

# The 34<sup>th</sup> Microelectronics Design & Test Symposium (IEEE MDTS 2025)

May 19 – 21, 2025

Crowne Plaza Albany - The Desmond Hotel in Albany, New York

<http://mdts.ieee.org>

## **Special Session 1: Testing-aware analog/RF, mixed-signal and digital integrated circuit design approaches**

**Session organizer: Dr. Marvin Onabajo** ([monabajo@ece.neu.edu](mailto:monabajo@ece.neu.edu))

Papers are solicited in the following topics of interest, but not limited to:

- Built-In Self-Test (BIST)
- Design for Test (DFT)
- On-chip calibration
- Machine learning based optimizations
- Design automation
- Industry best practices

## **Special Session 2: Emerging materials, devices, circuits, and processing for beyond-CMOS nanoelectronics and heterogeneous integration**

**Session organizer: Dr. Huamin Li** ([huaminli@buffalo.edu](mailto:huaminli@buffalo.edu))

Papers are solicited in the following topics of interest, but not limited to:

- Emerging low-dimensional materials such as carbon nanotubes, transition metal dichalcogenides, and metal oxides.
- Novel spintronic, magnetic, optoelectronic materials and devices.
- Neuromorphic and memristive devices such as artificial synapses and neurons.
- Steep-slope devices such as phase change transistors, tunnel transistors, ferroelectric transistors, and cold source transistors.
- Quantum computing, in-memory computing, and in-sensor computing devices and circuits.
- Monolithic 3D integration and processing.

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## **Special Session 3: New Design, Test and Packaging Solutions for Wide Bandgap Technologies**

**Session organizer: Dr. Tian Xia** ([txia@uvm.edu](mailto:txia@uvm.edu))

Wide bandgap (WBG) semiconductor technologies have advanced rapidly in recent years. Their advantages over conventional semiconductor materials like silicon and gallium arsenide include higher breakdown voltages, faster switching speeds, and superior thermal conductivity. These qualities make them well-suited for a wide range of applications, including high-frequency, high-power efficiency RF and microwave circuits & systems, power electronics, biomedical systems, and many more. However, design, testing and packaging of WBG circuits and systems present unique challenges. Many sophisticated factors must be carefully considered, such as high switching frequency, low leakage current, high operating voltage, high thermal density, etc. This technical session will aggregate studies from academia and industry on WBG technologies.

## **Special Session 4: Bioelectronics & Micro/Nano Devices w/ AI Integration**

**Session organizer: Dr. Umer Hassan** ([umer.hassan@rutgers.edu](mailto:umer.hassan@rutgers.edu))

Papers are solicited in the following topics of interest, but not limited to:

- Bioelectronics
- Micro-nano sensing devices with emphasis on biomedical applications
- BioMEMS and biomedical technologies
- Impedance/ fluorescence/ absorbance spectroscopy for biomolecular detection applications
- Multimodal biosensing systems
- Micro/ Nano electronics for Biosensing and Bio-actuation
- AI/ ML integration with biodevices

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## **Special Session 5: Emerging Issues in Hardware and System Security**

**Session organizers:** Dr. Dean Sullivan ([Dean.Sullivan@unh.edu](mailto:Dean.Sullivan@unh.edu)) and Dr. Zain Ul Abideen ([abideen@cmu.edu](mailto:abideen@cmu.edu))

There has been a recent explosion of attacks targeting hardware and its supply chain. These threats repeatedly reveal that our current solutions are lacking and that despite decades of threat analysis, modeling, and prevention, we face issues defending against creative adversaries. This special session seeks novel contributions from hardware to systems security that aim to expose emerging threats, investigate practical threat models, investigate novel hardware defenses, or automate the analysis of solutions.

Papers are solicited in the following topics of interest, but not limited to:

- Side-channels and fault-injection attacks or their countermeasures
- Cryptographic hardware
- Reconfigurable-based obfuscation
- Hardware security primitives
- Heterogeneous chiplet security
- Secure CAD tools
- Zero root-of-trust
- Hardware fuzzing
- Security-oriented hardware design
- CPS and IoT device security
- AI/ML hardware security

## **Special Session 6: Power electronics and its applications**

**Session organizer:** Dr. Prasanta K. Ghosh ([pkgghosh@syr.edu](mailto:pkgghosh@syr.edu))

Papers are solicited in the general area of power electronics technology, including application and design, analytical tools for efficient conversion, and control of electric power. Some topics of interest are listed below, but not limited to:

- Power conversion topologies.
- Energy storage systems.
- Power electronic packaging.
- Electric vehicles and charging infrastructure.
- Application of digital twins, cloud design and simulation techniques.
- Energy conversion for communication systems.
- Wireless power transfer.