

TECHNICAL PROGRAM

*“CAS leading post-pandemic AI”*



*June 13-15, 2022*  
*Songdo Convensia, Incheon, Korea*

# Time Table

## June 13, 2022 (Monday)

Time		Lobby	201+202	204+205	206+207
From	To				
8:30	9:00	Registration			
9:00	10:30		Tutorial 1	Tutorial 2	Tutorial 3
10:30	10:45		Coffee Break		
10:45	12:15		Tutorial 4	Tutorial 5	Tutorial 6
12:15	13:15		Lunch		
13:15	14:45		Tutorial 7	Tutorial 8	Artificial Intelligence Semiconductor Design Contest
14:45	15:00		Coffee Break		
15:00	16:30		Tutorial 9	Tutorial 10	

## June 14, 2022 (Tuesday)

Time		Lobby	201+202		204+205		206+207	
From	To							
8:30	8:45	Registration & Exhibition & Demo Exhibitions	AC	10	DCAS1	6	AD1	86
8:45	9:00			27		9		97
9:00	9:15			108		51		219
9:15	9:30			138		44		52
9:30	9:45			215		45		53
9:50	10:10		Opening Ceremony - (Grand Ballroom A & B)					
10:10	11:00		Keynote #1 - (Grand Ballroom A & B)					
11:00	11:10		Coffee Break					
11:10	12:10		Keynote #2 - (Grand Ballroom A & B)					
12:10	13:30		Lunch			(WiCAS) - (Grand Ballroom C)		
13:30	13:45	SS1	101	MT	274	SS2	90	
13:45	14:00		113		103		132	
14:00	14:15		177		147		182	
14:15	14:30		185		246		192	
14:30	14:45		222	66		226		
14:50	15:50	Live Demo - (Lobby)						
15:50	16:10	Coffee Break						
16:10	16:25	AD2	191	IN1	118	SS3	169	
16:25	16:40		210		139		248	
16:40	16:55		47		283		102	
16:55	17:10		255		285		129	
17:10	17:25		275		286		187	
17:25	17:40			287				
18:00	20:00	Banquet - (Grand Ballroom A & B)						

# Time Table

## June 15, 2022 (Wednesday)

Time		Lobby	201+202		204+205		206+207		308+309		
From	To										
8:30	8:45	Registration & Exhibition & Poster Exhibition	SS4	72	SS5	69	IN2	95	AutoCAS (09:00-17:00)		
8:45	9:00			83		74		149			
9:00	9:15			160		93		120			
9:15	9:30			253		178		250			
9:30	10:30		Keynote #3 - (Grand Ballroom A & B)								
10:30	10:50		Coffee Break								
10:50	11:50		Keynote #4 - (Grand Ballroom A & B)								
11:50	13:10		Lunch								
13:10	14:40		Poster Session - (Lobby)								
14:40	14:55		EA	54	AD3	4	DCAS2	38			
14:55	15:10			123		18		85			
15:10	15:25			207		155		161			
15:25	15:40			247		157		259			
15:40	15:55			263		174		270			
16:00	16:20		Coffee Break								
16:20	16:35		SS6	67	SS7	112	SS8	70			
16:35	16:50			98		134		73			
16:50	17:05			121		135		78			
17:05	17:20			128		137		87			
17:20	17:35			141		158		89			
17:35	17:50	227		168		167					
17:50	18:05	239									
18:05	18:30	Closing Ceremony - (Grand Ballroom A & B)									

