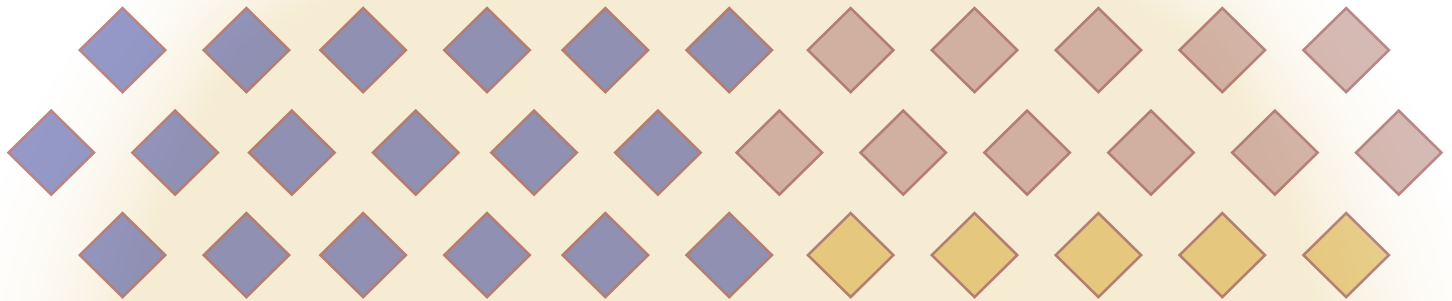


Irresistible India

A Global Engineering Powerhouse



39th

Indian Engineering Congress

December 20-22, 2024, Kolkata, WB

Hosted by West Bengal State Centre

Organised by

The Institution of Engineers (India)

A Century of Service to the Nation

Venue:

Novotel Kolkata

President's Message

As the world embraces the potential of deep tech, India is poised to emerge as a powerhouse in this transformative field. With thriving ecosystem, India is actively exploring and harnessing cutting-edge technologies, addressing societal challenges, and fostering transformative advancements and is set to reshape the future of innovation and solidify its position as a leader in the global deep tech landscape.

India's deep tech landscape has experienced an astonishing 53% growth, catapulting it to the forefront of global markets alongside established players like the US, Israel, and Europe. This rapid expansion sets the stage for India's future dominance in the deep tech realm.

In this wave of innovation, Indian start-ups are rewriting the rules of the global market, spearheading groundbreaking



advancements and revolutionizing industries. These game-changers are reshaping the landscape in remarkable ways.

In this backdrop, The Institution of Engineers (India) have aptly resolute to organize the 39th Indian Engineering Congress at Kolkata on the theme "Irresistible India - a Global Engineering Powerhouse," encapsulating India's burgeoning influence in the global engineering landscape.

I believe that deliberations during the Congress by the acclaimed engineers, scientists, visionaries and doyens of industry in the field in different technical verticals of engineering science and technology will enlighten engineers, technologists, scientists and other stakeholders on the opportunities & challenges ahead for a safe, secure and meaningful development, in the years to come.

Dr G. Ranganath, FIE

President

The Institution of Engineers (India)

About The Institution of Engineers (India)

The Institution of Engineers (India) or IEI is the largest multidisciplinary professional body in India that encompasses 15 engineering disciplines and provides engineers a global platform for sharing professional interests. IEI has membership strength of over 9 lakhs. Established in 1920, with its headquarters at Kolkata, IEI has rendered over a century of service to the engineering fraternity and the nation. In this period of time it has been inextricably linked with the history of modern-day engineering. In 1935, IEI was incorporated by Royal Charter and remains the only professional body in India to be accorded this honour. Today, its quest for professional excellence has given it a place of pride in almost every prestigious organization across the globe. IEI functions among professional engineers, academicians and research workers. It provides a vast array of technical, professional and supporting services to the Government, Industries, Academia and the Engineering fraternity, operating from 124 State/Local Centres, seven Foras located across the country and an organ viz Engineering Staff College of India (ESCI), Hyderabad and six Overseas Chapters. IEI has been recognized as Scientific and Industrial Research Organization (SIRO) by the Ministry of Science & Technology, Govt. of India and provides Grant-in-Aid to UG/PG/PhD students of Engineering Institutes & Universities to conduct research and development on engineering subjects. IEI holds the International Professional Engineers (IntPE) Register for India under the global International Professional Engineers Alliance. The Institution also awards the Professional Engineers (PE) Certification.

