

2021 IEEE Microelectronic Design and Test Symposium

Tuesday, May 18

Session 1: Tutorial

10:00 am - 10:05 am Welcome Address: Eugene Atwood, General Chair

10:05 am - 10:10 am Tutorial Introduction: Krishna Chakravadhanula and Carl Wisnesky, Tutorial Co-Chairs

10:10 am - 10:50 am “Security – From Simple Encryption to Secure System with Root of Trust and Anti Tamper Technology” Speaker: Tomas Eckenrode, Alion Science & Technology

10:50 am - 11:30 am “Physical Assurance and Inspection on Electronics” Speaker: Dr. Navid Asadi, Florida Institute for Cybersecurity (FICS) Research

11:30 am - 12:10 pm “On-Demand Key Generation to Secure Blockchains with Tamper Resistant ReRAMs” Speakers: Dr. Bertrand Cambou and Dr. Fatemeh Afghah, Northern Arizona University

12:10 pm - 1:10 pm Lunch

Session 2: Tutorial Continued

1:10 pm - 1:50 pm “New Frontiers of Hardware Security in the IoT Regime” Speaker: Dr. Swarup Bhunia, Semmoto Endowed Professor of IoT, Electrical and Computer Eng., University of Florida, Gainesville, Florida

1:50 pm - 2:00 pm Break

2:00 pm - 2:05 pm Keynote Introduction: Danella Zhao, Program Chair

2:05 pm - 3:05 pm Keynote: Challenges and opportunities for sub-5nm machine learning accelerators and hardware security technologies **Speaker:** Dr. Ram Kumar Krishnamurthy, Senior Research Director and Senior Principal Engineer, Intel Labs, Intel Corporation, Hillsboro, OR, USA

Wednesday, May 19

Session 3

10:00 am - 10:05 am Welcome: Eugene Atwood, General Chair

10:05 am - 10:10 am Keynote Introduction: Brion Keller

10:10 am - 11:10 am Keynote: CAD for (SoC) Security: Pre-silicon Security Sign-off from C to GDSII **Speaker:** Mark Tehranipoor, University of Florida

11:10 am - 11:15 am Break

11:15 am - Noon Invited: Structural test challenges in achieving cost-effective automotive quality

Speaker: Devanathan Varadarajan, Senior Member Technical Staff / Design Manager, Texas Instruments Inc.

Noon - 1:00 pm Lunch

Session 4

Special Session: Innovations in Optical Computing Organizer: Eugene Atwood

1:00 pm - 1:40 pm Session 4.1: Photonic Computing for Transformative AI Speaker: Igor Carron, LightOn

1:40 pm - 2:20 pm Session 4.2: Photonic convolutional processors and optical crossbars for neural network training Speaker: Bert Offrein, IBM Research

2:20 pm - 2:25 pm Break

2:25 pm - 3:05 pm Session 4.3: Processing Acceleration using Optical Fourier Transform Speaker: Iman Kundu, Optalysys Ltd.

Thursday, May 20

Session 5

10:00 am - 10:05 am Welcome: Eugene Atwood, General Chair

10:05 am - 10:10 am Program Introduction: Danella Zhao, Program Chair

10:10 am - 10:55 am Invited: Decadal Plan for Semiconductors - the New Roadmap

Speakers: David Yeh, Senior Director, and John Oakly, Science Director, Semiconductor Research Corporation

10:55 am - 11:00 am Break

Paper Session A: Machine Learning for Testing & Reliability

Session Chair: Tian Xia Session Co-chair: Paul Reuter

11:00 am - 11:20 am Paper Session A.1: Sanmitra Banerjee, Duke University

Title: Towards Functionally Robust AI Accelerators

11:20 am - 11:40 am Paper Session A.2: Soham Roy, Auburn University

Title: Principal Component Analysis in Machine Intelligence-Based Test Generation

