Responsibility for the Financial Statements

The Governing Council of Society is responsible for the preparation of financial statements that give true and fair view of the financial position and Income and Expenditures of the Society in accordance with the accounting principles generally accepted in India, including the accounting standards, to the extent applicable, issued by the Institute of Chartered Accountant of India including the relevant provision of the Act and Rules. This responsibility also include maintenance

P K M B & Co. Chartered Accountants Jasola, New Delhi

of adequate accounting records for safeguarding the assets of the Society and for preventing and detecting the frauds and other irregularities; selection and application of appropriate accounting policies; making judgements and estimates that are reasonable and prudent; and design, implementation and maintenance of adequate internal controls that were operating effectively for ensuring the accuracy and completeness of the accounting records, relevant to the preparation and presentation of the financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the Governing Council of Society is responsible for assessing the ability to continue as going concern, disclosing, as applicable, matters related to going concern and using going concern basis of accounting unless the Members either intend to liquidate the Society or cease operations, or have no realistic alternative, but to do so.

Auditor's Responsibilities for the Audit of Financial Statement

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatements, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with SAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

For **P K M B & Co.**
Chartered Accountants
Firm's Registration No. 00538N

P K M B & Co. Chartered Accountants Jasola, New Delhi

Mayank Gaur
Partner
Membership No. 518183
UDIN: 25518183BMLXTF3673

Place: New Delhi
Date: 27th June, 2025

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI
BALANCE SHEET AS AT 31ST MARCH, 2025

(Amount in Rs.)

	Schedule	Current Year 2024-25	Previous Year 2023-24
Corpus/Capital Fund And Liabilities			
Corpus/ General Fund	1	36,24,59,905	4,81,64,494
Reserve And Surplus	2	8,60,35,673	-
Earmarked/ Endowment Funds	3	3,27,680	3,31,978
Secured Loans And Borrowings	4	-	-
Unsecured Loans And Borrowings	5	-	-
Deferred Credit Liabilities	6	-	-
Current Liabilities And Provisions	7	10,74,07,588	26,10,12,052
Total		**55,62,30,846**	**30,95,08,524**
Assets			
Fixed Assets	8	1,45,81,852	1,62,55,498
Investments - From Earmarked/Endowment Funds	9	3,06,978	20,03,10,000
Investments - Others	10	36,66,27,680	2,80,00,000
Current Assets, Loans, Advances	11	17,47,14,336	6,49,43,026
Miscellaneous Expenditure(To The Extent Not Written Off Or Adjusted)			
Total		**55,62,30,846**	**30,95,08,524**
Significant Accounting Policies	24		
Contingent Laibilities And Notes To Accounts	25		

As per our report of even date
For **P K M B & Co.**
Chartered Accountants
Firm Reg. No.: 005311N

P K M B & Co. Chartered Accountants New Delhi

Mayank Gaur
Partner
Membership No.: 518183

Place: New Delhi
Date: 27th June, 2025

On behalf of the Council:

President : .....

Vice-President .....
(Finance & Establishment)

Deputy Executive Director .....

Manager (F & A).....

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH 2025

(Amount in Rs.)

Income	Schedule	Current Year 2024-25	Previous Year 2023-24
Income from Sales/Services	12	-	-
Grants / Subsidies	13	15,53,10,556	17,99,31,758
Fees/ Subscriptions	14	7,15,68,199	1,22,00,000
Income from Investments	15	69,94,476	1,12,868
Income from Royalty, Publication	16	1,95,255	3,35,292
Interest Earned	17	1,03,67,568	2,11,34,991
Other Income	18	2,17,84,186	1,27,19,244
Total (A)		**26,62,20,240**	**22,64,34,153**
Expenditure			
Establishment Expenses	20	1,49,96,276	1,47,93,188
Other Administrative Expenses	21	29,96,161	34,36,438
Expenditure on Grants, Subsidies :			
Utilization towards Engineering Programes and Activities against DST Grants	22-A	1,24,03,739	1,95,28,685
Utilization towards ANRF (SERB) Grant for Abdul Kalam TIN Fellowship Scheme	22-B	4,59,74,486	8,54,67,028
Utilization towards ANRF (SERB) Grant for Digital Gaming Research Initiative	22-C	31,74,649	4,13,51,797
Utilization towards ANRF (SERB)-INAE Collaborative Initiative in Engineering	22-D	65,60,510	68,34,044
Utilization towards INAE - DST Worksohp WiSLP	22-E	8,62,666	-
Utilization towards AICTE- INAE Travel Grant Scheme	22-F	-	-
Utilization towards India-Taiwan Co-operation Program	22-G	2,52,94,939	1,59,51,605
Expenditure towards Overhead Grants	22-H	11,11,736	2,13,908
Expenditure towards DST Wings	22-I	13,76,413	-
Expenditure towards activities out of FCRA Grant	22-J	1,92,285	-
Infosys Foundation CSR Project - CEEE	22-K	2,31,893	-
Expenditure towards Vaibhav - Payment of Research Grant	22-L	5,42,35,000	-
Interest	23	66,51,073	2,01,10,279
Depreciation/ Utilization of Grants	8	16,73,646	18,54,587
Total (B)		**17,77,35,471**	**20,95,41,560**
Balance being excess of Income over expenditure (A-B)		**8,84,84,769**	**1,68,92,593**
Transfer to Prof. Roddam Narsimha Memorial Lecture Endowment Fund	3	(20,702)	(20,394)
Transfer to New Corpus Fund	1	(69,73,774)	(92,474)
Transfer to Fixed Assets (Grant utilised for Capital Assets)	8	(65,960)	(9,97,960)
Transfer to Medium Term Sustenance Reserve	2	(2,38,35,673)	-
Transfer to Unrealised Contributions Reserve	2	(5,00,00,000)	-
Balance Being Surplus / (Deficit) Carried To General Fund		**75,88,660**	**1,57,81,765**
Significant Accounting Policies	24		
Contingent Liabilities And Notes On Accounts	25		

As per our report of even date
For **P K M B & Co.**
Chartered Accountants
Firm Reg. No.: 005311N

P K M B & Co. Chartered Accountants Jasola, New Delhi

Mayank Gaur
Partner
Membership No.: 518183

Place: New Delhi
Date: 27th June, 2025

On behalf of the Council:

President : .....

Vice-President .....
(Finance & Establishment)

Deputy Executive Director .....

Manager (F & A).....

