

Special Session Proposal for IEEE AECE 2026 Conference

1. Special Session Title

AI/ML and IoT for Post-Silicon and Intelligent Hardware Systems

2. Proposed Organisers (Session Co-Chairs)

Dr. Seema Malik

Assistant Professor
Department of Industrial Internet of Things
School of Engineering & Technology
Vivekananda Institute of Professional Studies – Technical Campus

Dr. Nishtha Kansal

Assistant Professor
Department of Electronics Engineering (VLSI Design & Technology)
School of Engineering & Technology
Vivekananda Institute of Professional Studies – Technical Campus

3. Rationale and Motivation

The increasing convergence of Artificial Intelligence (AI), Machine Learning (ML), and Internet of Things (IoT) technologies with semiconductor and embedded system design has transformed the landscape of post-silicon validation, testing, optimization, and lifecycle management. Traditional post-silicon methodologies are often time-consuming, data-intensive, and limited in scalability. AI/ML-driven approaches provide intelligent, adaptive, and automated solutions for improving hardware reliability, performance, power efficiency, and security.

This special session aims to create a focused platform for researchers and practitioners to present emerging techniques that integrate AI/ML and IoT into post-silicon and intelligent hardware ecosystems. The session encourages theoretical advances, modelling approaches, experimental validation, and real-world case studies.

4. Scope and Topics of Interest

The session invites high-quality original research contributions, including, but not limited to:

- AI/ML applications in hardware testing and post-silicon validation
- Intelligent debugging and automated fault diagnosis
- Data-driven yield analysis and reliability prediction
- Machine learning for ageing, variability, and failure modeling
- AI-based power, performance, and thermal optimization
- IoT-enabled hardware monitoring and lifecycle management

- Smart sensors for real-time silicon/system health tracking
- Edge and cloud analytics for semiconductor data processing
- AI-assisted hardware security and anomaly detection
- Digital twin frameworks for hardware modeling and optimization
- Intelligent embedded systems and heterogeneous architectures
- AI-driven adaptive and self-optimizing SoCs

5. Expected Audience

Researchers, academicians, industry professionals, and postgraduate students working in:

- VLSI Design and Technology
- Embedded Systems
- IoT Systems
- AI Hardware and Accelerators
- Cyber-Physical Systems
- Intelligent Electronic Systems

6. Relevance to the Conference

This special session aligns with the core themes of IEEE conferences focusing on intelligent systems, semiconductor technologies, AI-driven hardware solutions, and next-generation electronic system design. It aims to attract interdisciplinary research contributions and enhance academic-industry collaboration.

7. Estimated Number of Papers

The session is expected to include **15-20 peer-reviewed papers**, subject to the conference review process.