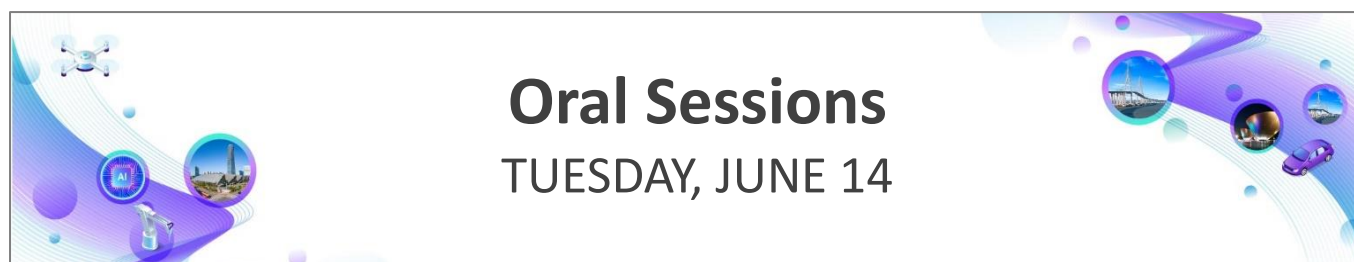
# Time Table

Oral Session	
AC	Analog Circuits, Neuromorphic, and New Device for AI
AD1	AI Algorithms Development and Design Automation (1)
AD2	AI Algorithms Development and Design Automation (2)
AD3	AI Algorithms Development and Design Automation (3)
EA	Emerging Applications Inspired by AI
MT	New Memory Technology and Processing in Memory for AI
DCAS1	Digital Circuits and Systems for AI (1)
DCAS2	Digital Circuits and Systems for AI (2)

Special Session	
SS 1	Novel Computation and Communication Methods for AI Accelerator Design
SS 2	Artificial Intelligence Boosted Circuits and Systems for Brain-Machine Interface
SS 3	Efficient Hardware Accelerator for DNN / Emerging Neural Network Circuits and Algorithms Combining Bio-Inspired and Machine-Learning Perspect
SS 4	Memory-Centric Accelerator Design for Energy-efficient Inferencing and Training
SS 5	Performance-Power Scalable AI-Accelerator Design Techniques
SS 6	AI Challenges in Biomedical Engineering
SS 7	Low Power Autonomous Systems
SS 8	Security and Privacy in Deployment of Deep Neural Networks

Industrial Session	
IN1	Research Facility (KETI & ETRI)
IN2	Industry (SK Hynix & LG & Samsung)

Tutorial	Title
Tutorial 1	Low-Power Computer Vision: Algorithms and Practice
Tutorial 2	Accelerator System Design Challenges from Real-time and Multi-DNN Workloads
Tutorial 3	Training Spiking Neural Networks Using Lessons from Deep Learning
Tutorial 4	Machine Learning Reproducibility: Guidance for Practitioners
Tutorial 5	Realizing a 5X Computer Vision Inference Speedup with PyTorch
Tutorial 6	Deep Neural Network Training Processor Design
Tutorial 7	Ultra-Low Power Biomedical AI Processor Design for Wearable Intelligent Health Monitoring Devices
Tutorial 8	Compute-in-Memory Processors: A Cross-layer Approach
Tutorial 9	Event-driven bio-inspired audio sensor front end for edgeTinyML
Tutorial 10	In-memory Computing Circuit Design for Neural Network Acceleration



# Oral Sessions

## TUESDAY, JUNE 14

AC

Analog Circuits, Neuromorphic, and New Device for AI

Chair:

08:30~09:45, Tuesday, June 14, 2022

Conference Room 201+202 (2F)

AC-1 (10)

08:30-08:45

**Memristor-Based In-Circuit Computation for Trace-Based STDP**Deyu Wang<sup>1</sup>, Jiawei Xu<sup>1</sup>, Feng Li<sup>1</sup>, Lianhao Zhang<sup>2</sup>, Yuning Wang<sup>3</sup>, Ahmed Hemani<sup>4</sup>, Anders Lansner<sup>4</sup>, Lirong Zheng<sup>1</sup> and Zhuo Zou<sup>1</sup><sup>1</sup>Fudan University, China<sup>2</sup>Technical University of Denmark, USA<sup>3</sup>University of Turku, Finland<sup>4</sup>KTH Royal Institute of Technology, Sweden

AC-2 (27)

08:45-09:00

**Energy-Efficient High-Accuracy Spiking Neural Network Inference Using Time-Domain Neurons**

Joonghyun Song, Jiwon Shin, Hanseok Kim and Woo-Seok Choi

Seoul National University, Korea

AC-3 (108)

08:45-09:00

**Analog-Domain Time-Series Moment Extraction for Low Power Predictive Maintenance Analytics**Ahish Shylendra<sup>1</sup>, Priyesh Shukla<sup>1</sup>, Swarup Bhunia<sup>2</sup> and Amit R Trivedi<sup>1</sup><sup>1</sup>University of Illinois at Chicago, USA<sup>2</sup>University of Florida, USA

AC-4 (138)

09:15-09:30

**Effect of ReRAM Neuromorphic Circuit Array Variation and Fault on Inference Accuracy**

Paul Quibuyen, Tom Jiao and Hiu Yung Wong

San Jose State University, USA

AC-5 (215)

09:30-09:45

**Low-current, highly linear synaptic memory device based on MoS<sub>2</sub> transistors for online training and inference**