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI
SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31ST MARCH, 2025

Schedule 1 - Corpus/General Fund	General Fund	INAE Corpus Fund	INAE New Corpus Fund*	Total Current Year	General Fund	INAE Corpus Fund	INAE New Corpus Fund*	Total Previous Year
		2024-25		2024-25		2023-24		2023-24
Balance as at beginning of the year	**4,36,12,895**	-	**45,51,599**	**4,81,64,494**	**7,16,16,833**	**5,31,13,510**	**4,45,000**	**12,51,75,343**
Less: Remitted to DST	-	-	-	-	(3,80,67,098)	(5,06,33,990)	-	**(8,87,01,088)**
Less: Other withdrawal	-	-	-	-	(84,883)	-	-	**(84,883)**
Less: Other withdrawal for depriciation during the year	(16,73,646)	-	-	**(16,73,646)**	(18,54,587)	-	-	**(18,54,587)**
Less: Transfer to General Reserves under Medium Term Sustenance Reserve	(1,22,00,000)	-		**(1,22,00,000)**				
Less: Payable to DST (Depriciation and interest for FY 2022-23)	-	-	-	-	(37,79,135)	(24,79,520)	-	**(62,58,655)**
Add: Corpus Contibutions received	-	-	31,36,06,624	**31,36,06,624**	-	-	40,14,125	**40,14,125**
Add: Transferred (to)/from Income and Expenditure A/c	75,88,660	-	69,73,774	**1,45,62,434**	1,57,81,765	-	92,474	**1,58,74,239**
Balance At The Year End	**3,73,27,908**	-	**32,51,31,997**	**36,24,59,905**	**4,36,12,895**	-	**45,51,599**	**4,81,64,494**

*. Refer note 13 of Schedule 25.

Manager (F&A)

P.K. Mittal & Co. Chartered Accountants Janpath, New Delhi

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI
SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31ST MARCH, 2025

(Amount in Rs.)

SCHEDULE 2 - RESERVES AND SURPLUS :	Current Year 2024-25		Previous Year 2023-24	
1. Capital Reserve				
As per last Account	-		-	
Addition during the year	-		-	
Less: Deductions during the year	-	-	-	-
2. Revaluation Reserve :				
As per last Account	-		-	
Addition during the year	-		-	
Less: Deductions during the year	-	-	-	-
3. Special Reserves				
As per last Account	-		-	
Addition during the year	-		-	
Less: Deductions during the year	-	-	-	-
4. General Reserve				
a) Medium Term Sustenance Reserve				
Opening balance	-		-	
Add: Transfer from General Fund	1,22,00,000			
Add: Addition during the year	2,38,35,673		-	
Less: Deduction during the year	-	3,60,35,673	-	-
b) Unrealised Contributions Reserve				
Opening balance	-		-	
Add: Addition during the year	5,00,00,000		-	
Less: Deduction during the year	-	5,00,00,000	-	-
Total		**8,60,35,673**		-

P K M B & Co. Chartered Accountants Jhandewalan, New Delhi

Manager (F&A)

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI
SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31ST MARCH, 2025

Schedule 3- Earmarked/Endowment Funds	Current Year 2024-25	Previous Year 2023-24
DKRC Development Fund (A)		
a. Opening balance	-	26,82,863
b. Additions to the funds		
i Transferred (to)/from Income and Expenditure A/c	-	-
c. Remited to DST	-	(26,82,863)
Sub-total A=(a+b-c)	-	-
Prof. Roddam Narsimha Memorial Lecture Endowment Fund (B)		
a. Opening balance	3,31,978	3,36,584
b. Additions to the funds		
i Contribution Received	-	-
ii Transferred (to)/from Income and Expenditure A/c	20,702	20,394
c. Utilisation/ Expendiutre towards objectives of Funds		
i Expenditure for the purpose	(25,000)	(25,000)
Sub-total B=(a+b-c)	**3,27,680**	**3,31,978**
Balance At The Year End Total : (A+B)	**3,27,680**	**3,31,978**

Manager (F&A)

P K M B & Co. Chartered Accountants Jasola, New Delhi

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31ST MARCH, 2025

(Amount in Rs.)

SCHEDULE 4 - SECURED LOANS AND BORROWING:	Current Year 2024-25		Previous Year 2023-24	
1. Central Government		-		-
2. State Government (Specify)				
3. Financial Institutions		-		-
a) Term Loans	-		-	
b) Interest accrued and due	-	-	-	-
4. Banks :				
a) Term Loans	-		-	
- Interest accrued and due	-		-	
b) Other Loans (Specify	-		-	
- Interest accrued and due	-	-	-	-
5. Other Institutions and Agencies		-		-
6. Debentures and Bonds		-		-
7. Others (Specify		-		-
Total		Nil		Nil
Note : Amounts due within one year				

Manager (F&A)

P K M B & Co. Chartered Accountants Jamia, New Delhi

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31ST MARCH, 2025

(Amount in Rs.)

SCHEDULE 5 - UNSECURED LOANS AND BORROWING:	Current Year 2024-25	Previous Year 2023-24
1. Central Government	-	-
2. State Government (Specify)	-	-
3. Financial Institutions	-	-
a) Term Loans	-	-
b) Interest accrued and due	-	-
4. Banks :		
a) Term Loans	-	-
b) Other Loans (Specify	-	-
5. Other Institutions and Agencies	-	-
6. Debentures and Bonds	-	-
7. Fixed Deposits	-	-
8. Others (Specify	-	-
Total	Nil	Nil
Note : Amounts due within one year		

SCHEDULE 6 - DEFFERED CREDIT LIABILITIES:	Current Year 2024-25	Previous Year 2023-24
a) Acceptance secured by hypothecation of capital equipment and other assets	-	-
b) Others	-	-
Total	Nil	Nil
Note : Amounts due within one year		

P K M B & Co. Chartered Accountants Janpath, New Delhi

Manager (F&A)

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI
SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31ST MARCH, 2025

(Amount in Rs.)

Schedule 7 - Current Liabilities And Provisions	Current Year 2024-25		Previous Year 2023-24	
A. Current Liabilities				
1. Salary Payable	2,73,568		7,88,001	
2. TDS & GST Payable	90,84,615		8,18,594	
3. Expenses/Bills Payable	7,88,915		14,32,892	
4. Audit Fee Payable	75,600		82,600	
5. Excess recived towards Membership	21,180	1,02,43,878	-	31,22,087
6. Payable to DST	6,86,367		1,31,75,392	
7. Unspent AICTE Grant for DVP Scheme	-		-	
8. Unspent AICTE Grant for Travel Grant Scheme	-		-	
9. Unspent ANRF (SERB) Grant for Digital Gaming Initiative	2,49,28,211		21,84,34,143	
10. Unspent ANFR (SERB) Grant for Colaborative Activities	21,30,333		9,77,931	
11. Unspent ANRF (SERB) Grant for Abdul Kalam TIN Fellowship	54,80,125		1,05,96,125	
12. Unspent grant India Taiwan Co. program	4,82,859		5,71,023	
13. Unspent grant Infosys Foundation	4,94,36,535			
		8,31,44,430		24,37,54,614
B. Provisions				
1. Provision for Gratuity	78,32,131		85,97,350	
2. Provision for Leave Encashment	61,87,149	1,40,19,280	55,38,001	1,41,35,351
Total		**10,74,07,588**		**26,10,12,052**

P K M B & Co. Chartered Accountants Delhi, New Delhi

Manager (F&A)

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI
SCHEDULE FORMING PART OF BALANCE SHEET AS AT 31ST MARCH , 2025

Schedule 8 - Fixed Assests (Amount in Rs.)

