



St. Peter's

College of Engineering and Technology

An Autonomous Institution

Affiliated to Anna University | Approved by AICTE



YEAR
2026

ISBN no - 9-781234-567798



CONFERENCE PROCEEDINGS ISAC_NGN 2026

3RD INTERNATIONAL CONFERENCE ON INTEGRATED
SENSING AND COMMUNICATION FOR NEXT
GENERATION NETWORKS

Organized by:
Department of
Electronics and Communication Engineering

Date: 02.04.2026



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3rd International Conference on

INTEGRATED SENSING AND
COMMUNICATION FOR NEXT
GENERATION NETWORKS

ELECTRONICS AND COMMUNICATION ENGINEERING

Proceedings of 3rd INTERNATIONAL CONFERENCE

ON INTEGRATED SENSING AND COMMUNICATION FOR

NEXT-GENERATION NETWORKS

ISBN no- 9-781234-567798

2nd April 2026

ISAC_NGN 2026

Organized by

DEPARTMENT OF ECE



St. PETER'S
COLLEGE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
Affiliated to Anna University|| Approved by AICTE
Avadi, Chennai 600 054



MESSAGE FROM CHIEF PATRON



Dr. T. BANUMATHY

I am delighted to announce that the Departments of Electronics and Communication Engineering are organizing a 3rd International Conference on Integrated Sensing and Communication for Next-Generation Networks in Electronics and Communication Engineering, "**ISAC_NGN 2026.**" This event is highly relevant, given the significant role that **Electronics and Communication** engineers play with their innovative thinking and emerging talents.

St. Peter's College of Engineering and Technology is committed to imparting a progressive contribution to the world, which is advancing rapidly in various dimensions to meet the technical and scientific requirements of people across the globe. Hence, it's crucial for students and professionals to reflect on their performance and share their knowledge. Intensive coordination and collaboration are essential for effectively applying technology in real-life scenarios. As the calendar for 2026 fills up with activities and events, I encourage everyone to stay engaged, participate actively, volunteer, and contribute ideas. I am confident that this conference will highlight the importance of sharing innovative ideas through its various events.

I wish **ISAC_NGN-2026** great success and look forward to its impactful outcomes.

CHAIRPERSON

MESSAGE FROM TRUSTEES



Dr. T Namratha



Dr. T Lasya

We are excited to host this 3rd international conference on Integrated Sensing and Communication for Next-Generation Networks in Electronics and Communication Engineering. At St. Peter's College of Engineering and Technology, we are deeply committed to imparting the invaluable wealth of education to our students. Our mission is to develop a socio-economic ecosystem that leads our country towards self-sustenance. The management strives to fortify the teaching and learning systems, intending to position our institution as one of the premier educational establishments in the nation.

This event is a testament to our ongoing commitment to academic excellence and our dedication to staying at the forefront of technological advancements. This reflects our commitment to fostering an atmosphere of innovation, leadership, and the development of interpersonal skills. We consider it our moral obligation to enable our students and participants to face the challenges posed by the new world order. We are delighted to bring together renowned experts, scholars, and industry professionals from around the globe to share their knowledge and insights on recent trends in Electronics and Communication Engineering. This gathering provides a unique platform for the exchange of ideas, collaboration, and the advancement of technology.

We extend our gratitude to all the participants, speakers, and organizing committee members for their contributions to making this conference a success. We hope this event will inspire new ideas, foster meaningful collaborations, and contribute to the ongoing advancements in our field.

MESSAGE FROM SECRETARY



Mr. K. PRABHU

It is with great pride that I extend my best wishes to the organizing committee of the 3rd International Conference on Integrated Sensing and Communication for Next-Generation Networks in Electronics and Communication Engineering at St. Peter's College of Engineering and Technology. This conference provides a vital platform for sharing innovative ideas, research, and developments in our field. By bringing together scholars, professionals, and students, it fosters collaboration and inspires new directions in technology and research.

My sincere thanks to the keynote speakers, presenters, and participants for their valuable contributions and to the organizing team for their dedicated efforts. Let us make the most of this opportunity to connect, learn, and advance together toward a brighter technological future.

