



# **ISLPED 2023**

# INTERNATIONAL SYMPOSIUM ON LOW POWER ELECTRONICS AND DESIGN

**AUGUST 7–8, 2023, TU WIEN, VIENNA, AUSTRIA** 









# **LOGISTICS**

# Welcome Reception and Conference (Sunday to Tuesday) Institut für Computertechnik der TU Wien

Address: Gußhausstr. 27-29, 1040 Vienna Welcome Reception (Sun) @ Rooftop (6th floor) Conference (Mon/Tue) @ Ground floor





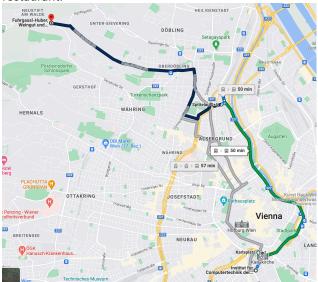
# Banquet Dinner (Monday)

# **Fuhrgassl-Huber, Weingut und Buschenschank**

Address: Neustift am Walde 68, 1190 Vienna

## **Public Transportation Guide**

Overall route from the conference site to the restaurant.



Take Metro Line **U4** at **Karlsplatz** station (600 m, 7 min walk).

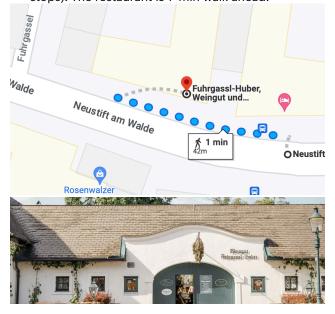




2. Get off at **Spittelau** station (10 min, 7 stops). Take Bus Line **35A** at **Spittelau S+U** station (400 m, 5 min walk).



3. Get off at **Neustift am Walde** station (21 min, 16 stops). The restaurant is 1 min walk ahead.



# **PROGRAM OVERVIEW**

El8 El8 Pötzl El9 El9 Hlawka

Sunday, August 6			
18:00-22:00	Welcome Reception (6th floor rooftop)		
Monday, Aug	ust 7		
7:30-8:00	Registration		
8:00-8:30	Welcome EI8		
8:30-9:30	Keynote 1 El8		
	Radu Marculescu		
0.00.0.45	"Thirty Years of Low-Power Design: From Wa	itts to Wisdom"	
9:30-9:45	Coffee Break		
9:45–10:45	Special Session El8 Aida Todri-Sanial, Sudeep Pasricha, and Pa	_	
40.45.44.00	"Energy-Efficient ML Acceleration: From Tec	hnologies to Circuits and Systems"	
10:45-11:00	Coffee Break	O 4D FIO	
11:00-12:20	Session 1A El8 "Energy-Efficient Memory and Processing"	Session 1B EI9 "Performance, and Energy-Aware	
	Energy-Emolent Memory and Processing	Acceleration and Tensor Processing"	
12:20-14:00	Lunch (Main Hall) & Poster Session (Side Ha		
14:00-15:00	Design Contest El8		
15:00-15:10	Coffee Break		
15:10–16:30	Session 2A EI8	Session 2B EI9	
	"Energy-Efficient Sensors, Processors, and Middleware"	"Energy-Efficient Hardware Acceleration of GNN and Transformers"	
16:30-19:30	Break		
19:30-	<b>Banquet Dinner</b>		
	Buschenschank Fuhrgassl-Huber		
Tuesday, Aug	Buschenschank Fuhrgassl-Huber ust 8		
<b>Tuesday, Aug</b> 7:30–8:00	Buschenschank Fuhrgassl-Huber ust 8 Registration		
Tuesday, Aug	Buschenschank Fuhrgassl-Huber ust 8 Registration Keynote 2 E18		
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# **MONDAY PROGRAM**