Description	Original cost of Asset as on 01.04.24	Asset Purchased during the year	Value of assets Disposed off/ sold	Original cost of Asset as on 31.03.25	Total Dep. Upto 01.04.24	Dep. for the Year	Depriciation on Assets Disposed off / sold	Utilisation of Grant U/s 11(1)	Total Depriciation Upto 31.03.25	Net Block of Asset as on 31.03.25	Net Block of Assets as on 31.03.24
Fixed Assets	1	2	3	4	5	6	7	8	9	10	11
Part -I Equipments	65,47,688	65,960	-	66,13,648	60,22,659	79,213	-	65,960	61,67,832	4,45,816	5,25,029
Part - II Furniture	1,33,39,499	-	-	1,33,39,499	1,06,85,892	2,65,363	-	-	1,09,51,255	23,88,244	26,53,607
Part - III Building	5,37,41,479	-	-	5,37,41,479	4,06,88,377	13,05,310	-	-	4,19,93,687	1,17,47,792	1,30,53,102
Part - IV Equipment out of Project Grant	-	-	-	-	-	-	-	-	-	-	-
Part-V Software -Digital Plateform	58,05,200	-	-	58,05,200	57,81,440	23,760	-	-	58,05,200	-	23,760
Total	**7,94,33,866**	**65,960**	**-**	**7,94,99,826**	**6,31,78,368**	**16,73,646**	**-**	**65,960**	**6,49,17,974**	**1,45,81,852**	**1,62,55,498**

Manager(F&A)

P K M B & Co. Chartered Accountants Delhi, New Delhi

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI
SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31ST MARCH, 2025

(Amount in Rs.)

Schedule 9 - Investment From Earmarked/Endowment Funds	Current Year 2024-25	Previous Year 2023-24
1. Prof. Roddam Narasimha M L Endowment Fund (Term Deposit with SBI)	3,06,978	3,10,000
2. SERB-INAE Digital Gaming Intiative Funds (Term Deposit with SBI)	-	20,00,00,000
Total	3,06,978	20,03,10,000

Schedule 10 - Investments - Others	Current Year 2024-25	Previous Year 2023-24
1. Corpus Fund (Term Deposit with SBI)	-	-
2. New Corpus Fund (Term Deposit with SBI)	32,02,17,680	42,00,000
3. Institutional Membership (Term Deposit with SBI)	2,56,00,000	1,18,00,000
4. Others (Term Deposit with SBI)	1,20,00,000	1,20,00,000
5. Corporate Membership (Term Deposit with SBI)	65,60,000	-
6. Foreign Contribution (Term Deposit with SBI-NDMB)	22,50,000	-
Total	**36,66,27,680**	**2,80,00,000**

Manager (F&A)

P K M B & Co. Chartered Accountants Jaipur New Delhi

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI
SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31ST MARCH, 2025

(Amount in Rs.)

Schedule 11 - Current Assets, Loans, Advances Etc.	Current Year 2024-25		Previous Year 2023-24	
A. Current Assets:				
1. Cash balances in hand (Including Cheque/ Draft, Revenue Stamps and Imprest)	-	-	11,772	11,772
2. Bank Balance:				
With Scheduled Banks:				
- On Saving Account	10,38,66,015	10,38,66,015	6,06,39,284	6,06,39,284
Total (A)		**10,38,66,015**		**6,06,51,056**
B. Loan, Advances And Other Assets (Unsecured, Considered Good)				
1. Advances and other amounts recoverable in cash or in kind or for value to be received:				
a) Pre-payments *	2,23,558		75,017	
b) Advance to Expert Groups*	-		18,55,333	
c) Advance for ANRF(SERB)-INAE Collaborative Initiatives**	3,03,523		6,80,039	
d) Others*	3,01,898		24,76,306	
e) Advance for Petty Exp	-	8,28,979	-	50,86,695
2. Income Accured				
a) On Investment from Earmarked/Endowment Funds	-		12,673	
b) On investments - others	55,41,908	55,41,908	8,33,389	8,46,062
3. Claims Receivable				
a) TDS	42,33,959		29,07,408	
b) Interst receivable	-		-	
c) Grant receivable from SERB	12,04,975		5,00,000	
d) Security Deposit	38,500		38,500	34,45,908
e) Membership fees receivables	5,90,00,000	6,44,77,434	-	-
Total (B)		**7,08,48,321**		**93,78,665**
* Advances out of DST Grant treated as utilisation during the FY		-		(44,06,656)
** Advances out of ANRF(SERB) Grant for -Collaborative Initiative treated as utilisation during the FY		-		(6,80,039)
Total (A+B)		**17,47,14,336**		**6,49,43,026**

Manager (F&A)

P K M B & Co. Chartered Accountants Jangpura New Delhi

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31ST MARCH, 2025

(Amount in Rs.)

SCHEDULE 12 - INCOME FROM SALES/SERVICES	Current Year 2024-25	Previous Year 2023-24
1) Income from Sales		
a) Sale of Finished Goods	-	-
b) Sale of Raw Material	-	-
c) Sale of Scrap	-	-
		-
2) Income from Services		
a) Labour and Processing Charges	-	-
b) Professional /Consultancy Services	-	-
c) Agency Commission and Brokerage	-	-
d) Maintenance Services (Equipment/Property)	-	-
e) Others (Specify)	-	-
Total	Nil	Nil

Manager (F&A)

P K M B & Co. Chartered Accountants Jasola, New Delhi

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI
SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR YEAR ENDED 31ST MARCH, 2025

(Amount in Rs.)

Schedule 13 - Grants/Subsidies (Irrevocable Grants & Subsidies Received)	Current Year 2024-25	Previous Year 2023-24
1. Central Government -Department of Science and Technology (DST)		
DST, Grants-in-Aid for INAE Core Activities	1,45,00,000	2,99,80,187
DST, India Taiwan Cooperation in S&T Program- through ANRF (SERB)	2,52,94,939	1,59,51,605
DST, VAIBHAV (Vaishwik Bhartiya Vaigyanik) - through ANRF (SERB)	5,42,35,000	-
DST, WINGS (Women's International Grant Support) - through TDB	13,76,413	-
2. Government Agencies		
ANRF (SERB) Grant for Abdul Kalam Technology Innovation National Fellowship Scheme	4,59,74,486	8,54,67,028
ANRF (SERB) Grant for Digital Gaming Research Initiative	31,74,649	4,13,51,797
ANRF (SERB) Grant for Collaborative Initiative	65,60,510	66,81,141
3. Other		
Contribution received from DRDO-Engineers Conclave 2022	27,50,000	-
Contribution received from ANRF (SERB) for Annual Convention	3,50,000	5,00,000
Grant receivable on workshop- WiSLP	8,62,666	-
Infosys Foundation	2,31,893	-
Total	**15,53,10,556**	**17,99,31,758**

Schedule 14 - Fees/Subscriptions	Current Year 2024-25	Previous Year 2023-24
1. Annual fees/ Subscriptions		
Institutional Membership fees - Diamond	1,10,00,000	1,20,00,000
Institutional Membership fees - Coral	6,00,000	2,00,000
Institutional Membership fees - Rubby	6,00,000	-
Institutional Membership fees - Sapphire	9,00,000	-
Individual Membership fees	13,08,339	-
Individual Application fees	90,526	-
Individual Registration fees	59,334	-
Corporate Membership fees - Perpetual	5,00,00,000	-
Corporate Membership fees	70,00,000	-
Registration Fees	10,000	-
Total	**7,15,68,199**	**1,22,00,000**

Manager (F&A)

P.K.M.B. & Co. Chartered Accountants Jwala, New Delhi

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI
SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR YEAR ENDED 31ST MARCH, 2025

(Amount in Rs.)