Matteo Farronato, Margherita Melegari, Saverio Ricci, Shahin Hashemkani and Christian Monzio Compagnoni

Politecnico di Milano, Italy

## DCAS1

## Digital Circuits and Systems for AI (1)

Chair:

08:30~09:45, Tuesday, June 14, 2022

Conference Room 204+205 (2F)

**DCAS1-1 (6) A probability-inspired normalization for fixed-precision Hyper-Dimensional Computing**

08:30-08:45

Sohum Datta and Jan Rabaey

*UC Berkeley, USA***DCAS1-2 (9) Enabling Energy-Efficient Inference for Self-Attention Mechanisms in Neural Networks**

08:45-09:00

Qinyu Chen<sup>1</sup>, Chang Gao<sup>2</sup>, Congyi Sun<sup>3</sup> and Zhonghai Lu<sup>4</sup><sup>1</sup>*University of Shanghai for Science and Technology, China*<sup>2</sup>*University of Zurich and ETH Zurich, Switzerland*<sup>3</sup>*Nanjing University, China*<sup>4</sup>*KTH, Sweden***DCAS1-3 (51) Temporal Frame Filtering with Near-Pixel Compute for Autonomous Driving  
Complex Numbers**

08:45-09:00

Wantong Li<sup>1</sup>, Qiucheng Wu<sup>2</sup>, Janak Sharda<sup>1</sup>, Shiyu Chang<sup>3</sup> and Shimeng Yu<sup>1</sup><sup>1</sup>*Georgia Institute of Technology, USA*<sup>2</sup>*University of California, USA*<sup>3</sup>*UCSB, USA***DCAS1-4 (44) A General-Purpose and Configurable Planar Data Processor for Energy-Efficient Pooling  
Computation**

09:15-09:30

Mingqiang Huang<sup>1</sup>, Lunshuai Pan<sup>1</sup>, Peng Xue<sup>1</sup>, Litao Sun<sup>2</sup> and Hongxing Li<sup>2</sup><sup>1</sup>*Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China*<sup>2</sup>*SEU-FEI Nano-Pico Center, Key Laboratory of MEMS of Ministry of Education, China***DCAS1-5 (45) A 0.95 mJ/frame DNN Training Processor for Robust Object Detection with Real-World  
Environmental Adaptation**

09:30-09:45

Donghyeon Han

*KAIST, Korea*

## AD1

## AI Algorithms Development and Design Automation (1)

Chair:

08:30~09:45, Tuesday, June 14, 2022

Conference Room 206+207 (2F)

AD1-1 (86)

**Class Attention Transfer for Semantic Segmentation**

08:30-08:45

Yubin Cho and Suk-Ju Kang  
*Sogang University, Korea*

AD1-2 (97)

**Lightweight and Efficient Neural Network Using Progressively Greedy Search**

08:45-09:00

Jheng Yi Chang, Ching-Te Chiu and Pin Hsuan Chen  
*National Tsing Hua University, Taiwan*

AD1-3 (219)

**Deep Learning Toolkit-Driven Equivalence Checking of Flow-Based Computing Systems**

09:00-09:15

Suraj S Singireddy<sup>1</sup>, Rickard Ewetz<sup>2</sup> and Sumit K Jha<sup>1</sup>  
<sup>1</sup>*University of Texas at San Antonio, USA*  
<sup>2</sup>*University of Central Florida, USA*

AD1-4 (52)

**GaN Distributed RF Power Amplifier Automation Design with Deep Reinforcement Learning**

09:15-09:30

Yuxiang Sun<sup>1</sup>, mouhacine Benosman<sup>2</sup> and Rui Ma<sup>1</sup>  
<sup>1</sup>*Mitsubishi Electric Research Laboratories (MERL), Japan*  
<sup>2</sup>*MERL, Japan*

AD1-5 (53)

**Real-time prediction of cardiovascular diseases using reservoir-computing and fusion with electronic medical record**

09:30-09:45

Sudarsan Sadasivuni<sup>1</sup>, Vasundhara Damodaran<sup>2</sup>, Imon Banerjee<sup>3</sup> and Arindam Sanyal<sup>2</sup>  
<sup>1</sup>*University at Buffalo SUNY, USA*  
<sup>2</sup>*Arizona State University, USA*  
<sup>3</sup>*Mayo Clinic, USA*

## MT

## New Memory Technology and Processing in Memory for AI

Chair:

