# **IEEE MDTS'25 Conference Program**

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	Day 1
• 9:30	AM: Registration
• 10:30	AM – 10:45 AM: Welcome and Opening Remarks
Brief	introduction to the conference, logistics, and acknowledgments.
• 10:45	AM – 11:35 AM: Keynote Talk 1 Speaker: Dr. Wenke Weinreich (Fraunhofer
IPMS	
Title: Eu	ropean Pilot Line APECS - Advanced Packaging and Heterogeneous Integration for
Electroni	c Components and Systems.
• 11:35	AM – 12:55 PM: Special Session 1 Session chair: Huamin Li
Emergin	g materials, devices, circuits, and processing for beyond-CMOS nanoelectronics
and hete	rogeneous integration
<b>SS1_1.</b> 1	1:35 am -11:55 am: Invited: Harnessing Ion Dynamics on 2D Materials: Innovations
for Next-	Generation Neuromorphic Applications
Ke Xu (F	Rochester Institute of Technology)
<b>SS1_2.</b> 1	1:55 am -12:15 pm: Invited: Strain Engineering 2D Van der Waals Devices
Stephen	Wu (University of Rochester)
<b>SS1_3.</b> 12	2:15 pm -12:35 pm: Invited: Addressing Throughput and Scalability Challenges in
Time-dor	nain Neuromorphic Computing
Hagar He	endy, Elaine Greenfield, Huayuan Han, Jacob O'Donnell, Ke Xu, Cory Merkel,
Tejasvi I	Das (Rochester Institute of Technology)
SS1_4. 12	2:35 pm -12:55 pm: Location-Controlled Chemical Vapor Deposition of MoS2 for
High-Per	formance Field-Effect Transistor Arrays
<u>Chu-Te</u>	Chen, Anthony Cabanillas, Fei Yao, Huamin Li (State University of New York at
Buffalo)	
• 12:55	PM – 1:55 PM: Lunch Break
• 1:55	PM – 2:45 PM: Keynote Talk 2 – Speaker: Dr. Samuel Pagliarini (CMU)
Title: RE	PQC: Reverse Engineering and Backdooring Hardware Accelerators for Post-quantum
Cryptogr	anhy

Cryptography

## • 2:45 PM – 4:05 PM: Contribution Session 1 Session Chair: Kelly Ockunzzi New Design and Testing Technologies

**CS1\_1.** 2:45 pm – 3:05 pm: An Energy Efficient Crossbar MAC Array with 128 Conductance State ECRAM devices

Huayuan Han, Jason Inman, Mark Indovina, Amlan Ganguly, Tejasvi Das, Ke Xu (Rochester institute of technology)

**CS1\_2.** 3:05 pm - 3:25 pm: On the Design and Fabrication of PATH-based In-Memory Computing Multipliers

Jinam Modasiya (University at Albany), Venkata Kamineni (University of Florida),

Muhammad Rashed ( University of Texas at Arlington ), Maximilian Liehr ( NY CREATES ),

Sumit Jha (Florida International University), Rickard Ewetz (University of Florida), Nathaniel Cady ( University at Albany )

**CS1\_3 (22).** 3:25 pm – 3:45 pm: A 17mV Load Transient Highly Efficient Low Ripple Split Inductor based Buck Converter using Novel Ramp Generation

Asish Jaldu, Megha T S, Laqueta N, Harshitha G R, Rashmi Seethur (PES University)

**CS1\_4** 3:45 pm – 4:05 pm: SARHD: A 6T-SRAM based Side-Channel Attack Resilient Brain-Inspired Hyperdimensional Computing Architecture

<u>Md Rubel Sarkar</u>, Shirazush Salekin Chowdhury, Govind Sunil Kumar, Yang Yi (Virginia Tech)

• 4:05 PM – 4:20 PM: Coffee Break

• 4:20 PM – 5:20 PM: Special Session 2 Session Chair: Tejasvi Das Analog/RF and Mixed-Signal Circuit Design and Test