MESSAGE FROM PATRON



Dr. S. POORNACHANDRA

It is a matter of great pleasure to convey my warm greetings and best wishes to the organizing committee of the 3rd International Conference on Integrated Sensing and Communication for Next-Generation Networks in Electronics and Communication Engineering (ISAC_NGN 2026). In today's rapidly evolving technological landscape, conferences like ISAC_NGN 2026 play a crucial role in bringing together researchers, academicians, industry professionals, and students to exchange knowledge, present innovative ideas, and discuss emerging trends in Electronics and Communication Engineering. Such platforms are essential for encouraging interdisciplinary research and fostering collaboration that leads to technological advancement and societal development. This conference provides an excellent opportunity for participants to showcase their research contributions, interact with experts, and explore solutions to real-world challenges through advanced communication and sensing technologies.

I appreciate the sincere efforts of the organizing team whose dedication and commitment have made this conference possible. I am confident that this conference will be highly beneficial to all participants and will contribute significantly to the advancement of research and innovation.

I extend my best wishes for the grand success of ISAC_NGN 2026 and hope the conference achieves its intended goals and outcomes.

PRINCIPAL

ABOUT THE INSTITUTION

St. Peter's College of Engineering and Technology is a co-educational college established by Lakshmi Saraswathi Educational Trust in the year 2008. An autonomous Institution, affiliated to Anna University, Chennai. The college aims to impart training to students to develop their intellectual powers, identify and cultivate interest, and train them to become responsible and eminent citizens of India. The institution is spread over a sprawling campus with its calm surroundings, creating a study atmosphere. The invigorative and serene milieu of the institution is conducive to higher education. Our college is accredited by NAAC with A⁺ and is an ISO 9001:2015 certified unit. We have 43 university ranks to our credit.

The college runs the following programme:

- B.Tech.(Artificial Intelligence and Data Science)
- B.E. (Computer Science & Engineering)
- B.E. (Computer Science & Business Systems)
- B.E. (Electronics & Communication Engineering)
- B.E. (Electrical & Electronics Engineering)
- B.E. (Mechanical Engineering)
- B.Tech.(Biotechnology)
- B.Tech.(Chemical Engineering)
- B.Tech.(Information Technology)
- M.B.A.
- M.E. (Computer Science & Engineering)

ABOUT THE DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

The ECE department is dedicated to enhance innovative engineering society, start-up, entrepreneurs and higher study with research. It is enriched with well-equipped laboratories and highly qualified experienced faculty members. The budding engineers from this department are employed in core and software companies in private and government sector. Our alumni are placed in Infosys, Cognizant Technology Solutions, HCL Technologies, TCS and IBM, Accenture Solutions, Amazon, Wipro, Flextronics Technologies, Tech Mahindra, Ericsson India etc. Our student also placed in public sector units like BSNL, ISRO, DRDO, CSIR and NIT Delhi, etc. Many of our students pursue their higher studies in foreign universities in UK, USA and Ireland etc. To receive their MS, MBA and PhD degrees. The ECE department has signed MOU with reputed industries for student Internship and In-plant training, Guest Lecture, Research Seminar. Leadership qualities and knowledge enhancement to students are encouraged by organizing various events through IETE student chapter.

ABOUT THE CONFERENCE

The aim of the conference is to provide a platform where researchers in industry and academia can share their expertise through presentations and discussions in different fields. This conference may play a crucial role in upgrading knowledge, promoting innovation, exchanging ideas and forging collaborations among the participants. The technical program of the conference will include keynote address by eminent people and paper presentations by the participants, which provide valuable insights to both the academic and industry updates in the field of Electronics and Communication Engineering. This conference includes a wide range of topics, including academic disciplines, scientific research, technology, and beyond.

The objectives include the following:

- Facilitate the dissemination of recent scientific advances and emerging trends.
- Provide a platform for networking among professionals, researchers, and academicians.
- Share cutting-edge research and development efforts.
- Encourage interdisciplinary research and innovative solutions.
- Showcase the latest technological advancements and applications.
- Discuss the impact of new technologies on industry practices and future research directions.
- Offer workshops, tutorials, and keynote sessions to improve knowledge and skills.
- Provide opportunities for young researchers and students to present their work and receive feedback.
- Foster collaboration between academic institutions and industry.
- Explore the role of industry-academic partnerships in driving innovation.
- Discuss the role of Electronics and Communication Engineering in achieving sustainable development goals (SDGs).
- Support the publication of high-quality research papers and findings.
- Provide a platform for the global dissemination of research work and innovative ideas.