13:30~14:45, Tuesday, June 14, 2022

Conference Room 204+205 (2F)

MT-1 (274)

13:30-13:45

**MemSE: Fast MSE Prediction for Noisy Memristor-Based DNN Accelerators**Jonathan Kern<sup>1</sup>, Henwood Sebastien<sup>1</sup>, Gonçalo Mordido<sup>1</sup>, Elsa Dupraz<sup>2</sup>, Abdeldjalil Aissa-El-Bey<sup>2</sup>, Yvon Savaria<sup>1</sup> and Leduc-Primeau François<sup>1</sup><sup>1</sup>Polytechnique Montreal, Canada<sup>2</sup>IMT Atlantique, France

MT-2 (103)

13:45-14:00

**TAC-RAM: A 65nm 4Kb SRAM Computing-in-Memory Design with 57.55 TOPS/W supporting Multibit Matrix-Vector Multiplication for Binarized Neural Network**XIAOMENG WANG<sup>1</sup>, Xuejiao Liu<sup>2</sup>, Hu Xianghong<sup>3</sup>, Xiaopeng Zhong<sup>3</sup>, Xizi Chen<sup>3</sup>, Yu Liu<sup>2</sup>, Patrick Kong<sup>2</sup>, Fengshi Tian<sup>3</sup>, Chi Ying Tsui<sup>3</sup><sup>1</sup>The Hong Kong University of Science and Technology, Hong Kong<sup>2</sup>AI chip center for emerging smart systems (ACCESS), Hong Kong<sup>3</sup>HKUST, Hong Kong

MT-3 (147)

14:00-14:15

**DualPIM: A Dual-Precision and Low-Power CNN Inference Engine Using SRAM- and eDRAM-based Processing-in-Memory Arrays**

Sangwoo Jung, Jaehyun Lee, Huiseong Noh, Jong-Hyeok Yoon and Jaeha Kung

DGIST, Korea

MT-4 (246)

14:15-14:30

**BiMDiM: Area efficient Bi-directional MRAM Digital in-Memory Computing**

Dongsu Kim, Yunho Jang, Taehwan Kim and Jongsun Park

Korea University, Korea

MT-5 (66)

14:30-14:45

**T-EAP: Trainable Energy-Aware Pruning for NVM-based Computing-in-Memory Architecture**

Cheng-Yang Kevin Chang, Yu Chuan Chuang, Kuang-Chao Chou, An-Yeu (Andy Wu)

National Taiwan University, Taiwan



## AD2

## AI Algorithms Development and Design Automation (2)

Chair:

16:10~17:25, Tuesday, June 14, 2022

Conference Room 201+202 (2F)

AD2-1 (191)

16:10-16:25

**Towards On-device Domain Adaptation for Noise-Robust Keyword Spotting**Cristian Cioflan<sup>1</sup>, Lukas Cavigelli<sup>2</sup>, Manuele Rusci<sup>3</sup>, Miguel de Prado<sup>4</sup>, Luca Benini<sup>5</sup><sup>1</sup>ETH Zurich, Switzerland<sup>2</sup>Huawei Technologies, China<sup>3</sup>Università di Bologna, Italy<sup>4</sup>Bonseyes Community Association, Switzerland<sup>5</sup>ETHZ, University of Bologna, Switzerland

AD2-2 (210)

16:25-16:40

**Temporal Redundancy-Based Computation Reduction for 3D Convolutional Neural Networks**

Udari De Alwis and Massimo Alioto

National University of Singapore, Singapore

AD2-3 (47)

16:40-16:55

**MOGNET: A Mux-residual quantized Network leveraging Online-Generated weights**

Thien NGUYEN VAN, William GUICQUERO and Gilles Sicard

CEA, France

AD2-4 (255)