Schedule 15 - Income From Investments (Income On Invest.From Earmarked/Endowment Funds Transferred To Funds)	Investment from Earmarked		Investment - Others	
	Current Year 2024-25	Previous Year 2023-24	Current Year 2024-25	Previous Year 2023-24
Interest from Term Deposit	20,702	20,394	69,73,774	92,474
Total	**20,702**	**20,394**	**69,73,774**	**92,474**
Transferred To Earmarked/Endowment Funds		**20,394**		**92,474**

Schedule 16 - Income From Royalty, Publication Etc.	Current Year 2024-25	Previous Year 2023-24
Income from Royalty	1,95,255	3,35,292
Total	**1,95,255**	**3,35,292**

Schedule 17 - Interest Earned	Current Year 2024-25	Previous Year 2023-24
1. On Term Deposits:		
a) With Scheduled Banks	51,74,929	1,70,17,108
b) With FCRA Scheduled Bank	1,00,710	-
2. On Savings Accounts:		
a) With Scheduled Banks	50,78,598	41,17,883
b) With FCRA Scheduled Bank	13,331	-
c) Collected form Grantee Institutions		
Total	**1,03,67,568**	**2,11,34,991**
Note - Tax deducted at source to be indicated	5,27,564	17,01,711

Schedule 18 - Other Income	Current Year 2024-25	Previous Year 2023-24
1) Profit on Sale/disposal of Assets: (Net)		
Owned Assets	-	-
2) Miscellaneous Income	30,656	8,282
3) Institutional Overhead collected on implementation of Schemes	43,13,012	25,00,000
4) Research and Experimental Development Overhead (IIT Jodhpur)	7,90,000	6,83,360
5) Deffered revenue Grant (AS12) -Depreciation on asset out of Grants	16,73,646	18,54,587
6) Withrwal form Roddam Narasimha MLEF	25,000	25,000
7) Prior period income 2022-23	43,15,013	60,31,625
8) Rents	18,67,100	16,16,390
9) Advertising Income	10,00,000	-
10) Foreign Contribution	24,69,759	-
11) Sponsorship	53,00,000	-
Total	**2,17,84,186**	**1,27,19,244**

P K M B & Co. Chartered Accountants Jawahar Nagar Delhi

Manager (F&A)

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31ST MARCH, 2025

(Amount in Rs.)

SCHEDULE 19 - INCREASE/(DECREASE) IN STOCK OF FINISHED GOODS & WORK IN PROGRESS .	Current Year 2024-25	Previous Year 2023-24
a) Closing Stock		
- Finished Goods	-	-
- Work-in-progress	-	-
b) Less: Opening Stock		
- Finished Goods	-	-
- Work-in-progress	-	-
NET INCREASE/(DECREASE) [a-b]	Nil	Nil

Manager (F&A)

P K M B & Co. Chartered Accountants Jasola, New Delhi

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI
SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR YEAR ENDED 31ST MARCH, 2025

(Amount in Rs.)

Schedule 20 - Establishment Expenses	Current Year 2024-25	Previous Year 2023-24
Out of DST Grant		
1. Salaries and Wages	93,88,578	1,13,66,047
2. Contribution to NPS out of DST Grant (12.80%)	10,92,066	13,20,294
3. Contribution to Gratuity and Leave Encashment	18,216	10,92,715
4. Staff Welfare Expenses	-	-
5. Leave Travel Concession (LTC)	1,140	20,672
Sub-total	**1,05,00,000**	**1,37,99,728**
Out of Internal Resource		
1. Salaries and Wages	18,42,630	-
Add: Contribution to NPS out of Internal Resource (1.20%)	3,42,985	1,23,780
Add: Contribution to Gratuity and Leave Encashment out of Internal Resource	23,10,661	8,69,680
Total	**1,49,96,276**	**1,47,93,188**

Schedule 21 - Other Administrative Expenses Etc	Current Year 2024-25	Previous Year 2023-24
1. Electricity and power	6,60,448	6,13,557
2. Water Charges	62,000	37,746
3. Insurance	31,483	31,483
4. Repairs and maintenance	1,50,498	4,61,163
5. Rent, Rates and Taxes	92,648	88,244
6. Postage, Telephone and communnication Charges	1,22,277	1,35,593
7. Printing and Stationary	1,69,629	2,18,535
8. Travelling and Conveyance Expenses	29,799	20,874
9. Subscription Expenses	-	1,94,700
10. Auditors Remuneration	82,600	82,600
11. Professional Charges	14,37,158	13,13,698
12. General Expenses	1,51,659	1,20,338
13. Bank Charges	5,847	5,443
14. Books and Periodicals	105	1,600
15. Nikshya Mitra Contibution	-	1,980
16. Training of Staff	-	33,000
17. Advertisement and Publicity	-	75,885
18. Short & Excess	11	-
Total	**29,96,161**	**34,36,438**

P K M B & Co. Chartered Accountants Delhi, New Delhi

Manager (F&A)

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI
SCHEDULES FORMING PART OF INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2025

(Amount in Rs.)