**SS2\_1:** 4:20 pm – 4:40 pm: Invited: Watermarking Superconducting Electronic Circuits in Classical and Quantum Computers

Ayisat Adedokun, Yerzhan Mustafa, Selçuk Köse (University of Rochester)

**SS2\_2:** 4:40 pm – 5:00 pm: Invited: A 7nW, 55 µm2 DC Process Monitor with Linear Temperature Tracking

Ramana Ranganatham, Roberto Ramos-Brito, Tejasvi Das (Rochester Institute of Technology)

**SS2\_3:** 5:00 pm – 5:20 pm: Invited: Testing Strategies for Ferroelectric BTO Films and BTO-IGZO Ferroelectric FETs for Analog Memory Applications Nicholas Haehn, Connor Socolik, Vamshi Kiran Gogi, Siddharth Barve (University of Cincinnati MIND Lab ), Joshua Mayersky ( Tokyo Electron ), Amber Reed, Kevin Leedy (Air Force Research Lab), Rashmi Jha (University of Cincinnati MIND Lab )

- 5:20 PM 6:30 PM: Long Break (Taking Group Pictures)
- 6:30 PM 7:30 PM: Welcome Reception
- 7:30 PM 9:00 PM: Panel Session Coordinator: Eugene Atwood (IBM) Title: AI Power and Security Impacts: Wide-Bandgap, RF, Power Electronics and Chiplets Panelists: Dr. Wenke Weinreich, Dr. Samuel Pagliarini, Dr. David Z. Pan, Dr. Dean Sullivan

# Day 2

- 7:00 AM 8:00 AM Breakfast
- 8:00 AM 8:15 AM: Conference Introduction
  - Brief introduction of the conference, logistics, and acknowledgments.
- 8:15 AM 9:15 AM: Keynote Talk 3 Speaker: Professor David Pan

Title: Toward Agile and Intelligent Analog/RF IC Design Automation

### • 9:15 AM – 9:25 AM: Coffee Break

- 9:25 AM 10:25 AM: Keynote Talk 4 Speaker: Dr. Moitreyee Mukherjee Roy
  - (IBM) Title: Opportunities and challenges in the Era of chiplets
- 10:25 AM 10:35 AM: Coffee Break
- 10:35 AM 11:00 AM: Special Guest Talk Dr. Douglas Merrill (V-GaN Tech Hub) Title: The Vermont Gallium Nitride Tech Hub: Creating an ecosystem to attract and develop high power and high frequency microelectronics innovators
- 11:00 AM 12:20 AM: Special Session 3 Session Chair: Tian Xia
- Wideband Gap Technology

**SS4\_1:** 11:00 am – 11:20 am: Invited: 28/39 GHz Dual-Band GaN Power Amplifier Design

Swarup Chakraborty, Tian Xia (University of Vermont)

SS4\_2: 11:20 am – 11:40 am: Invited: Effect of Growth Conditions on the Performance of

Vertically Conducting b-Ga2O3 Diodes on 4H-SiC Substrate.

<u>Nifat Jahan Nipa\*</u> Kai Fu<sup>#</sup>, Tahir Hassan\*, Lee Dongkyu\*, Botong Li<sup>#</sup>, Iftikhar Ahmad, University of South Carolina\*, The University of Utah<sup>#</sup>

**SS4\_3:** 11:40 am – 12:00 pm: Investigating the Limitations of Desat Protection for WBG Semiconductors: Conjoint Effects due to the Parasitic Inductances, Junction Temperature and Dynamic Drain-Source Resistance

Annoy Kumar Das, Tian Qiu, Zheyu Zhang (Rensselaer Polytechnic Institute)

**SS4\_4:** 12:00 pm – 12:20 pm: Invited: Optimum Design of GaN Superjunction Devices in the Presence of Charge Imbalance

- Monzurul Alam (North Carolina Agricultural and Technical State University)
- 12:20 PM 1:20 PM: Lunch Break