14:00-14:03

<b>8:30-9:30</b> El8 Pötzl	<b>Keynote 1</b> Chair: Umit Ogras, University of Wisconsin–Madison	
	Thirty Years of Low-Power Design: From Watts to Wisdom Radu Marculescu, University of Texas at Austin	
9:45-10:45	Special Session Organizer: Partha Pande, Washington State University	
	Energy-Efficient ML Acceleration: From Technologies to Circuits and Systems Aida Todri-Sanial, Eindhoven University of Technology Sudeep Pasricha, Colorado State University Partha Pande (Organizer), Washington State University	
<b>11:00-12:20</b> El8 Pötzl	Session 1A: "Energy-Efficient Memory and Processing" Chair: Alexander Fish, Bar-Ilan University	
11:00-11:20	A Comparative Study on Front-Side, Buried and Back-Side Power Rail topologies in 3nm technology node Sandra Shaji, Lingjun Zhu, Junsik Yoon and Sung Kyu Lim	
11:20-11:40	CoolDRAM: An Energy-Efficient and Robust DRAM (Best Paper Candidate) Nezam Rohbani, Mohammad Arman Soleimani and Hamid Sarbazi-Azad	
11:40-12:00	Development of Tropical Algebraic Accelerator with Energy Efficient Time-Domain Computing for Combinatorial Optimization and Machine Learning Qiankai Cao, Xi Chen and Jie Gu	
12:00-12:20	IMBUE: In-Memory Boolean-to-Current Inference Architecture for Tsetlin Machines Omar Ghazal, Simranjeet Singh, Tousif Rahman, Shengqi Yu, Yujin Zheng, Domenico Balsamo, Sachin Patkar, Farhad Merchant, Fei Xia, Alex Yakovlev and Rishad Shafik	
<b>11:00-12:20</b> EI9 Hlawka	Session 1B: "Performance- and Energy-Aware Acceleration and Tensor Processing" Chair: Ganapati Bhat, Washington State University	
11:00-11:20	iMAT: Energy-Efficient In-Memory Acceleration of Ternary Neural Networks With Sparse Dot Product (Best Paper Candidate) Shien Zhu, Shuo Huai, Guochu Xiong and Weichen Liu	
11:20-11:40	Accelerating ML-adjacent Computation Using Tensor Processors  Dongho Ha, Won Woo Ro and Hung-Wei Tseng	
11:40-12:00	Energy-Harvesting-Aware Adaptive Inference of Deep Neural Networks in Embedded Systems Gwanjong Park, Osama Khan and Euiseong Seo	
12:00-12:20	Precision-aware Latency and Energy Balancing on Multi-Accelerator Platforms for DNN Inference  Matteo Risso, Alessio Burrello, Giuseppe Maria Sarda, Luca Benini, Enrico Macii, Massimo Poncino, Marian Verhelst and Daniele Jahier Pagliari	
12:20-14:00	Lunch & Poster Session	
Main Hall (Lunch) Side Hall (Posters)	List of posters on p. 9	
<b>14:00-15:00</b> El8 Pötzl	<b>Design Contest</b> Co-Chairs: Rajesh Kedia, IIT Hyderabad; Florian Huemer, TU Wien	

**Energy Aware Time Series Classification for Low-Power Microcontrollers** 

Matthias Bittner, Dominik Dallinger, Matthias Wess, Daniel Schnoell, and Axel Jantsch