16:55-17:10

**Survey and Comparison of Milliwatts Microcontrollers for Tiny Machine Learning at the Edge**

Marco Giordano, Luigi Piccinelli and Michele Magno

ETH Zurich, Switzerland

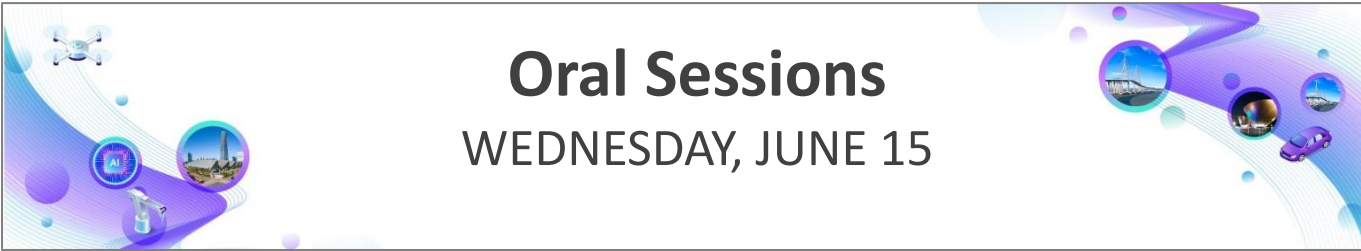
AD2-5 (275)

17:10-17:25

**Optimizing Exponent Bias for Sub-8bit Floating-Point Inference of Fine-tuned Transformers**

Janghwan Lee and Jungwook Choi

Hanyang University, Korea



# Oral Sessions

## WEDNESDAY, JUNE 15

**EA****Emerging Applications Inspired by AI**

Chair:

14:40~15:55, Wednesday, June 15, 2022

*Conference Room 201+202 (2F)*

- |                                   |  |
|-----------------------------------|--|
| <p>EA-1 (54)<br/>14:40-14:55</p>  | <p><b>Stain-free Holographic Detection of Circulating Tumor Cells Using A Deep Feature Fusion Neural Network</b></p> <p>Maoyu Wei<sup>1</sup>, Xiwei Huang<sup>1</sup>, Wentao<sup>1</sup> Han, Zekun Tian<sup>1</sup>, Guohua Wu<sup>2</sup>, Shuqi Wang<sup>3</sup> and Lingling Sun<sup>1</sup></p> <p><sup>1</sup>Hangzhou Dianzi University, China<br/> <sup>2</sup>Zhejiang University, China<br/> <sup>3</sup>Sichuan University, China</p> |
| <p>EA-2 (123)<br/>14:55-15:10</p> | <p><b>Energy Efficient Text Spotting Technique for Mobile Edge Computing</b></p> <p>Seonghwan Jeong and YoungMin Kwon</p> <p><i>The State University of New York Korea, Korea</i></p>  |
| <p>EA-3 (207)<br/>15:10-15:25</p> | <p><b>A Study On Reliable High-Speed HBC Enhanced by ECC for Wearable Neural Interfaces</b></p> <p>Seungsik Moon, Jaehyun Ko, Byungsub Kim and Youngjoo Lee</p> <p><i>Pohang University of Science and Technology (POSTECH), Korea</i></p>   |
| <p>EA-4 (247)<br/>15:25-15:40</p> | <p><b>Deep Learning aided BP-Flip Decoding of Polar Codes</b></p> <p>Yongje Lee, Useok Lee, Hintsu Fisseha Hishe and Myung Hoon Sunwoo</p> <p><i>Ajou University, Korea</i></p>  |
| <p>EA-5 (263)<br/>15:40-15:55</p> | <p><b>Improving Deep-Learning-based Optical Music Recognition for Camera-based Inputs</b></p> <p>Xuan Truong Nguyen and Weihang Ng</p> <p><i>Seoul National University, Korea</i></p>  |

## AD3

## AI Algorithms Development and Design Automation (3)

Chair:

14:40~15:55, Wednesday, June 15, 2022

Conference Room 204+205 (2F)

- |                            |  |
|----------------------------|--|
| AD3-1 (4)<br>14:40-14:55   | <b>AutoDeepHLS: Deep Neural Network High-level Synthesis using fixed-point precision</b><br>Mohammad Riazati, Masoud Daneshtalab, Mikael Sjödin and Björn Lisper<br><i>Mälardalen University, Sweden</i>   |
| AD3-2 (18)<br>14:55-15:10  | <b>Intrinsic Sparse LSTM using Structured Targeted Dropout for Efficient Hardware Inference</b><br>Chang Gao <sup>1</sup> , Johanna M Hedlund Lindmar <sup>2</sup> and Shih-Chii Liu <sup>2</sup><br><sup>1</sup> <i>University of Zurich and ETH Zurich, Switzerland</i><br><sup>2</sup> <i>Institute of Neuroinformatics, Switzerland</i>  |
| AD3-3 (155)<br>15:10-15:25 | <b>DC-MPQ: Distributional Clipping based Mixed-Precision Quantization for Convolutional Neural Networks</b><br>Seungjin Lee and Hyun Kim<br><i>Seoul National University of Science and Technology, Korea</i>  |
| AD3-4 (157)<br>15:25-15:40 | <b>An Energy-Efficient Spiking Neural Network for Finger Velocity Decoding for Implantable Brain-Machine Interface</b><br>Jiawei Liao <sup>1</sup> , Lars Widmer <sup>1</sup> , Xiaying Wang <sup>1</sup> , Samuel Nason-Tomaszewski <sup>2</sup> , Cynthia A Chestek <sup>2</sup> , Luca Benini <sup>3</sup> and Taekwang Jang <sup>2</sup><br><sup>1</sup> <i>ETH Zurich, Switzerland</i><br><sup>2</sup> <i>University of Michigan, USA</i><br><sup>3</sup> <i>ETHZ, University of Bologna, Switzerland</i> |
| AD3-5 (174)<br>15:40-15:55 | <b>A Full-Neuron Memory Model Designed for Neuromorphic Systems</b><br>Kefei Liu<br><i>Peking University, China</i>  |

