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## **TC5: Industry Forum - Panel**

Virtual Room 3

Chairs: Juergen Becker (Karlsruhe Institute of Technology, Germany), Thanh T Tran (Rice University, USA)

**Wednesday, September 9**

**Wednesday, September 9 9:00 - 9:10**

### **WL: Welcome Address**

Virtual Room 1

Chair: Danella Zhao (Old Dominion University, USA)

**Wednesday, September 9 9:10 - 10:10**

### **WR1: Technical Session 1**

Security

Virtual Room 1

Chairs: Sakir Sezer (Queen's University Belfast & CTO Titan IC, United Kingdom (Great Britain)), Md Farhadur Reza (University of Central Missouri, USA)

9:10 HARDY: Hardware Based Analysis for malware Detection in Embedded sYstems.....1

Sai Praveen Kadiyala (Nanyang Technological University, Singapore); Mohit Garg (Birla Institute of Technology and Science (BITS) Pilani, India); Manaar Alam (IIT Kharagpur, India); Hau Ngo (United States Naval Academy, USA); Debdeep Mukhopadhyay (IIT Kharagpur, India); Srikanthan Thambipillai (Nanyang Technological University, Singapore)

9:25 A Reconfigurable Permutation Based Address Encryption Architecture for Memory Security.....7

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Fahad Siddiqui (Queens University Belfast & The Centre for Secure Information Technologies (CSIT), United Kingdom (Great Britain)); Sakir Sezer (Queen's University Belfast & CTO Titan IC, United Kingdom (Great Britain))

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Ziming Wang (Harbin Institute of Technology (Shenzhen), China); Aijiao Cui (HIT Shenzhen, China); Gang Qu (University of Maryland, USA)

## **WS1: Special Session 1**

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Virtual Room 2

Chairs: Weiwen Jiang (University of Notre Dame, USA), Lei Yang (University of New Mexico, USA)

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Jinyu Zhan, Ying Li and Wei Jiang (University of Electronic Science and Technology of China, China); Jianping Zhu (Tencent Technology Shenzhen Company of China, China)

9:25 Architectural Exploration on Racetrack Memories.....31  
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9:40 A DNN Compression Framework for SOT-MRAM-Based Processing-In-Memory Engine.....37  
Geng Yuan, Xiaolong Ma, Sheng Lin and Zhengang Li (Northeastern University, USA); Jieren Deng and Caiwen Ding (University of Connecticut, USA)

9:55 Cube Attack on a Trojan-Compromised Hardware Implementation of Ascon.....43  
Basel Halak (Southampton University, United Kingdom (Great Britain)); Jorge Duarte-Sanchez (University of Southampton, United Kingdom (Great Britain))

### **Wednesday, September 9 10:10 - 10:20**

#### **Virtual Coffee Break**

Rooms: Virtual Room 1, Virtual Room 2

### **Wednesday, September 9 10:20 - 11:05**

#### **WK1: Keynote1**

Edge Computing Drives SoC Open Software Platforms  
Jered Floyd, Member of Technical Staff, Technology Strategist, Red Hat, Inc.  
Virtual Room 1  
Chair: Jinjun Xiong (IBM T. J. Watson Research Center, USA)

### **Wednesday, September 9 11:05 - 11:10**

#### **Virtual Coffee Break**

Rooms: Virtual Room 1, Virtual Room 2

### **Wednesday, September 9 11:10 - 11:55**

## **WK2: Keynote 2**

Incorporation of Security into Chip Design Methodologies  
Serge Leef, Program Manager, Microsystems Technology Office, DARPA  
Virtual Room 1  
Chair: Ramalingam Sridhar (University at Buffalo, USA)

### **Wednesday, September 9 11:55 - 12:00**

#### **Virtual Coffee Break**

Rooms: Virtual Room 1, Virtual Room 2

### **Wednesday, September 9 12:00 - 1:00**

#### **WP1: Poster Session 1**

Virtual Room 3  
Chair: Venkatesan Muthukumar (University of Nevada Las Vegas, USA)

- 12:00 The IANET Hardware Accelerator for Audio and Visual Data Classification.....48  
Rohini Jayachandre Gillela (Rochester Institute of Technology & RIT, USA); Amlan Ganguly, Dorin Patru and Mark Indovina (Rochester Institute of Technology, USA)
- 12:05 An Energy-Efficient Low Power LSTM Processor for Human Activity Monitoring.....54  
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- 12:15 Cycle-to-cycle Variation Enabled Energy Efficient Privacy Preserving Technology in ANN.....66  
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- 12:20 Improving the Performance of a NoC-based CNN Accelerator with Gather Support.....72  
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- 12:25 A Novel Method for Hardware Acceleration of Convex Hull Algorithm on Reconfigurable Hardware.....78  
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Shaoxia Fang (Tsinghua University & Xilinx, Inc., China); Shulin Zeng and Yu Wang (Tsinghua University, China)

12:30 A Ferroelectric FET Based In-memory Architecture for Multi-Precision Neural Networks.....96

Taha Soliman (Bosch GmbH & University of Kaiserslautern, Germany); Ricardo Olivo, Maximilian Lederer and Thomas Kämpfe (Fraunhofer IPMS, Germany); Tobias Kirchner and Andre Guntoro (Bosch GmbH, Germany); Norbert Wehn (University of Kaiserslautern, Germany)