14:03-14:06	A Low-Power RISC-V Multicore Processor with a Shared Lightweight FPU  Jina Park, Eunjin Choi, Woojoo Lee, Sukho Lee, Jae-Jin Lee, and Massoud Pedram
14:06–14:09	SmartHeaP - A High-level Programmable, Low Power, and Mixed-Signal Hearing Aid
	SoC in 22nm FD-SOI  Jens Karrenbauer, Simon Klein, Sven Schönewald, Lukas Gerlach, Meinolf Blawat, Jens Benndorf and Holger Blume
14:09–14:12	Object Detection on a Nano-Drone Using a RISC-V Multi-Core MCU Accelerator Luca Bompani, Lorenzo Lamberti, Victor Javier Kartsch, Manuele Rusci, Daniele Palossi and Luca Benini
14:12–14:15	PLP-DVS: Adaptive Energy Scaling of Capacitor-Based Power Loss Protection in SSDs Jaehyuck Cho, Jeongmin Jeongmin Choi, Sunghyun Park, Jiyong Kim, Sungjun Yun, Kyungmin Lim, Jaehyun Park, Sungyong Ahn, and Donghwa Shin
14:15–14:18	A Passive Bidirectional BLE Tag Demonstrating Battery-Free Communication in Tablet/ Smartphone-to-Tag, Tag-to-Tablet/Smartphone, and Tag-to-Tag Modes Ziyi Chang, Qijing Xiao, Cheng Chen, Yuxuan Luo, and Bo Zhao
14:18-14:21	TunnelTx: Demonstrating Low-Power Wireless Transmissions using Tunnel Diode based Wireless Transmitters  Wenging Yan, Manoj Gulati, Prabal Dutta, and Ambuj Varshney
14:21-15:00	Live demo and poster presentation
15:10-16:30	Session 2A: "Energy-Efficient Sensors, Processors, and Middleware"
EI8 Pötzl	Chair: Jaehyun Park, University of Ulsan
15:10–15:30	Florian: Developing a Low-power RISC-V Multicore Processor with a Shared Lightweight FPU
	Jina Park, Kyuseung Han, Eunjin Choi, Sukho Lee, Jae-Jin Lee, Woojoo Lee and Massoud Pedram
15:30–15:50	Energy Efficient Real-Time Scheduling on Heterogeneous Architectures with Self- Suspension Model
	Wenwen Xu, Zheyu Zhang, Yuankai Xu, Jing Li, Yehan Ma, Yier Jin, Chris Gill, Xuan Zhang and An Zou
15:50–16:10	<b>CARMA:</b> Context-Aware Runtime Reconfiguration for Energy-Efficient Sensor Fusion Yifan Zhang, Arnav Malawade, Xiaofang Zhang, Yuhui Li, DongHwan Seong, Mohammad Al Faruque and Sitao Huang
16:10-16:30	Uncertainty-aware Online Learning for Dynamic Power Management in Large Manycore systems (Best Paper Candidate)
47.40.40.00	Gaurav Narang, Raid Ayoub, Michael Kishinevsky, Jana Doppa and Partha Pratim Pande
<b>15:10–16:30</b> EI9 Hlawka	Session 2B: "Energy-Efficient Hardware Acceleration of GNN and Transformers" Chair: Nee Arman Roohi, University of Nebraska
15:10-15:30	A Multicore GNN Training Accelerator
15.20 15.50	Sudipta Mondal, Ramprasath S, Ziqing Zeng, Kishor Kunal and Sachin S. Sapatnekar
15:30–15:50	Joint Optimization of Cache Management and Graph Reordering for GCN Acceleration Kyeong-Jun Lee, ByungJun Kim, Han-Gyeol Mun, Seunghyun Moon and Jae-Yoon Sim
15:50–16:10	ITA: An Energy-Efficient Attention and Softmax Accelerator for Quantized Transformers
	Gamze Islamoglu, Moritz Scherer, Gianna Paulin, Tim Fischer, Victor Jung, Angelo Garofalo and Luca Benini
16:10-16:30	Energy-Efficient RISC-V-Based Vector Processor for Cache-Aware Structurally-Pruned Transformers
	Jung Gyu Min, Dongyun Kam, Younghoon Byun, Gunho Park and Youngjoo Lee

# **TUESDAY PROGRAM**

<b>8:00-9:00</b> El8 Pötzl	<b>Keynote 2</b> Chair: Pascal Meinerzhagen, Intel Corporation	
	Lessons from the Brain Jan M. Rabaey, University of California, Berkeley	
<b>9:10-10:40</b> El8 Pötzl	<b>Panel Discussion</b> Organizer: Massoud Pedram, University of Southern California; Moderator: Ajay Joshi, Boston University and Lightmatter	
	Artificial General Intelligence: A Technological Marvel or an Existential Question  Massoud Pedram (Organizer), University of Southern California  Ajay Joshi (Moderator), Boston University and Lightmatter  Ahmed Hemani, KTH Royal Institute of Technology  Axel Jantsch, Technische Universität Wien  Diana Marculescu, University of Texas at Austin  Radu Marculescu, University of Texas at Austin  Aida Todri-Sanial, Technische Universiteit Eindhoven	
<b>10:50-12:10</b> El8 Pötzl	Session 3A: "ML-Driven Automation and Multi-Objective Optimization for Low-Power Design"  Chair: Massimo Poncino, Politecnico di Torino	
10:50–11:10	Machine Learning Driven Synthesis of Clock Gating Doyeon Won, Soomin Kim and Taewhan Kim	
11:10-11:30	Automatic Generation of Cell Based Structured CIM Macros Christian Lanius, Jie Lou, Johnson Loh and Tobias Gemmeke	
11:30–11:50	Multi-objective optimization for Floating Point Mix-Precision Tuning (Best Paper Candidate)  Zeqing Li and Youhui Zhang	
11:50-12:10	REFROM: Responsive, Energy-efficient Frame Rendering for Mobile Devices (Best Paper Candidate)	
<b>10:50-12:10</b> El9 Hlawka	Tsung-Yen Hsu, Yi-Shen Chen, Yun-Chih Chen, Yuan-Hao Chang and Tei-Wei Kuo  Session 3B: "Novel Processing-in-Memory Techniques for Low Power"  Chair: Yoav Weizman, Bar-Ilan University	
10:50–11:10	CIM-3DRec: A 3D Reconstruction Accelerator with Digital Computing-in-Memory and Octree-Based Scheduler Yiqi Jing, Yiyang Sun, Xiao Wang, Wentao Zhao, Meng Wu, Fengyun Yan, Yufei Ma, Le Ye and Tianyu Jia	
11:10-11:30	Processing-in-Memory using Optically-Addressed Phase Change Memory Guowei Yang, Cansu Demirkiran, Zeynep Ece Kizilates, Carlos A. Rios Ocampo, Ayse Coskun and Ajay Joshi	
11:30–11:50	LAXOR: A Bit-Accurate BNN Accelerator with Latch-XOR Logic for Local Computing (Best Paper Candidate)  Dongrui Li, Tomomasa Yamasaki, Niangjun Chen, Mani Aarthy, Anh Tuan Do and Bo Wang	
11:50-12:10	AR-PIM: An Adaptive-Range Processing-in-Memory Architecture Teyuh Chou, Fernando Garcia-Redondo, Paul Whatmough and Zhengya Zhang	
12:10-13:50	Lunch & Poster Session	
Main Hall (Lunch) Side Hall (Posters)	List of posters on p. 9	
<b>13:50-15:10</b> EI8 Pötzl	Session 4A: "When Low Power Design Meets Hardware Security" Chairs: Ajay Joshi, Boston University	