Schedule 22-A -Engineering Programmes And Activities Out of DST Grant	Current Year 2024-25		Previous Year 2023-24	
	Details	Total	Details	Total
Expenditure On INAE Seminars/Conferences/Symposiyum/Workshops				
Conferences :-		35,32,316		21,02,603
INAE Foundation Day	4,74,175		52,585	
Engineers Conclave	30,36,913		20,50,018	
CII Global Summit on advanced Materials & Metals	21,228		-	
Symposium:-		-		-
Seminars :-		-		5,17,070
Brain stroming meet - Mumbai chapter	-		45,020	
Brain stroming meet on Mission Vision - Banglore	-		2,16,719	
India International Science Festival	-		2,12,261	
Session on Innovative Pathways for Hydrogen Development	-		43,070	
Workshops/Events:-		1,30,218		2,89,627
Roddam Narasihma Memorial Endowment Lecture	25,000		25,000	
INAE-NAEK Workshop on High Temp Materials, Kolkata	-		2,15,212	
INAE- Local Chapter Mumbai	12,156		500	
IEH- Metallurgy	-		6,903	
INAE- Local Chapter Bangalore	2,334		1,366	
INAE- Local Chapter Delhi	-		33,990	
INAE - Local Chaper Exp- Kolkata	31,048		6,656	
INAE - Local Chaper Exp- Bhuvneshwar	31,895		-	
INAE - Local Chaper Exp- Delhi	27,785		-	
INAE Schemes		1,30,000		21,53,508
INAE Chair Professorships / Distinguished Technologist & Professors	10,000		11,10,000	
Mentoring of Engineering Teachers	55,000		1,30,286	
Mentoring of Engineering Students	65,000		72,000	
Frugal Innovation Nurturing Programme- FINP	-		8,41,222	
Research Studies / Projects		14,42,652		3,46,873
Expert Group By Prof. K.K. Pant IIT Delhi on Tech Road map for Caputure & Conversion of Co2 to V	8,82,677		-	
Expert Group By Prof. Jayanta Bhattacharya on IRRI of Automationon Mineral Sector	5,59,975		-	
INAE Satish Dhawn Chair of Engineering Eminence	-		-	
Expert Group Microwave-THz Wave Tech- Lalit Kumar	-		3,46,873	
INAE Forums		51,431		61,239
Academy Meetings		11,89,991		13,86,016
Annual Convention		46,81,371		28,92,230
International Affairs		10,38,003		19,74,929
INAE Publications		79,501		1,76,018
INAE Digital Platform Maintaince		1,28,256		32,21,917
Advances towards Engineering Programmes and Activities		-		44,06,656
Total		**1,24,03,739**		**1,95,28,685**

Manager (F&A)

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI
SCHEDULES FORMING PART OF INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2025

(Amount in Rs.)

SCHEDULE 22-B -Expenditure out of ANRF(SERB) Grant for Abdul Kalam TIN Fellowship Scheme	Current Year 2024-25		Previous Year 2023-24	
	Details	Total	Details	Total
ANRF (SERB) -INAE Abdul Kalam Technology Innovation National Fellowship		4,59,74,486		8,54,67,028
Abdul kalam TIN Fellowship- Research Grant	4,47,48,409		8,39,04,681	
Abdul kalam TIN Fellowship- Advt	-		98,991	
Abdul kalam TIN Fellowship- Manpower	10,00,000		7,34,221	
Abdul kalam TIN Fellowship- Misc exp	2,26,077		1,93,721	
Abdul kalam TIN Fellowship- Meetings	-		5,35,414	
Total		**4,59,74,486**		**8,54,67,028**

SCHEDULE 22-C -Expenditure out of ANRF(SERB) Grant for Digital Gaming Research Initiative	Current Year 2024-25		Previous Year 2023-24	
	Details	Total	Details	Total
ANRF (SERB)-INAE Digital Gaming Research Initiative		31,74,649		4,13,51,797
ANRF(SERB)-INAE Digital Gaming Conclave	-		-	
ANRF (SERB)-INAE Digital Gaming -Advertisment	-		49,713	
Digital gaming - Expense Research Grant - General	-		1,67,56,660	
Digital gaming - Expense Research Grant - SC	-		6,45,000	
Digital gaming - Expense Research Grant - Capital	-		2,14,28,549	
Digital gaming - Expense Research Grant - Manpower	28,45,558		18,42,084	
Digital gaming - Expense Research Grant - Meeting	3,29,091		6,29,791	
ANRF(SERB)-INAE Digital Gaming -Technical Service & Const.	-		-	
Total		**31,74,649**		**4,13,51,797**

SCHEDULE 22-D -Expenditure out of ANRF (SERB) Grant for Collaborative Initiatives in Engineering	Current Year 2024-25		Previous Year 2023-24	
	Details	Total	Details	Total
ANRF (SERB)-INAE Collaborative Initiative in Engineering				
i. ANRF (SERB)-INAE Conclave -Atmanirbhar Technologies - Engineering Secured Future		22,32,005		16,95,386
a. ANRF (SERB)-INAE Atmanirbhar Technology Initiative - NatFoE 2023	-		16,95,386	
b. Conclave on Atmanirbhar Technologies- NIAMT Ranchi during March 21-22, 2025	2,50,000		-	
c. Conclave on AN Tech - IIT Dharwad on March 21, 2025	3,00,000		-	
d. NATFOE NIT Warangal during Sep 16-17, 2024 at Warangal	10,32,005		-	
e. Atmanirbhar Tech Poster Presentation IIT Delhi during Dec 19-21, 2024	6,50,000		-	
ii. ANRF (SERB)-INAE Women Engineers Program		12,84,504		7,18,671
a. Symphosium in North-East for Young Women - Tezpur University during Nov 20-21, 2023	3,99,840		1,96,439	
b. Women WS on Sustanibility in Water & Environment - IIT Banaras Hindu University	-		5,22,232	
c. ANRF (SERB) -INAE Prog for Women Engineers - MNIT Jaipur during Feb 7-8, 2025	5,64,403		-	
d. ANRF (SERB)- INAE Women Engineers Prog. - NIT Hamirpur during Feb 21-22, 2025	3,20,261		-	
iii. ANRF (SERB)-INAE Outreach Programs for NE, J&K and Ladakh		14,16,010		13,37,052
a. Entp & Skill development WSRT startups- University of Ladakh	-		4,09,934	
b. Workshop on Pedagogy Training for Teaching- IIT Guwahati	-		3,95,619	
c. Workshop on Self Employmnt - NIT Silchar	-		2,91,456	
d.Workshop on Skilling, Reskilling & Upskilling - NIT Srinagar	-		2,40,043	
e. ANRF (SERB)-INAE Outreach Prog for NE J & K and Ladakh during Feb 24-25 at IIT Janmmu	3,90,548		-	
f. ANRF (SERB)-INAE Outreach Prog for NE IIT Guwahati during Feb 28 to March 1, 2025	6,04,597		-	
g. W/S on skill development of Women - NIT Mizoram during Feb 19-21, 2025	4,20,865		-	
iv. ANRF (SERB)-INAE Innovation Hackathon		8,77,991		14,99,993
a. Youth Conclave 2023	-		14,99,993	
b. Youth Conclave 2024 IIT Bhilai during Dec 12-14, 2024	5,60,907		-	
c. Hackathon AVINYA-2025 MVJ College Bangalore during March 19-20, 2025	3,17,084		-	
v. Institutional Overheads		7,50,000		7,50,000
v.a Institutional Overheads -Expenditure Manpower		-		1,52,903
Advance for Workshop on Writing R&D Proposals for Women Engineers, Feb 23-24,2023 at IIT Gandhinagar		-		6,80,039
Total		**65,60,510**		**68,34,044**

P K M B & Co. Chartered Accountants Jaipur, New Delhi

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI
SCHEDULES FORMING PART OF INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2025

(Amount in Rs.)