Indian Engineering Congress

The aim of the Indian Engineering Congress is to bring to fore the developments in various fields of engineering and prepare our engineers to face the future challenges for sustainable development of the country.

The objectives of the Indian Engineering Congress are:

- To debate and discuss the theme of the Congress to create awareness, promote ideas, innovations in their respective engineering disciplines.
- To provide Engineers with a forum for exchange of knowledge, updating information and developing a sense of responsibility in their professional functioning.
- To promote and inculcate social responsibilities of engineers towards fulfilling the basic needs of common citizen of our country.
- To promote the engineering practice that meets the challenges of sustainable and renewable energy demands.

Chairman, Organising Committee

Er. Sandip Kumar Deb, Council Member, IEI

Co-Chairman, Organising Committee

Prof.(Dr.) Sadhan Chandra Ray, Council Member, IEI

Prof.(Dr.) Netai Chandra Dey, Council Member, IEI

Er. Prabir Kumar Mukhopadhyay

Former Member Secretary, Damodar Valley Corporation

Secretary, Organising Committee

Prof. (Dr.) Raju Basak

Chairman, IEI-WBSC and Council Member, IEI

Convenor, Organising Committee

Er. Anirban Datta

Honorary Secretary, IEI-WBSC

Theme of the 39th Indian Engineering Congress

Irresistible India - A Global Engineering Powerhouse

India is a significant player in the global engineering landscape, driven by its robust IT industry, skilled workforce, and government initiatives. The Indian engineering sector provides high quality engineering goods and services to

domestic as well as overseas markets. Engineering exports, about 110 billion USD in FY 2023-24, play a significant role in the Indian economy, contributing substantially to foreign exchange earnings and providing employment opportunities. India's engineering basket includes a wide range of products & services such as mechanical, electrical, process & transportation equipment & machineries, engineering goods, ICT Software and various other industrial products. Their exports cater to diverse sectors globally, including automotive, aerospace, construction, electronics, and more. Many MNCs have set up their Global Engineering Centre in India. Over the years, India has emerged as a prominent player in the global engineering market, with countries in Asia, Europe, North America and Africa being major importers of Indian engineering products & services. Our Engineering Export is expected to reach 1 trillion USD by 2030.

The country is also the home to a large number of STEM graduates. However, the majority of this talent pool is focused on routine IT development rather than research and innovation. To address this, the Indian government has launched the National Strategy for Artificial Intelligence, aiming to create a thriving AI research and development ecosystem. AI start-ups in India are making significant contributions to various sectors, including healthcare, finance, and telecommunications, by automating processes and improving efficiency.

In summary, India, as a global engineering powerhouse, is ready to foster the entire globe in all sectors which includes but not limited to Energy & Power, Metals & Minerals, Information & Communication Technology, Chemicals & Hydrocarbons, Biomedical Science & Technology, Environment & Sustainability, as well as Infrastructure.

Chairman, Technical Committee Prof. (Dr.) Ajoy Kumar Ray, Padmashree Former Director, Indian Institute of Engineering Science and Technology, Shibpur Former Professor, Indian Institute of Technology, Kharagpur	Chairman, Publication Committee Prof. (Dr.) N.R. Bandyopadhyay Former Professor, Indian Institute of Engineering Science and Technology, Shibpur
Co-Chairman, Technical Committee Prof. (Dr.) Girish Shrikisan Mundada Professor (ET)- PICT-Pune and Council Member, IEI Chairman -Committee for Advancement of Technology and Engineering (CATE)	Convenor, Technical Committee Dr. Nilanjan Sengupta Former Director (Technical) The Institution of Engineers (India)

Call for Papers

Engineering professionals from Industries, Academic Institutions, Research & Development Organisations, Government Departments, UG-PG-Ph.D. Students and Entrepreneurs are invited to contribute papers pertaining to the theme and sub-themes of the Congress under each of the following Seven Technical Verticals and corresponding Sub-themes (sharing the experience, concepts, innovative ideas, research findings, articles, etc.)