13:50-14:10	Low Power Logic Obfuscation Through System Level Clock Gating Daniel Xing, Yuntao Liu and Ankur Srivastava
14:10-14:30	FPGA-Patch: Mitigating Side Channel Attacks on Multi-Tenant FPGAs using Dynamic Patch Generation (Best Paper Candidate)
	Mahya Morid Ahmadi, Lilas Alrahis, Ozgur Sinanoglu and Muhammad Shafique
14:30-14:50	Enabling DVFS Side-Channel Attacks for Neural Network Fingerprinting in Edge Inference Services
	Erich Malan, Valentino Peluso, Andrea Calimera and Enrico Macii
14:50–15:10	Hardware Trojans in fdSOI Christian Lanius, Florian Freye, Shutao Zhang and Tobias Gemmeke
13:50-15:10	Session 4B: "Low Power AI Accelerators and AI for Low Power Design"
EI9 Hlawka	Chair: Younghyun Kim, University of Wisconsin-Madison
13:50-14:10	Bridging the Gap between Spiking Neural Networks & LSTMs for Latency & Energy Efficiency
	Gourav Datta, Haoqin Deng, Robert Aviles, Zeyu Liu and Peter Beerel
14:10-14:30	Partial-sum Quantization for near ADC-Less Compute-In-Memory Accelerators Utkarsh Saxena and Kaushik Roy
14:30–14:50	Efficient Multi-Objective Optimization for PVT Variation-Aware Circuit Sizing using Surrogate Models and Smart Corner Sampling Octavian Pascu, Catalin Visan, Georgian Nicolae, Mihai Boldeanu, Horia Cucu, Cristian V. Diaconu, Andi Buzo and Georg Pelz
14:50–15:10	Model-Driven Dataset Generation for Data-Driven Battery SOH Models  Khaled Sidahmed Sidahmed Alamin, Francesco Daghero, Giovanni Pollo, Daniele Jahier Pagliari, Yukai Chen, Enrico Macii, Massimo Poncino and Sara Vinco
<b>15:20-16:20</b> El8 Pötzl	Session 5A: "Novel Parallel Architectures for Deep Learning" Chair: Jiang Hu, Texas A&M University
15:20-15:40	Ocellus: Highly Parallel Convolution-in-Pixel Scheme Realizing Power-Delay-Efficient Edge Intelligence (Best Paper Candidate) Sepehr Tabrizchi, Shaahin Angizi and Arman Roohi
15:40–16:00	Sky-NN: Enabling Efficient Neural Network Data Processing with Skyrmion Racetrack Memory
	Yong-Cheng Liao, Shuo-Han Chen, Yuan-Hao Chang and Yu-Pei Liang
16:00–16:20	RF2P: A Lightweight RISC Processor Optimized for Rapid Migration from IEEE-754 to Posit
	Hyun Woo Oh, Seongmo An, Won Sik Jeong and Seung Eun Lee