SCHEDULE 22-E - INAE - DST Worksohp WiSLP	Current Year 2024-25		Previous Year 2023-24	
	Details	Total	Details	Total
Workshop on Women-in Space and Allied Sciences Leadership Program (WiSLP) on Jan 21-24 2025, New Delhi		8,62,666		-
Total		8,62,666		-

SCHEDULE 22-F -Expenditure out of AICTE- INAE Travel Grant Scheme	Current Year 2024-25		Previous Year 2023-24	
	Details	Total	Details	Total
AICTE- INAE Travel Grant Scheme		-		-
Reimbursement to Students under Travel Grant Scheme	-		-	
Secretarial Assistance for Overheads	-		-	
Total		-		-

SCHEDULE 22-G - Expenditure out of India-Taiwan S&T Cooperation Program	Current Year 2024-25		Previous Year 2023-24	
	Details	Total	Details	Total
Disbursement of Research Grant		2,51,97,210		1,38,72,628
IIT Guwahati-Dr. Sudip Biswas	-		16,24,834	
IIT Guwahati-Dr. Gopinandan Kalon	-		16,70,834	
IIT Guwahati-Dr. Ankush Barg	-		16,77,334	
IIT Guwahati-Dr. Kuntal Dheka	-		15,58,834	
IIT Jammu-Dr. Satya Shekar Bhogilla	-		7,05,834	
IISc Bangalore-Prof. Prabal K. Maiti	-		20,34,634	
SSN College of Engg. Chennai-Dr. Manikaran Sriniva	-		4,15,500	
IIT Delhi-Dr. Bhani Ray	-		8,95,490	
IIT Delhi-Dr. Leena Nebhani	-		11,11,500	
Pondichery University-Dr. Mohane Coumar	-		11,05,000	
CUSAT- Dr. Preetham Elumalai	-		10,72,834	
BITS Pilani-HYD-Prof. Sounak Roy	12,52,074		-	
IISc Bangalore-Dr. Arup Polley	15,73,070		-	
IISc Bangalore-Dr. Gayathri Pillai	16,19,584		-	
IISc Bangalore-Dr. Rajamalli Pachaiyappan	21,00,616		-	
IISc Bangalore-Dr.Siddharth Jhunjhunwala	21,34,116		-	
IIT Gandhinagar- Prof Atul Bhargav	19,72,074		-	
IIT Indore-Prof. Anand Palani Iyamperumal	11,79,456		-	
IIT Indore-Prof. Shaibal Mukherjee	20,56,956		-	
IIT Jodhpur-Prof. Rakesh K Sharma	18,37,344		-	
IIT Kanpur-Prof. Yogesh Singh Chauhan	16,80,116		-	
IIT Madras-Dr. Tuhin Subhra Santra	17,97,074		-	
IIT Madras-Prof. Amit Kumar	15,19,574		-	
IIT Roorkee-Prof. Soumitra Satapathi	21,42,966		-	
Raman Research Institute Bangalore-Dr. Saurabh Singh	12,52,074		-	
VNIT Nagpur-Dr. Nikhil Deep Gupta	10,80,116		-	
Administrative Expenses		97,729		18,26,000
India- Taiwan PEMC Meeting	97,729		76,000	
Program Implemetation Fee -Overheads to INAE	-		17,50,000	
India- Taiwan Joint Committee Meeting	-	-	2,52,977	2,52,977
Total		2,52,94,939		1,59,51,605

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI
SCHEDULES FORMING PART OF INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2025

(Amount in Rs.)

SCHEDULE 22-H -Expenditure towards Overhead Grants	Current Year 2024-25		Previous Year 2023-24	
	Details	Total	Details	Total
INAE-IIT Jodhpur Joint Outreach Centre -Research and Experimental (R&E) Development Overhead		6,12,736		1,73,908
R&E Conveyance exp	16,686		5,412	
R&E Electricity Exp	40,460		14,382	
R&E office maintenance	5,05,682		1,54,114	
R&E Printing & Stationery	21,655		-	
Legal & Professional expense for Rent (Orange Mantra)	28,253		-	
Overhead Expenditure on Taiwan S&T Cooperation Program	80,000	80,000	40,000	40,000
SERB-INAE Collaborative Initiative Overhead Exp on Manpower cost	4,19,000	4,19,000	-	-
Total		**11,11,736**		**2,13,908**

SCHEDULE 22-I -Expenditure towards DST WINGS Project	Current Year 2024-25		Previous Year 2023-24	
	Details	Total	Details	Total
DST WINGS		13,76,413		-
Overhead Expenses- WINGS	10,00,000		-	
WINGS - Contingency - Advertisement Exp.	34,104		-	
WINGS Projects - Man Power	3,42,309		-	
Total		**13,76,413**		-

SCHEDULE 22-J -Expenditure towards activities out of FCRA Grant	Current Year 2024-25		Previous Year 2023-24	
	Details	Total	Details	Total
FCRA Grant		1,92,285		-
Bank charges	10,700		-	
Professional charges	35,400		-	
INAE Forum - Workshop on Sustainbility of Civil Infrastructure	1,46,185			
Total		**1,92,285**		-

SCHEDULE 22-K - Infosys Foundation CSR Project - CEEE	Current Year 2024-25		Previous Year 2023-24	
	Details	Total	Details	Total
Program Management Cost , Personnel Cost		2,31,893		-
Infosys CSR Proj. - Advertisement Exp.	1,18,856		-	
Infosys CSR Proj. - Advisory Committee Mtg.	1,13,037		-	
Total		**2,31,893**		-

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI
SCHEDULES FORMING PART OF INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2025

(Amount in Rs.)

SCHEDULE 22-L -Expenditure towards Vaibhav - Payment of Research Grant	Current Year 2024-25		Previous Year 2023-24	
	Details	Total	Details	Total
Payment of Research Grant				-
For VAIBHAV Fellows		4,81,50,000		
CSIR-IGIB - Dr.Debjyoti Chakraborty	24,07,500		-	
IIR Kharagpur - Dr.Mukunda Dev Behra	24,07,500		-	
IISC Bangalore - Dr.Arkaprava Basu	24,07,500		-	
IISC Bangalore - Prof.Naga Phani B Aetukuri	24,07,500		-	
IISER Pune - Prof.Ashish Arora	24,07,500		-	
IIT Bombay - Dr.Varun Bhalerao	24,07,500		-	
IIT Bombay - Prof.Debjani Paul	24,07,500		-	
IIT Kanpur - Dr.Ketan Rajawat	24,07,500		-	
IIT Madras - Dr.Chandan Sarangi	24,07,500		-	
IIT MADRAS - Dr.Radha Krishna Ganti	24,07,500		-	
IIT Madras - Dr.Swathi Sudhakar	24,07,500		-	
IIT Madras - Prof.Boby George	24,07,500		-	
IIT Madras - Prof.Velmurugan	24,07,500		-	
IIT Roorkee - Dr.Gaurav Dixit	24,07,500		-	
IIT Roorkee - Prof.Kamal Kishore Pant	24,07,500		-	
IUCAA - Prof.Subhadeep De	24,07,500		-	
NIT Calicut - Dr.Jagadeesha T	24,07,500		-	
SRMIST - Prof.Revathi Venkataraman	24,07,500		-	
TIFR Banglore - Prof.Rama Govindrajan	24,07,500		-	
TIFR - Dr.Mohammed Rameez	24,07,500		-	
For Distinguished VAIBHAV Fellows		35,85,000		
IIT Bombay - Prof.Prasanna Chaporkar	17,92,500		-	
IIT Kanpur - Prof.Nitin Saxena	17,92,500		-	
Overhead Expenses- DST Viabhav		25,00,000		-
Total		**5,42,35,000**		-

P K M B & Co. Chartered Accountants Delhi

Manager (F&A)

INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI

SCHEDULES FORMING PART OF INCOME AND EXPENDITURE ACCOUNT FOR YEAR ENDED 31ST MARCH, 2025

(Amount in Rs.)