• 1:20 PM – 2:40 PM: Poster Session Session Chair: Deniz Rende

• 2:40 PM - 2:50 PM: Break

• 2:50 PM – 4:10 PM: Special Session 4 Session Chair: Eric Hunt-Schroeder Analog/RF and Mixed-Signal Circuit Design and Test

**SS3\_1:** 2:50 PM – 3:10 PM. Invited: A Generative-Model-Assisted Optimizer for Restoring Transmission Performance

Junting Deng. Ethan Chen, Vanessa Chen ( Carnegie Mellon University )

SS3\_2: 3:10 PM – 3:30 PM. Invited: Design for Testability of a CMOS Dynamic Bias

Comparator for Through-Wafer Two-Photon Absorption Pulsed-Laser Testing

<u>Andrew Ash</u> (Oklahoma State University), Ickhyun Song (Hanyang University), John O'Hara, John Hu ( Oklahoma State University )

**SS3\_3:** 3:30 PM – 3:50 PM. Invited: Phase Signal Classification with Reservoir Computing

Md Rubel Sarkar, Shirazush Salekin Chowdhury, Jeffrey S. Walling, Yang Yi (Virginia Tech)

**SS3\_4:** 3:50 PM – 4:10 PM. Invited: Mixed Signal Approaches to Machine Learning

Hardware Accelerator for Inference Engines

Bibhu Datta Sahoo, University of Buffalo

• 4:10 PM – 4:20 PM: Coffee Break

• 4:20 PM – 5:40 PM: Special Session 5 Session chair: Umer Hassan

**Bioelectronics & Micro/Nano Devices w/ AI Integration** 

**SS5\_1:** 4:00 pm – 4:20 pm: Invited: Microelectronics Differential Impedance Spectrometry System: Modeling and Noise Analysis for Biomedical Sensing Applications

<u>Muhammad Nabeel Tahir</u>, Umer Hassan (Rutgers the State University of New Jersey)

**SS5\_2:** 4:20 pm – 4:40 pm: Invited: Thin-Film Hall Sensors for Detecting Micron-Scale Magnetic Particles using a Computational Study

Harshitha Govindaraju, Umer Hassan (Rutgers University)

**SS5\_3:** 4:40 pm – 5:00 pm: 44. Invited: Wafer-Scale 2D MoS2 Transistors Utilizing Location-

On-Demand Selective Synthesis

Anthony Cabanillas, Chu Te Chen, Fei Yao, Huamin Li (SUNY at Buffalo)

SS5\_4: 5:00 pm – 5:20 pm: ECG-Driven Automatic Personality Trait Identification

**Timothy Sweeney-Fanelli**, Justin Au-Yeung, Naveenkumar Venkataswamy, Masudul Imtiaz (Clarkson University)

• 5:40 PM - 6:30 PM: Long Break (Taking Group Pictures)

• 6:30 PM – 8:00 PM: Conference Banquet

Dinner and networking. Service awards and best poster award announcement.

# Day 3

- 7:00 AM 8:00 AM Breakfast
- 8:00 AM 8:50 AM: Keynote Talk 5 Speaker: Dr. Qiaoyan Yu (NSF)
  Title: Research and Education Opportunities in NSF SaTC Programs

• 8:50 AM – 9:50 AM: Special Session 6 Session chair: Zain UI Abideen Emerging Issues in Hardware and System Security

**SS6\_1:** 8:50 am – 9:10 am: Invited: Towards Fuzzing Hardware as Hardware

Ruochen Dai, Michael Lee ( University of Florida ), Patrick Hoey ( University of

Massachusetts Lowell ), Weimin Fu, Xiaolong Guo (Kansas State University), Shuo Wang

( University of Florida ), Dean Sullivan (University of New Hampshire), Tuba Yavuz

( University of Florida ), Orlando Arias (University of Massachusetts Lowell)

**SS6\_2:** 9:10 am – 9:30 am: Invited: Securing the Interconnect in Heterogeneous 3DICs:

Threats and Emerging Solutions

Dipal Halder, Sandip Ray (University of Florida)