11:40 am - 12:00 pm Paper Session A.3: Xiang Chen, Huawei Tech, China Title: A Machine Learning-based Approach for Failure Prediction at Cell Level based on Wafer Acceptance Test Parameters
12:00pm - 1:00 pm Lunch
Paper Session A: Machine Learning for Testing & Reliability
1:00 pm - 1:20 pm Paper Session A.4: Minsoo Kim, Sungkyunkwan Univ, South Korea Title: Detection of Field Failure Chips by Ensemble Learned from Different Chip Areas
Paper Session B: Electronics Test Methodologies & EDA Tools
Session Chair: Andrew Laidler Session Co-chair: Uma Srinivasan
1:20 pm - 1:40 pm Paper Session B.1: Mohammad Ebrahimi, Tehran University, Iran Title: Compensating Detection Latency of FPGA Scrubbers with a Collaborative Functional Hardware Duplication
1:40 pm - 2:00 pm Paper Session B.2: Nicholai R L'Esperance, IBM, Cadence Title: High Throughput Multiple Device Chain Diagnosis Methodology for Clock and Control Line Defects
2:00 pm - 2:05 pm Break
2:05 pm - 2:25 pm Paper Session B.3: John G Massey, IBM Title: Large-Scale Thermal TCAD Simulations of 7nm Circuits
2:25 pm - 2:45 pm Paper Session B.4: Arvind Chokhani, Cadence Title: Transition Delay Cell-Aware Test
2:45 pm - 3:00 pm Paper Session B.5: Mike Lei, Marvell Title: DFT ECO Verification with Logical Equivalence Formal Verification
Friday, May 21
10:00 am - 10:05 am Welcome: Eugene Atwood, General Chair
Session 6
10:05 am - 11:10 am Keynote Speaker Introduction: Danella Zhao, Program Chair
10:10 am - 11:10 am Keynote: Hardware/Software Co-design for AI Systems Speaker: Prof. Yiran Chen, Duke University
11:10 am - 11:15 am Break
Paper Session C: Hardware Security
Session Chair: Martin Margala Session Co-chair: Malinky Ghosh
11:15 pm - 11:35 pm Paper Session C.1: Eric D Hunt-Schroeder, University of Vermont Title: Pre-Amplifier Based Entropy Source with Stable Output for use in a Physical Unclonable Function
11:35 pm - 11:55 pm Paper Session C.2: Bryan Moy, Stony Brook University Title: Low-Cost Encryption Core for Resource-Constrained Applications
Noon - 1:00 pm Lunch
1:00 pm - 1:20 pm Paper Session C.3: Zhuoran Li, Old Dominion University Title: A New Design of Smart Plug for Real-time IoT Malware Detection
Paper Session D: Micro Circuits & Microsystems Design and Emerging Technologies
Session Chair: Kelly Ockunzzi Session Co-chair: Nicola Nicolici
1:20 pm - 1:40 pm Paper Session D.1: Ruoyu Zhi, Green Mountain Semiconductor Title: Opportunities and Limitations of in-Memory Multiply-and-Accumulate Arrays
1:40 pm - 2:00 pm Paper Session D.2: Yixuan He, Northeastern University Title: A Compensation Technique for Threshold Mismatch in Sub-threshold Current Mirror
2:00 pm - 2:05 pm Break
2:05 pm - 2:25 pm Paper Session D.3: Rasputha Rama Kanth Singi, Sree Vidyanikethan Engineering College Title: High Performance Ternary Logic Gates Using GNR-FET
2:25 pm - 2:45 pm Paper Session D.4: Ernesto Sola-Thomas, Clarkson University Title: Design of an Initial Prototype of the AI Wheelchair
2:45 am - 2:50am Invited Speaker Introduction: Danella Zhao, Program Chair
2:50 pm - 3:35 pm Invited: Quantum Computing Technology: Challenges and Future Directions Speaker: Hanhee Paik, IBM
3:35 pm - 3:40 pm Symposium Wrap-up: Kelly Ockunzzi, Vice General Chair