## DCAS2

## Digital Circuits and Systems for AI (2)

Chair:

14:40~15:55, Wednesday, June 15, 2022

Conference Room 206+207 (2F)

DCAS2-1 (38)

14:40-14:55

**Optimizing Accelerator Configurability for Mobile Transformer Networks**Steven Colleman<sup>1</sup>, Peter Zhu<sup>2</sup>, Vincent Sun<sup>2</sup> and Marian Verhelst<sup>3</sup><sup>1</sup>KU Leuven, Belgium<sup>2</sup>OPPO Electronics, China<sup>3</sup>Leuven, Belgium

DCAS2-1 (85)

15:10-15:25

**Configurable CNN Accelerator in Speech Processing based on Vector Convolution**

Lanqing Hui, Shan Cao, Shan Li, Zhiyong Chen and Shugong Xu

Shanghai University

DCAS2-3 (161)

15:10-15:25

**Quantized 1D-CNN for a low-power PDM-to-PCM conversion in TinyML KWS applications**

Won Jeon, Yong Cheol Peter Cho, Hyun Mi Kim, Hyeji Kim, Jaehoon Chung, Juyeob Kim, Miyoung Lee, Chun-Gi Lyuh, Jinho Han and Youngsu Kwon

ETRI, Korea

DCAS2-3 (259)

15:25-15:40

**Quantized 1D-CNN for a low-power PDM-to-PCM conversion in TinyML KWS applications**Paola Vitolo<sup>1</sup>, Gian Domenico Licciardo<sup>1</sup>, Anna Chiara Amendola<sup>2</sup>, Luigi Di Benedetto<sup>1</sup>, Rosalba Liguori<sup>1</sup>, Alfredo Rubino<sup>1</sup> and Danilo Pietro Pau<sup>3</sup><sup>1</sup>University of Salerno, Italy<sup>2</sup>Analog Device, USA<sup>3</sup>STMicroelectronics, Switzerland

DCAS2-3 (270)

15:40-15:55

**A Real-time Super-resolution Accelerator Using a big.LITTLE Core Architecture**Xuan Truong Nguyen<sup>1</sup>, Tuan Nghia Nguyen<sup>1</sup>, Kyujoong Lee<sup>2</sup> and Hyuk-Jae Lee<sup>1</sup><sup>1</sup>Seoul National University, Korea<sup>2</sup>Sungshin Women's University, Korea

**IN1****Research Facility (KETI & ETRI)**

Chair:

16:10~17:40, Tuesday, June 14, 2022

Conference Room 204+205 (2F)

IN1-1 (118)

16:10-16:25

**AIWareK: Compiling PyTorch Model for AI Processor Using MLIR Framework**Hyunjeong Kwon, Hyun Mi Kim, Chun-Gi Lyuh, Jinkyu Kim, Jinho Han and Youngsu Kwon  
*ETRI, Korea*

IN1-2 (139)

16:25-16:40

**MOGNET: A Mux-residual quantized Network leveraging Online-Generated weights**Jinho Han, Chun-Gi Lyuh, Hyunjeong Kwon, Jinkyu Kim, Hyun Mi Kim, Jung Hee Suk, Kyoungseon Shin, Jaehoon Chung, Yong Cheol Peter Cho, Minseok Choi, Chan Kim and Youngsu Kwon  
*ETRI, Korea*

IN1-3 (283)