Technical Verticals and sub-themes

INFRASTRUCTURE		
	Committee Members	Sub-themes
Chairman:	Prof (Dr) Sriman Kumar Bhattacharyya Vice Chancellor, Shiv Nadar University	Planning and design of Infrastructural systems Application of AI & ML and Computational techniques for Infrastructural systems Disaster Resilient Infrastructural systems Sustainable Material for Infrastructural systems Transportation Infrastructure Communication and Power Infrastructural systems Health Monitoring and Retrofitting of Infrastructural systems Safety and Reliability of Infrastructural systems Special Infrastructural system and New Technologies
Co-Chairman	Prof (Dr) Sudip Kumar Roy Indian Institute of Engineering Science and Technology, Shibpur	
Convener	Dr. Swati Maitra RCG School of Infrastructure, IIT Kharagpur	
Members	Prof. Dinakar Pasala IIT Bhubaneswar Prof. Debasish Bandyopadhyay Jadavpur University Prof. Subrata Chakraborty Indian Institute of Engineering Science and Technology, Shibpur	

POWER & ENERGY

	Committee Members	Sub-themes
Chairman:	Prof (Dr) Amitava Datta Pro Vice Chancellor, Jadavpur University	Advanced fossil-fuel technologies Renewable energy technologies Hydrogen and fuel cell technologies Nuclear technology and beyond Electrical machines and drives Power system stability, reliability and flexibility High-voltage engineering and technology Energy storage technologies Distributed generation, micro-grid and smart grid Condition monitoring and retrofitting Frontier technologies in mobility Applications of AI and ICT Smart energy utilization technologies Energy policy, economics and sustainability HVAC-HVDC
Co-Chairman	Er Dipta Sundar Mallick Development Consultants Private Limited	
Convener	Prof (Dr) Ranjan Ganguly Jadavpur University	
Members	Prof. (Dr.) Prithwiraj Purkait Jadavpur University	
	Dr Sudip Ghosh Indian Institute of Engineering Science and Technology, Shibpur	

METALS & MINERALS

	Committee Members:	Sub-themes
Chairman:	Prof (Dr) Partha Protim Chattopadhyay Director, National Institute of Advanced Manufacturing Technology	Metallurgy and Materials High Performance Structural Materials for Mobility Applications Materials for Energy, Sensors and other Electronics Applications Multifunctional Materials Decarbonisation and Material Recycling Integrated Computational Materials Engineering (ICME) Mining and Minerals Sustainability in mining Mineral beneficiation and waste management Automation in mining operation Geographic Information Systems (GIS) enabled mining
Co-Chairman	Prof (Dr) Pratik Dutta Indian Institute of Engineering Science and Technology, Shibpur	
Convener	Dr Sumit Chabri Narula Institute of Technology	
Members	Dr Shantanu Bhowmik National Institute of Technology, Rourkela	
	Dr Mirajul Islam Indian Institute of Engineering Science and Technology, Shibpur	
	Dr Snehanshu Pal Indian Institute of Engineering Science and Technology, Shibpur	
	Dr Gautam Anand Indian Institute of Engineering Science and Technology, Shibpur	
	Dr Srijan Acharya National Institute of Technology, Rourkela	

ENVIRONMENT & SUSTAINABILITY

	Committee Members	Sub-themes
Chairman:	Prof (Dr) Anirban Gupta Indian Institute of Engineering Science and Technology, Shibpur	Climate Change – Mitigation and Adaptation Sustainable Development and Smart Cities Waste Management and Circular Economy Environmental Pollution and Management Air pollution and Control Contaminant Transport and Remediation Sustainable Industrial Processing and Green Technologies River Rejuvenation Environmental Acts, Standards, Certification and Life-cycle Analysis Natural Disaster Mitigation Waste to Energy Emerging Pollutants
Co-Chairman	Prof. (Dr.) Sudipta Sarkar IIT Roorkee	
Convener	Prof (Dr) Asok Adak Indian Institute of Engineering Science and Technology, Shibpur	
Members	Prof. (Dr.) Anupam Debsarkar Jadavpur University	
	Dr. Pritha Chatterjee IIT Hyderabad	
	Dr. Indrasis Das CSIR - Central Leather Research Institute, Chennai	