# **POSTERS**

## # Monday 12:20-14:00 & Tuesday 12:10-13:50

- Scaled Population Division for Approximate Computing Kunal Bharathi, Sunil Khatri and Jiang Hu
- 2 Cryogenic CMOS as an Enabler for Low Power Dynamic Logic Rakshith Saligram, Suman Datta and Arijit Raychowdhury
- 3 Quantifying the Overheads of Modular Multiplication
  Deepraj Soni, Mohammed Nabeel Thari Moopan, Negar Neda, Ramesh Karri, Michail Maniatakos and Brandon Reagen
- 4 **Multi-Source Transfer Learning for Design Technology Co-Optimization**Jakang Lee, Jaeseung Lee, Seonghyeon Park and Seokhyeong Kang
- 5 **Enabling Highly-Efficient DNA Sequence Mapping via ReRAM-based TCAM** Yu-Shao Lai, Shuo-Han Chen and Yuan-Hao Chang
- A Self-powered Predictive Maintenance System Based on Piezoelectric Energy Harvesting and TinyML
   Zijie Chen, Yiming Gao and Junrui Liang
- 7 **Temperature-Aware Memory Mapping and Active Cooling of Neural Processing Units**Vahidreza Moghaddas, Hammam Kattan, Tim Buecher, Mikail Yayla, Jian-Jia Chen and Hussam Amrouc
- 8 **WeNet: Configurable Neural Network with Dynamic Weight-Enabling for Efficient Inference**Jingxiao Ma and Sherief Reda
- 9 Energy-Efficient Missing Data Recovery in Wearable Devices: A Novel Search-based Approach
  Dina Hussein, Taha Belkhouja, Ganapati Bhat and Jana Doppa
- 10 RecPIM: A PIM-Enabled DRAM-RRAM Hybrid Memory System For Recommendation Models Heewoo Kim, Haojie Ye, Trevor Mudge, Ronald Dreslinski and Nishil Talati
- Weight-Aware Activation Mapping for Energy-Efficient Convolution on PIM Arrays
  Kang Eun Jeon, Johnny Rhe, Hyeonsu Bang and Jong Hwan Ko
- 12 **Teleport: A High-Performance ShiftNet Hardware Accelerator with Fused Layer Computation**Hyunmin Kim and Sungju Ryu
- 13 Energy-Efficient ReRAM-based ML Training via Mixed Pruning and Reconfigurable ADC
  Chukwufumnanya Ogbogu, Biresh Kumar Joardar, Soumen Mohapatra, Jana Doppa, Deukhyoun
  Heo, Krishnendu Chakrabarty and Partha Pratim Pande
- 14 **Digital Implementation of On-Chip Hebbian Learning for Oscillatory Neural Networks**Edgar Leonard Marvin Luhulima, Madeleine Abernot, Federico Corradi and Aida Todri-Sanial
- 15 PAIRS: Pruning-Alded Row-Skipping for SDK-Based Convolutional Weight Mapping in Processing-In-Memory Architectures

  Johnny Rhe, Kang Eun Jeon and Jong Hwan Ko
- A Fully-Integrated Energy-Scalable Transformer Accelerator Supporting Adaptive Model Configuration and Word Elimination for Language Understanding on Edge Devices Zexi Ji, Hanrui Wang, Miaorong Wang, Win-San Khwa, Meng-Fan Chang, Song Han and Anantha P. Chandrakasan
- 17 Learning from Output Transitions: A Chosen Challenge Strategy for ML Attacks on PUFs Chia-Chih Lin and Ming-Syan Chen
- 18 **Efficient Machine Learning on Encrypted Data using Hyperdimensional Computing**Yujin Nam, Minxuan Zhou, Saransh Gupta, Gabrielle De Micheli, Rosario Cammarota, Chris Wilkerson, Daniele Micciancio and Tajana Rosing

# **ORGANIZING COMMITTEE**

## **General Co-Chairs**

Swaroop Ghosh, Pennsylvania State University Axel Jantsch, Technische Universität Wien

## **Technical Program Co-Chairs**

Umit Ogras, University of Wisconsin-Madison Pascal A. Meinerzhagen, Intel Corporation

## **Treasurer**

Mehdi Kamal, University of Southern California

# **Local Arrangements Chair**

Thilo Sauter, Technische Universität Wien Maximilian Götzinger, Technische Universität Wien

#### Web Chair

Meron Zerihun Demissie, University of Michigan

# **Publications Chair**

Younghyun Kim, University of Wisconsin-Madison

# **Design Contest Co-Chairs**

Rajesh Kedia, Indian Institute of Technology Hyderabad Florian Huemer, Technische Universität Wien