16:40-16:55

**Implementing Binarized Neural Network Processor on FPGA-Based Platform**Jeahack Lee, Hyeonseong Kim, Byung-Soo Kim, Seokhun Jeon, Jung Chul Lee and Dong Sun Kim  
*Korea Electronics Technology Institute, Korea*

IN1-4 (285)

16:55-17:10

**Implementation of an Quantum Circuit Simulator using Classical Bits**Yunpyo Hong, Seokhun Jeon, Sihyeong Park and Byung-Soo Kim  
*Korea Electronics Technology Institute, Korea*

IN1-5 (286)

17:10-17:25

**Weighted Decoupling : An Effective Image Resizing Method for Binarized Neural Network**Seungwoo Im, Seokhun Jeon, Byungsoo Kim and Teaho Hwang  
*Korea Electronics Technology Institute, Korea*

IN1-6 (287)

17:25-17:40

**A Study of Korean unstructured Dialogue Corpora**Seona Moon, Saim Shin, Minyoung Jung, Jinyea Jang and san kim  
*Korea Electronics Technology Institute, Korea*

## IN2

## Industry (SK Hynix &amp; LG &amp; Samsung)

Chair:

08:30~09:30, Wednesday, June 15, 2022

Conference Room 206+207 (2F)

IN2-1 (95)

08:30-08:45

**AI Accelerator Embedded Computational Storage for Large-Scale DNN Models**Byungmin Ahn, Jaehun Jang, Hanbyeul Na, Mankeun Seo, Hongrak Son and Yong Ho Song  
*Samsung Electronics, Korea*

IN2-2 (149)

08:45-09:00

**An Architecture of Sparse Length Sum Accelerator in AxDIMM**Sukhan Lee, Shin-haeng Kang and Kyomin Sohn  
*Samsung Electronics, Korea*

IN2-3 (120)

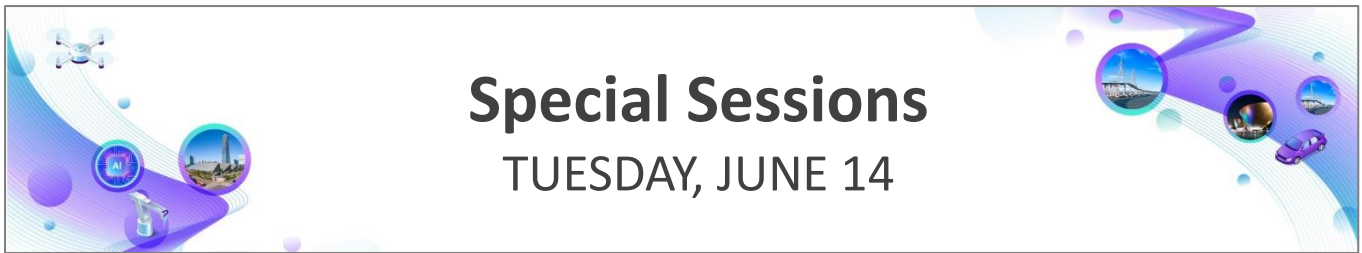
09:00-09:15

**CMS: A Computational Memory Solution for High-Performance and Power-Efficient Recommendation System**Minho Ha, Donguk Moon, Joonseop Sim, Myunghyun Rhee, Jungmin Choi, Byungil Koh, Euicheol Lim and Kyoung Park  
*SK Hynix, Korea*

IN2-4 (250)

09:15-09:30

**AI Engine Structures in TV Processor**HYUN CHUL SHIN, SangChul Kim, JungEun Lim, KwangYeon Rhee, JeongHyu Yang and Jingyeong Kim  
*LG Electronics, Korea*



SS1

## Novel Computation and Communication Methods for AI Accelerator Design

Chair:

13:30~14:45, Tuesday, June 14, 2022

Conference Room 201+202 (2F)