**SS6\_3:** 9:30 am – 9:50 am: Invited: Analyz-N: Toolset for hardware security vulnerability

detection and mitigation

Travis Meade, Raj Dutta (Silicon Assurance)

### • 9:50 AM- 10:00 AM Coffee Break

### • 10:00 AM – 11:20 AM: Special Session 7 Session chair: Dean Sullivan

### **Emerging Issues in Hardware and System Security**

**SS7\_1:** 10:00 am – 10:20 am: Invited: AI-assisted sensing for system security enhancement using user biometric data

Xianglong Feng (Miami University)

**SS7\_2:** 10:20 am: – 10:40 am: Invited: Constructing Secure Hardware Datasets to Support the

Application of Large Language Models in Hardware Domain

Xiaolong Guo, Weimin Fu ( Kansas State University )

**SS7\_3:** 10:40 am – 11:00 am: Invited: NIST 800-22 Statistical Validation of SRAM-based

PUFs for Hardware Security

Zain Ul Abideen (Carnegie Mellon University)

**SS7\_4:** 11:00 am – 11:20 am: CAPRI6: A Solution for Fault Root Cause Detection

DILLIBABU SHANMUGAM, Zhenyuan Liu, Patrick Schaumont, (Worcester Polytechnic

Institute)

• 11:20 AM – 11:30 AM: Break

• 11:30 AM – 12:30 PM: Contribution Session 2 Session chair: Paul Reuter

### New Design and Verification

**CS2\_1:** 11:30 am – 11:50 am: LVS Rule File Connectivity Network: A Novel LVS Rule File Qualification for Enhanced Connectivity and Parasitic Extraction in Advanced Semiconductor Designs

JAEYOUNG SO, HEEJAE LIM, MINHO JUNG, JIMIN YEO, YUNSEONG LEE,

YONGSEOK LEE, JIYOUNG SHIN (SAMSUNG ELECTRONICS), AHMED SALEH,

MOHAMED ALIMAM (SIEMENS EDA )

**CS2\_2:** 11:50 am – 12:10 pm: Design and Fabrication of a Memory Test Vehicle (MTV) for Emerging Memory Devices

**Rajas Mathkari** \*, Jinam Modasiya\*, Karsten Beckmann<sup>#</sup> (NY CREATES and University at Albany<sup>#</sup>), Natalya Tokranova\*, Maximilian Liehr<sup>#</sup>, Nathaniel Cady\* (University at Albany\*) **CS2\_3:** 12:10 pm – 12:30 pm: Emerging Non-Volatile Memories based on Ferroelectric AlScN and Testing Approaches

Vamshi Kiran Gogi, Siddharth Barve, Rashmi Jha(University of Cincinnati)

• 12:30 PM – 1:30 PM: Lunch Break

• 1:30 PM – 2:50 PM: Contribution Session 3 Session chair: Brion Keller

**Power Electronics and Emerging Technologies** 

**CS3\_1:** 1:30 pm – 1:50 pm: A Hebbian Learning based Spiking Neuromorphic Hardware Accelerator with ReRAM

Wolfgang Hokenmaier, Darin Daudelin, **Ewan McNeil**, Ryan Jurasek (Green Mountain Semiconductor, Inc.)

**CS3\_2:** 1:50 pm – 2:10 pm: Invited: Single Stage AC-DC Bidirectional Converter Topologies for Solid State Transformer

Pritam Das, SUNY Binghamton

**CS3\_3:** 2:10 pm – 2:30 pm: Google Coral Dev Board Micro Implementing Custom Models for

Use in AI Vision Projects

Connor Blais (Clarkson University)

**CS3\_4:** 2:30 pm - 2:50 pm: Revolutionizing IC Testing Methodology with Hybrid TPI to

Achieve Superior Test Coverage and Design Optimization

Yadukrishnan Gopinathan, Subramanyam A, Saravanan Arulmozhi, Renold Sam,

Vethamuthu Edward Alaises (Microchip Technology Inc.)

• 2:50 PM – 3:05 PM: Closing Remarks and Awards

Summary of the conference, acknowledgments, and best student paper award.