## **Publicity Chair**

Semeen Rehman, Technische Universität Wien Linghao Song, University of California, Los Angeles Jae-Joon Kim, Seoul National University

# **TECHNICAL PROGRAM COMMITTEE**

## Track 1. Technology, Circuits, and Architecture

## 1.1-1.2. Technologies and Circuits

Aatmesh Shrivastava (Track Co-Chair), Northeastern University

Rahul Rao (Track Co-Chair), IBM

Deliang Fan, Arizona State University

Fady Abouzeid, ST Microelectronics

Frank Gurkavnak, ETH Zurich

Sudhanshu Khanna. Texas Instruments

Vishal Khatri, Kandou

Amit Agarwal, Intel

Alexandre Levisse, EPFL

Farshad Moradi, Aarhus University

Joycee Mekie, IIT Gandhinagar

Inhee Lee, University of Pittsburgh

#### 1.3. Logic and Architecture

Antonia Zhai (Track Co-Chair), University of Minnesota

John (Jack) Sampson (Track Co-Chair), Pennsylvania State University

Adam Teman, Bar-Ilan University

Daniel Wong, UC Riverside

Marisa Lopez-Vallejo, Universidad Politécnica de Madrid

Matthias Korb, ETH Zurich

Theocharis Theocharides, University of Cyprus

M. Hassan Najafi, University of Lousiana

Kshitij Bhardwaj, LLNL

# Track 2. CAD, Systems, and Software

# 2.1. CAD Tools and Methodologies

Enrico Macii (Track Co-Chair), Politecnico di Torino

Azadeh Davoodi (Track Co-Chair), University of Wisconsin-Madison

Alberto Macii, Politecnico di Torino

Pascal Vivet, CEA-Leti

Matthew Ziegler, IBM

Alessio Burrello, University of Bologna

Francesco Regazzoni, USI

Donkyu Baek, Chungbuk National University

Nadine Azemard-Crestani, LIRMM

Sanghamitra Roy, Utah State University

# 2.2. Systems and Platforms

Marina Zapater (Track Co-Chair), University of Applied

Sciences Western Switzerland

Hun Seok Kim (Track Co-Chair), University of Michigan

Donghwa Shin, Soongsil University

Massimo Poncino, Politecnico di Torino

Pai Chou, National Cheng Kung University, Taiwan

Jaehyun Park, University of Ulsan

Mohammad Al Faruque, UC Irvine

Masanori Hashimoto, Osaka University

Hussam Amrouch, University of Stuttgart

Taeyoung Kim, Intel

Jason Xue, City University of Hong Kong

William Fornaciari, Politecnico di Melano

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### 2.3. Software and Applications

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Xue Lin (Track Co-Chair), North Eastern University

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Wanli Chang, University of York

Daniele Jahier Pagliari, Politecnico di Torino

Young Geun Kim, Korea University

Aporva Amarnath, IBM

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# Track 3. AI/ML Hardware and System Security

#### 3.1. AI/ML Hardware

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Priyadarshini Panda (Track Co-Chair), Yale

Jan Moritz Joseph, RWTH

Amit Trivedi, University of Illinois

Georgios Karakonstantis, Queen's University Belfast

Arman Roohi, University of Nebraska

Kanad Basu, University of Texas Dallas

Gokul Krishnan, Arizona State University

Prabal Basu, Cadence

Abhronil Sengupta, Pennsylvania State University

Shaahin Angizi, New Jersey Institute of Technology

Youngjoo Lee, POSTECH

Jason Eshraghian, University of California Santa Cruz

Ivan Miro-Panades, CEA

Srivatsa Rangachar Srinivasa, Intel

Nikita Mirchandani, On Semi

Jae-sun Seo, Arizona State University

Greg Chen, Intel

Phil Knag, Intel

Cedric Lichtenau, IBM

Sumit Mandal, Indian Institute of Science

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## 3.2. Hardware and System Security

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Anupam Chattopadhyay (Track Co-Chair), Nanyang

**Technological University** 

Kaveh Shamsi, University of Texas Dallas

Wei Jiang, UESTC

Asmit De, SiFive

Sara Tehranipoor, West Virginia University

Debjyoti Bhattacharjee, IMEC

Debayan Das, Intel

Shivam Bhasin, Nanyang Technological University

Sohrab Aftabjahani, Intel

Jeyavijayan Rajendran, Texas A&M University