Schedule 23 - Interest	Current Year 2024-25	Previous Year 2023-24
a) On Fixed Loans	-	-
b) On Other Loans (including Bank Charges)	-	-
c) Interest accrued on DST Grants- added in Payable to DST	1,94,884	53,08,403
d) Interest accrued on ANRF (SERB) Grant for Abdul Kalam TIN Fellowship-added in unspent SERB Grant	12,29,919	20,47,305
e) Interest accrued on AICTE Grant for DVP Scheme-added in unspent AICTE-DVP Grant	-	-
f) Interest accrued on AICTE Grant for TG Scheme-added in unspent AICTE-TG Grant	-	-
e) Interest accrued on ANRF (SERB) Grant for Digital Gaming Research Initiative	46,09,469	1,25,95,499
f) Interest accrued on ANRF (SERB) Grant for Collaborative Initiative	91,785	1,59,072
g) Interest accrued on India Taiwan -added in Unspent Grant	1,56,588	-
h) Interest accrued on Infosys Foundation- added in Unspent Grant	3,68,428	-
Total	**66,51,073**	**2,01,10,279**

Manager (F&A)

INDIAN NATIONAL ACADEMY OF ENGINEERING

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31ST MARCH, 2025

Schedule-24

ACCOUNTING POLICIES

1. **Basis of Accounting**
   These accounts are prepared on the basis of historical cost convention and on the accrual method of accounting.

2. **Grant-in-aid**
   Grant received from the Department of Science & Technology and others are accounted for as income to the extent utilized and unspent grant has been shown under current liabilities. Grants relating to fixed assets have been shown under Income and Expenditure Account and its utilization has been transferred to fixed assets under section 11(1) of the Income Tax Act, 1961.

3. **Fixed Assets**
   Fixed Assets are stated at cost of acquisition including inward freight, duties and taxes and direct expenses related to acquisition.

4. **Depreciation**
   Fixed Assets are depreciated on written down value according to Deferred Income Method as per Accounting Standard (AS)-12. Depreciation is calculated as per following rate prescribed in Income Tax Rules

Building	: 10%	Office Furniture	: 10%
Office Equipment	: 15%	Computers	: 40%

   However, no depreciation has been provided on assets purchased from 01.04.2017 and applied u/s 11(1) of The Income Tax Act, 1961 and in fixed assets schedule it has been shown as utilization under section 11 (1) of Income Tax Act 1961.

5. **Interest on Investments**
   Interest is earned on two types of Investments, one against Corpus and General Funds and the other against Earmarked Funds etc. The interest earned on all the mentioned funds is included in Income and Expenditure account and thereafter interest related to Corpus and Earmarked Funds is transferred to respective funds.

6. **Gratuity & Leave Encashment**
   Provision for Gratuity is made as per the payment of Gratuity Act, 1972 and provision for accumulated leave and encashment is made on the basis of number of days of leave accumulated for employee. Actuarial valuation is not made to ascertain such liability.

P K M B & Co. Chartered Accountants Jeevan, New Delhi

Schedule-25

CONTINGENT LIABILITIES AND NOTES TO ACCOUNTS

1. Refunds received against the advances & project expenditure during Previous year 2023-24, which had been credited to 'Payable To DST' for further transfer of funds to Consolidated fund of India through 'Bharat Kosh'. Accordingly total payable to DST was an amount of Rs.1,31,75,392/-, as per the details given below:

Details	Amount (Rs.)
Return of Honorarium -Prof. Hari Hablani, Dist. Technologist- IIT Indore	9,00,000
Return of unspent amount by CSIR-CEERI, Pilani- Expert Group by Prof. Lalit Kumar	27,787
Return of Rolling Advance by M/s Balmer & Lawrie	2,00,000
Return of Unspent Balance from NIAS- FINP	4,80,546
Interest transferred to Old Corpus fund for FY 2022-23	24,79,520
Depreciation for FY 2022-23	20,49,835
Interest out of Surplus transferred to General Fund 2022-23	17,29,301
Interest Payable to DST for FY 2023-24	
Interest Payable to DST - old Corpus Fund investments	26,10,565
Interest Payable to DST - General Fund Investments	26,48,364
Interest Payable to DST - Unspent DST	1,578
Interest Payable to DST - Unspent DKRC Development Fund	47,896
Total	**1,31,75,392**

Further, the above amounts collected during 1.4.22 to 31.3.24 a have been remitted on 04.10.2024 to Consolidated Fund of India (CFI), PAO, DST through Bharat Kosh, as per the details given below:

Purpose of Remittance	Amount (Rs.)	SBI NEFT No.	Dated	Bharat Kosh Receipt No.
Refunds against advances given before 31.3.23	16,08,333	SBIN124277939005	04-10-24	3009240037056
Interest transferred to Old Corpus fund for FY 2022-23	24,79,520	SBIN124277937611	04-10-24	3009240047912
Depreciation for FY 2022-23 apportioned out of Interest	20,49,835	SBIN124277933537	04-10-24	3009240048536
Interest out of Surplus transferred to General Fund 2022-23	17,29,301	SBIN124277936346	04-10-24	3009240049041
Interest on Old Corpus Fund Refunded for FY 2023-24	26,10,565	SBIN224277139011	04-10-24	310240031226
Interest on Gen & DKRC Fund Refunded for FY 2023-24 & Others	26,97,838	SBIN224277139005	04-10-24	310240044681
Total	**1,31,75,392**			

2. Refunds received against the advances & project expenditure during Previous year amounting to Rs. 4,49,445/- and interest collected Rs.42105/- and interest accrued on amounts refunded as mentioned above amounting Rs.1,94,884/- will be surrendered to DST, which has been credited to 'Payable To DST' for further transfer of funds to Consolidated fund of India through 'Bharat Kosh'. Accordingly total payable to DST as on 31.3.25 is an amount of Rs.6,86,367/-, as per the details given below:

Details	Amount (Rs.)
Return of unspent amount by IIT Delhi, towards Expert Group by Prof. KK Pant	1,31,623
Return of unspent amount by IIT Kharagpur, towards Expert Group by Prof. Jayanta Bhattacharya	2,81,058
Unsettled Advances given to MTNL and others	42,038
Return of unspent amount by INAE Local Chapter Bangalore	11,745
Return of unspent amount by INAE Local Chapter Mumbai	25,019
Interest Payable to DST – including interest collected along with unspent amounts and accrued on Refunded amount RS.1,31,75,392/-	1,94,884
Total	**6,86,367**

3. Balance Sheet and Income and Expenditure account have been prepared as per uniform format of accounts for Central Autonomous Bodies prescribed by the committee of expert constituted with the approval of Hon'ble Finance Minister.