INFORMATION AND COMMUNICATION TECHNOLOGY

	Committee Members	Sub-themes
Chairman:	Er Ram Chandra Chakraborty Managing Director, PSI Metals India Private Limited	VLSI, Embedded and Mechatronics
Co-Chairman	Dr Tapas Chakravarty Principal Scientist, TCS Research	Microwave, Millimeter Wave and THz Communication
Convener	Er Chanchal Chakraborty Director & CEO, Associated Tech Management India Private, Limited	Satellite Communication
Members	Dr Manodipan Sahoo IIT, Dhanbad	Digital Transformation(AI/ML, Bigdata, IoT, IIoT, Analytics, Cloud Computing, Digital Twin, Robotics, Industry 4.0/5.0
	Dr Subhas Chandra Saha Vidyasagar University	5G/6G Communication Optical Fiber Communication Computer Architecture Quantum Computing- Quantum Sensing, Quantum Security, Quantum Communication Cyber Security

CHEMICALS & HYDROCARBON

	Committee Members	Sub-themes
Chairman:	Prof (Dr) Papita Das Jadavpur University	Speciality Chemicals.
Co-Chairman	Dr. Avijit Ghosh Heritage Institute of Technology, Kolkata	Gas Processing
Convener	Dr Sudeshna Saha Jadavpur University	Net Zero, Sustainability
Members	Dr Ratna Dutta Jadavpur University	Application of AI and ML
	Dr Mehabub Rahaman Jadavpur University	Application of Renewable Feedstock
	Dr Saswata Bose Jadavpur University	Polymer and Nano Materials Hydrogen Economy and Circular Economy Waste management & Pollution abatement

BIOMEDICAL SCIENCE AND TECHNOLOGY

	Committee Members	Sub-themes
Chairman:	Prof (Dr) M Manjunatha IIT Kharagpur	Biomedical Imaging-Sensing and Instrumentation
Co-Chairman	Prof (Dr) Jyotirmoy Chatterjee JIS Institute of Advanced Studies and Research	Genomics, Bioinformatics, and Synthetic Biology
Convener	Dr. Keya De Mukhopadhyay University of Engineering & Management, Kolkata	Biomaterials, Tissue Engineering, and Regenerative Medicine
Members	Prof (Dr) Renu John IIT Hyderabad	Cancer and Immunology
	Prof (Dr) Ramakrishnan S IIT Madras	Microbiology, Virology, and Evidence-based Medicine
	Prof (Dr) Asish Chaudhuri The University of Incarnate Word San Antonio, Texas	AI /ML in Biomedical Research & Technology
	Dr. Sandip Paul JIS Institute of Advanced Studies and Research	Bio-inspired Mathematics/ Technology and Cognitive Science
	Dr. Sugato Ghosh JIS Institute of Advanced Studies and Research	Ergonomics and Chronobiology / Chronomedicine Neural and Rehabilitation Engineering/Technology Interdisciplinary Biomedical Research Space Medicine related Biomedical Technology & Challenges

Guidelines for Authors

The authors are requested to submit the **Extended Abstract** through the online submission system under the following link:
www.39iec.org

Authors intending to submit an Extended Abstract for 39th Indian Engineering Congress are advised to adhere to the guidelines as mentioned below:

- All extended abstracts must be submitted to the online submission system before August 31, 2024.
- Extended abstracts should be at least three pages, but not more than five pages in length including the references. Word limit is 1500 - 2,000 words. The extended abstract should be submitted highlighting important findings (with max three figures and table), relevant discussions and essential references.
- The following template of IEI should be used for writing the Extended Abstract:
https://www.ieindia.org/webui/IEI-Activities.aspx#Call_Papers
- The language of the Publication is English. The mode of presentation should be in third person.
- SI units should be used wherever possible. Other units, if used, should be given only in parentheses preceded by SI units.
- Mathematical symbols should be typed and care should be taken to differentiate between similar characters (e.g. 1 and I), upper and lower case letters and superscripts and subscripts.
- Lengthy mathematical proofs and derivations and extensive test data are discouraged. If absolutely essential, they should be given as an appendix.
- All extended abstracts must be uploaded in PDF format.
- Each extended abstract should contain the following:

Title

It includes the title of the extended abstract, and the names and affiliations of the authors.

Please underline the name of the presenter.

Keywords

Three to five keywords of the extended abstract should be provided.

Introduction

The Introduction section should introduce the problem to be studied, review the literature briefly, and provide the main findings of the work.

Methodology

The methodology of the research should be clearly explained in this section.