CONFERENCE PAPER TOPICS (not limited to)

- Integrated Sensing and Communication
- Joint Waveform Design
- Spectrum Management and Coexistence
- 6G and Beyond Technologies
- AI and Machine Learning for Networks
- Edge and Cloud Computing
- Internet Of Things (IoT)
- Vehicular and Aerial Networks
- Localization And Imaging
- Massive MIMO and mmWave
- Optical and Satellite Systems
- Network Security and Privacy
- Energy-Efficient Systems
- Hardware Design and Testbeds
- Smart Grids and Energy Management Systems
- IoT and Industrial Automation
- 5G and Beyond: Communication Technologies
- Artificial Intelligence and Machine Learning in Engineering
- Renewable Energy Technologies and Integration

- Robotics and Autonomous Systems
- Advanced Sensor Networks and Applications
- Embedded Systems and Real-Time Applications
- Nanotechnology and Microelectronics
- Cybersecurity in Communication Networks
- Advanced Signal Processing Techniques
- Quantum Computing and Quantum Communication
- Wireless Power Transfer and Energy Harvesting
- High-Frequency and Microwave Engineering
- VLSI Design and Technology
- Optical and Photonic Communication Systems
- Biomedical Electronics and Wearable Devices
- Advanced Control Systems and Applications
- Vehicular Technology and Smart Transportation Systems
- Sustainable Electronics and Green Technologies

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Chennai

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Professor/ Dept of ECE Vishnu Institute of Tech, Andhra Pradesh

Keynote Address

Dr. M. Ghulam Nabi Alsath.,
Deputy Director, Centre for Research, Anna University.

Dr. Edeh Michael Onyema
Dean & Professor, Coal University, Nigeria

Dr. K. Shamganth.,
IEEE Senior Member and Branch Counselor,
Head & Professor, University of Technology and Applied Sciences, IBRA

Organizing Members

S. No.	Faculty Name	Conference position	Responsibility
1	Dr. R. Valarmathi	Organizing Chair	Finance and Publication
2	Ms. Tanaya Kanungo	Coordinator	Paper presentation
3	Mr. G. Thavaselan	Coordinator	Publicity to social media
4	Mr. E. Madhankumar	Coordinator	Publicity to External Institutions & Proceedings
5	Mr. N. Jagadish	Coordinator	
6	Ms. M.P. Nirmala	Coordinator	Registration and feedback
7	Ms. R.Anuja	Coordinator	

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IMPROVING SPECTRAL EFFICIENCY IN MASSIVE MIMO FOR 5G

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Abstract

The growing use of data-hungry applications and the rapid rise in connected devices have placed stringent requirements on modern wireless networks, including higher data rates, lower latency, and improved energy efficiency. Fifth-generation (5G) communication systems address these demands through advanced technologies such as Massive Multiple-Input Multiple-Output (Massive MIMO), beamforming, and millimetre - wave transmission. Among these, Massive MIMO plays a vital role by leveraging large antenna arrays at the base station to enhance spectral efficiency (SE) and system capacity through spatial multiplexing. However, the effectiveness of Massive MIMO largely depends on accurate Channel State Information (CSI) and efficient pre-coding strategies. Conventional linear pre-coding methods, particularly Zero Forcing (ZF) and Minimum Mean Square Error (MMSE), are widely used due to their simplicity and strong interference mitigation capability. Nonetheless, their performance degrades under imperfect CSI, noise uncertainty, and increasing computational complexity in realistic channel conditions. Hence, evaluating these techniques under practical 5G scenarios is necessary to establish reliable performance benchmarks. This work investigates spectral efficiency enhancement in a multi-user Massive MIMO downlink system using classical signal processing techniques. MATLAB R2022a simulations are carried out over a Rayleigh fading channel with additive white Gaussian noise. MMSE-based channel estimation and ZF pre-coding are employed, and performance is evaluated with respect to SNR and antenna scaling. The results confirm that increasing antenna count significantly improves SE, while highlighting the performance gap caused by CSI imperfections. This study forms a baseline for future exploration of Quantum-Inspired Deep Learning-based precoding solutions.

Keywords

Massive MIMO, 5G, Spectral Efficiency Beamforming, Zero-Forcing (ZF), minimum mean square error (MMSE), Pre-coding, channel estimation, channel state information (CSI).