4. Figures in Income and Expenditure Account and Balance Sheet have been given as applicable to INAE as per uniform format. Utilization against the grants has been shown under schedule 22A to L, this includes expenditure incurred and advances given for activities/programs.

5. During the year ended March 31, 2025 a sum of Rs. 1,05,00,000/- has been received as Grant-in-aid Salary & a sum of Rs.40,00,000/- as Grant-in-aid General from DST as allocation through Treasury Single Account (TSA) in RBI Zero Balance Account. The above grants have been Fully utilized during the FY 2024-25 and no balance left unspent at the end of March 31, 2025.

6. During the year ended March 31, 2025 INAE entered in to an MoU with Infosys Foundation for execution of Corporate Social Responsibility (CSR) Project of M/s Infosys Limited for "Improving of Quality of Engineering Education" for 4 years, with a financial support of Rs.38.35 crores. Out of the sanctioned budget an amount of Rs. 4.93 crores have been received on Dec 31, 2024. Since the project is in conceptualization stage the expenditure of Rs.2,31,893/- has been incurred towards this project and accordingly Income of Rs.2,31,893/- has been booked during the FY 2024-25. The unspent balance of Rs.4,90,68,107/- along with Interest accrued Rs.3,68,428/- has been booked as Unspent Grant Infosys Foundation amounting Rs.4,94,36,535/- under Current Liabilities in Schedule-7.

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7. The balance of security deposits and advances are subject to confirmation/reconciliation.

8. Investment from earmarked/endowment funds includes Rs. 3,06,978/- towards Prof Roddam Narsimha Memorial Lecture Endowment Fund created out of contribution received from INAE Bengaluru Chapter in from of Term deposit with SBI. Investment (others)- Term Deposit amounting to Rs.32,02,17,680/- with SBI taken out of New Corpus Fund generated through individual donations/voluntary contributions with specific direction, Term deposits amounting Rs.2,56,00,000/- against collections from Institutional Memberships, Term deposits amounting Rs.65,60,000/- against collections from Corporate Memberships, Term deposits amounting Rs.22,50,000/- against collections from Foreign contributions collected in FCRA account and Term Deposits amounting Rs.1,20,00,000/- against provision for gratuity and leave encashment have been included in investment (others).

9. In view of direction received from DST for disengagement in terms of release of grant-in-aid w.e.f. 31.03.2025, to attain self-sufficiency in long run, INAE has resorted for collections from Memberships (Institutional, Individual & Corporate). The option under Section 11(2) of the Income Tax Act, 1961 to accumulate surplus to the tune of Rs.1,22,00,000/- out of the incomes generated form internal resources (i.e. Institutional Memberships, not being grants-in-aid from DST) was being exercised during FY 2023-24 by INAE for utilization of such accumulated amount during the next 5 financial years for furtherance of the objectives of INAE including support establishment and administrative expenditure. Notice to the Assessing Office in Form No. 10 was given accordingly.

   During the year 2024-25 the option under Section 11(2) of the Income Tax Act, 1961 to accumulate surplus to the tune of Rs.2,38,35,673/- out of the incomes generated form internal resources i.e. Rs.1,45,58,199/- from Institutional and Individual Memberships, Rs.70,00,000/- from Corporate Memberships & Rs.22,77,474/- from Foreign Contributions (not being grants-in-aid from DST) is being exercised by INAE for utilization of such accumulated amount during the next 5 financial years for furtherance of the objectives of INAE including support establishment and administrative expenditure. Notice to the Assessing Office in Form No. 10 shall be given accordingly.

   The amounts so accumulated have been depicted under Schedule -2 "Reserve and surpluses" under the head General Reserve as "Medium Term Sustenance Reserve" by transfer of Rs.1,22,00,000/- from INAE General Fund & Rs.2,38,35,673/- from Income & Expenditure Account during the year.

10. During the year 2024-25 an invoice for Corporate Membership was issued for Rs. 5 Crore on March 19, 2025 for which payment could not be received till 31.3.2025. Due to this, the option under -Explanation- 1 to Section 11(1)(a) of the Income Tax Act, 1961 to set aside surplus to the tune of Rs.5,00,00,000/- out of the incomes generated form Corporate Memberships (not being grants-in-aid from DST) is being exercised by INAE for utilization of such accumulated amount during the previous year it is received for furtherance of the objectives of INAE

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including support establishment and administrative expenditure. Notice to the Assessing Office in Form No. 9A shall be given accordingly under Rule 17.
The amounts so accumulated have been depicted under Schedule -2 "Reserve and surpluses" under the head General Reserve as "Unrealised Contributions Reserve".

11. Utilization certificates are being received from Research Scholars on term year end basis in place of financial year end basis, in respect of the expenditure of Rs. 4,47,48,409/- on ANRF (SERB)- INAE Abdul Kalam Technology Innovation National Fellowship; Rs.2,51,97,210/- on DST, India-Taiwan Cooperation in S&T Program and Rs.5,17,35,000/- on DST Vaibhav Fellowships Program.

12. During the previous financial year, the following Grant-in-aid had been received from Science and Engineering Research Board (SERB) now Anusandhan National Research Foundation (ANRF) and carry forward of these grants for expenditure during FY 2024-25 was granted towards new collaborative initiatives, unspent balances of which along with interest have been shown under Schedule-7:
    a) Grant-in-aid towards SERB-INAE Abdul Kalam TIN Fellowship – Rs.0.55 Crore/-
    b) Grant-in-aid towards SERB-INAE Digital Gaming Initiative – Rs. 2.49 Crore/-
    c) Grant-in-aid towards SERB-INAE Collaborative Activities – Rs. 0.21 Crore/-
    d) Grant-in-aid towards DST, India Taiwan Cooperation in S&T Program- Rs. 0.05 Crore/-

13. During the year 2022-23 the approval for creation of a new Corpus Fund from INAE's own resources (internal accruals) had been received from Department of Science and Technology (DST), vide letter dt March 24, 2023. Accordingly, a new bank account no. 41790835603 in the name of INAE Corpus Fund was opened on March 29, 2023 with approval of 146th INAE Governing Council on Mar 27, 2023.

    During the year a sum of Rs. 31.36 crores has been received from INAE fellows as voluntary contributions with specific direction as corpus fund contribution.

14. Figures are rounded off to Rupees.

15. Previous year's figures have been re-grouped/aligned, where ever found necessary.

As per our report of even date
For **P K M B & Co.**
Chartered Accountants
Firm Reg. No.: 005311N

P K M B & Co. Chartered Accountants Jasola, New Delhi

Mayank Gaur
Partner
Membership No.: 518183

Place: New Delhi
Date: 27th June, 2025

On behalf of the Council:

President

Vice-President
(Finance & Establishment)

Deputy Executive Director

Manager (F & A)

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