Results

The main results of the work should be presented and discussed. Tables and figures can be used to assist the explanation, and the number of tables and figures is limited to three altogether.

Conclusion

A brief conclusion including the summary and generalization of the results, and the contributions and the limitations of the work should be provided.

Acknowledgement (optional). Acknowledgement can be included identifying the funding sources. Do not use the name of any persons in the Acknowledgment.

References

The references are not counted in the word limit.

Presentation of Papers

The selected Extended Abstracts will be invited to present their papers either in person or in online mode during the Congress. Some selected Extended Abstracts will be invited for Poster presentation during the Congress.

The consent from the authors of “Accepted Extended Abstracts” agreeing to make presentation at the Congress should be sent along with the necessary registration fees online, as mentioned in the relevant section in the brochure.

Publication of Papers

The selected Extended Abstracts will be included in the ‘**Technical Volume of the 39th Indian Engineering Congress** (Book of Abstracts)’ (with ISBN No.).

The papers based on its worth and merit of presentation will be short-listed afterwards and will be intimated to the authors. Authors may opt for possible publication through peer review, by uploading his paper, in IEI-Springer SCOPUS-indexed journals (Series A,B,C,D,E) based on its appropriate technical domain.

Name of the Journal	Coverage
Journal of The Institution of Engineers (India): Series A https://www.editorialmanager.com/ieia	Civil, Architectural, Environmental and Agricultural Engineering
Journal of The Institution of Engineers (India): Series B https://www.editorialmanager.com/ieib	Electrical, Electronics & Telecommunication and Computer Engineering
Journal of The Institution of Engineers (India): Series C https://www.editorialmanager.com/ieic	Mechanical, Production, Aerospace and Marine Engineering
Journal of The Institution of Engineers (India): Series D https://www.editorialmanager.com/ieid	Metallurgical & Materials and Mining Engineering
Journal of The Institution of Engineers (India): Series E https://www.editorialmanager.com/ieie	Chemical and Textile Engineering

All the journals of The Institution of Engineers (India) are SCOPUS indexed and published through Springer

The papers which will not be considered in the journals, will be published in a separate Technical Volume (with ISBN) of The Institution of Engineers (India).

The copyright of papers accepted for publication lies with The Institution of Engineers (India) and reproduction of the papers or any part thereof is not allowed without the permission of the Institution.

The Publication subcommittee of 39th Indian Engineering Congress will guide and assist the authors willing to submit the papers in the journals of The Institution of Engineers (India).

Awards

- The Institution of Engineers (India) will confer “**39th IEC Best Paper Awards 2024**” to authors based on the merit of their presentations (both Oral and Poster) in each technical vertical, as will be evaluated by a **panel of experts** in the field for selection.
- The papers published in the journals of The Institution of Engineers (India) will be considered for various awards of IEI (please see <https://www.ieindia.org/webui/IEI-Activities.aspx#prizes-awards>), which are to be presented during the next Indian Engineering Congress.

Nodal Dates

Last date for receipt of extended abstract	30 th September 2024
Information of acceptance	15 th October 2024
Due Date of Registration	30 th October 2024
Communication on schedule of presentation	30 th November 2024

Registration Fee for Authors, Paper presenters

Each author/paper presenter has to register for the Congress as a Delegate within the due date.

Type of Delegate	Registration Fee within due date (30 th October 2024)	Registration Fee after due date (30 th October 2024)
To attend the full Congress on all three days	INR 5000 + 18% GST	INR 6000 + 18% GST
To attend only on the day of presentation	INR 2000 + 18% GST	INR 3000 + 18% GST

Registration Fee has to be paid online by NEFT/RTGS to the following account:

Account Name: The Institution of Engineers India 39 IEC

Account Number: 50200098404381

Bank: HDFC BANK

IFSC: HDFC0000469

MICR Code: 700240024

PAN: AAATT3439Q

GST: 19 AAATT3439Q2ZQ

The payment receipt along with the Paper number has to be mailed to 39iec.technical@gmail.com

Contact	
Convenor, Technical Committee Dr. Nilanjan Sengupta, FIE Former Director (Technical) The Institution of Engineers (India)	Co-Convenor, Technical Committee Er. Sudeep Chakraverty Deputy Director (Technical) The Institution of Engineers (India)
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