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Haoran Ren (University of Maryland Baltimore County, USA); Arnab Neelim Mazumder and Hasib-Al Rashid (University of Maryland, Baltimore County, USA); Vandana Chandrareddy, Aidin Shiri and Tinoosh Mohsenin (University of Maryland Baltimore County, USA)

## **WS2: Special Session 2**

Processing/Computing-in-Memory: From Circuit to Architecture, From Digital to Analog

Virtual Room 2

Chairs: Xiaoming Chen (Institute of Computing Technology, Chinese Academy of Sciences, China), Xunzhao Yin (Zhejiang University, China)

12:00 Analog Content Addressable Memory Using Ferroelectric: A Case Study of Search-In-Memory.....108

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12:15 C2IM: A Compact Computing-In-Memory Unit of 10 Transistors with Standard 6T SRAM.....113

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12:30 Processing-In-Memory Accelerator for Dynamic Neural Network with Run-Time Tuning of Accuracy, Power and Latency.....117

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## **Thursday, September 10**

**Thursday, September 10 9:00 - 10:00**

### **TP2: Poster Session 2**

Virtual Room 3

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**Thursday, September 10 10:00 - 10:10**

**Virtual Coffee Break**

Rooms: Virtual Room 1, Virtual Room 2

**Thursday, September 10 10:10 - 10:55**

**TK3: Keynote 3**

Tiny Machine Learning on Microcontrollers  
Song Han, Assistant Professor, MIT EECS  
Virtual Room 1

Chairs: Danella Zhao (Old Dominion University, USA), Juergen Becker (Karlsruhe Institute of Technology, Germany)

**Thursday, September 10 10:55 - 11:05**

**Virtual Coffee Break**

Rooms: Virtual Room 1, Virtual Room 2

**Thursday, September 10 11:05 - 11:50**

**TK4: Keynote 4**

miliJoules for 1000 Inferences: Machine Learning Systems "on the Cheap"  
Diana Marculescu, Professor, University of Texas, Austin  
Virtual Room 1

Chairs: Danella Zhao (Old Dominion University, USA), Juergen Becker (Karlsruhe Institute of Technology, Germany)

**Thursday, September 10 11:50 - 12:00**

**Virtual Coffee Break**

Rooms: Virtual Room 1, Virtual Room 2

**Thursday, September 10 12:00 - 1:00**

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Virtual Room 2

Chairs: Bipin Rajendran (King's College London, United Kingdom (Great Britain)), Abhronil Sengupta (Penn State University, USA)

- 12:00 Toward Scalable, Efficient, and Accurate Deep Spiking Neural Networks.....N/A  
 Priyadarshini Panda (Yale University, USA)
- 12:15 Neuromorphic Computing Research at Intel: From Chip to Applications.....N/A  
 Yulia Sandamirskaya (Intel Labs, Germany)
- 12:30 Re-Imagining System Design for Brain-Inspired Computing.....N/A  
 Bipin Rajendran (King's College London, United Kingdom (Great Britain))
- 12:45 Spintronics Enabled Neuromorphic Computing: Hardware-Algorithm Co-Design.....N/A  
 Abhronil Sengupta (Penn State University, USA)

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**Friday, September 11 9:00 - 10:00**

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Virtual Room 1

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Secure Your SoC: How to Design Unbreakable System-on-Chip (SoC)  
Virtual Room 2

Chairs: Shivam Bhasin (Temasek Labs at NTU, Singapore), Anupam Chattopadhyay  
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Singapore); Yaswanth Tavva (National University of Singapore, Singapore)

9:15 Secure Integration of Untrusted SoC Components Through Hardware Root of Trust.....N/A  
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**Friday, September 11 10:00 - 10:10**

**Virtual Coffee Break**

Rooms: Virtual Room 1, Virtual Room 2

**Friday, September 11 10:10 - 10:55**

**FK5: Keynote 5**

Quantum Systems - The foundation for a new model of computation  
Christy Tyberg, Senior Manager, Quantum Hardware Technology Development IBM  
Quantum, IBM T. J. Watson Research Center  
Virtual Room 1

Chairs: Thomas Buechner (IBM Germany Research & Development, Germany), Gang Qu  
(University of Maryland, USA)

**Friday, September 11 10:55 - 11:05**

**Virtual Coffee Break**

Rooms: Virtual Room 1, Virtual Room 2

**Friday, September 11 11:05 - 11:50**

**FK6: Keynote 6**

ML-augmented Thermal Solution from Architecture to Layout for Large SoC and 3DIC  
Norman Chang, Ansys Fellow & Chief Technologist, ANSYS, Inc.

Virtual Room 1

Chairs: Gang Qu (University of Maryland, USA), Jinjun Xiong (IBM T. J. Watson Research Center, USA)

**Friday, September 11 11:50 - 12:00**

**Virtual Coffee Break**

Rooms: Virtual Room 1, Virtual Room 2

**Friday, September 11 12:00 - 1:00**

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Virtual Room 2

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**Friday, September 11 1:00 - 1:10**

**FCR: Concluding Remarks**

Virtual Room 1

Chair: Gang Qu (University of Maryland, USA)