- SS 1-1 (101) **Hybrid Binary-Stochastic Computing-based ANN Design with Binary-in-Series-out ReLU**  
13:30-13:45 Kun-Chih Chen and Cheng-Ting Chen  
*National Sun Yat-sen University, Taiwan*
- SS 1-2 (113) **A Behavior-Level Simulation Framework for RRAM-Based Deep Learning Accelerators with Flexible Architecture Configurations**  
13:45-14:00 Hsu-Yu Kao and Shih-Hsu Huang  
*Chung Yuan Christian University, Taiwan*
- SS 1-3 (117) **Scale up your In-Memory Accelerator: Leveraging Wireless-on-Chip Communication for AIMC-based CNN Inference**  
14:00-14:15 Nazareno Bruschi<sup>1</sup>, Giuseppe Tagliavini<sup>1</sup>, Francesco Conti<sup>1</sup>, Sergi Abadal<sup>2</sup>, Alberto Cabellos-Aparicio<sup>2</sup>, Eduard Alarcon<sup>2</sup>, Geethan Karunaratne<sup>3</sup>, Irem Boybat<sup>3</sup>, Luca Benini<sup>4</sup> and Davide Rossi<sup>4</sup>  
<sup>1</sup>University of Bologna, Italy  
<sup>2</sup>Universitat Politècnica de Catalunya, Spain  
<sup>3</sup>IBM Research Europe, Switzerland  
<sup>4</sup>ETHZ, Switzerland
- SS 1-4 (185) **X-Fault: Impact of Faults on Binary Neural Networks in Memristor-Crossbar Arrays with Logic-in-Memory Computation**  
14:15-14:30 Felix Staudigl, Karl J. X. Sturm, Maximilian Bartel, Thorben Fetz, Dominik Sisejkovic, Jan Moritz Joseph, Leticia Bolzani Pöhls and Rainer Leupers  
*Institute for Communication Technologies and Embedded Systems, RWTH Aachen University*
- SS 1-5 (222) **An Asynchronous Soft Macro for Ultra-Low Power Communication in Neuromorphic Computing**  
14:30-14:45 Davide Bertozzi<sup>1</sup>, Kshitij Bhardwaj<sup>2</sup>, Steven M. Nowick<sup>3</sup>  
<sup>1</sup>University of Ferrara, Italy  
<sup>2</sup>LLNL, USA  
<sup>3</sup>Columbia University, USA

SS2

## Artificial Intelligence Boosted Circuits and Systems for Brain-Machine Interface

Chair:

13:30~14:45, Tuesday, June 14, 2022

Conference Room 206+207 (2F)

SS 2-1 (90)

13:30-13:45

### A 62.45 TOPS/W Spike-Based Convolution Neural Network Accelerator with Spatiotemporal Parallel Data Flow and Sparsity Mechanism

Chen-Han Hsu, Yu-Hsiang Cheng, Zhaofang Li, Ping-Li Huang and Kea-Tiong Tang  
National Tsing Hua University, Taiwan

SS 2-2 (132)

13:45-14:00

### A Closed-Loop Brain-Machine Interface with Online Tuning for Patient-Specific Neurological Disorder Treatment

Chne-Wuen Tsai<sup>1</sup>, Miaolin Zhang<sup>2</sup>, Lian Zhang<sup>1</sup> and Jerald Yoo<sup>1</sup>  
<sup>1</sup>National University of Singapore, Singapore  
<sup>2</sup>Huawei Technologies, China

SS 2-3 (182)

14:00-14:15

### Challenges and Opportunities of Edge AI for Next-Generation Implantable BMIs

MohammadAli Shaeri, Arshia Afzal and Mahsa Shoaran  
École polytechnique fédérale de Lausanne (EPFL), Switzerland

SS 2-4 (192)

14:15-14:30

### Towards Intelligent Noninvasive Closed-loop Neuromodulation Systems

Jie Yang and Mohamad Sawan  
Westlake university, China

SS 2-5 (226)

14:30-14:45

### A Wearable High Blood Pressure Classification Processor Using Photoplethysmogram Signals through Power Spectral Density Features

Muhammad Sheeraz<sup>1</sup>, Abdul Rehman Aslam<sup>1</sup>, Nauman Hafeez<sup>2</sup>, Hadi Heidari<sup>3</sup> and Muhammad Awais Bin Altaf<sup>1</sup>  
<sup>1</sup>Lahore University of Management Sciences, Pakistan  
<sup>2</sup>Brunel University London, United Kingdom  
<sup>3</sup>University of Glasgow, United Kingdom



SS3

## Efficient Hardware Accelerator for DNN / Emerging Neural Network Circuits and Algorithms Combining Bio-Inspired and Machine-Learning Perspect

Chair:

16:10~17:25, Tuesday, June 14, 2022

Conference Room 206+207 (2F)

SS 3-1 (169)

16:10-16:25

### Reconfigurable Acceleration of Graph Neural Networks for Jet Identification in Particle Physics

Zhiqiang Que, Marcus Loo and Wayne Luk  
Imperial College London, United Kingdom

SS 3-2 (248)

16:25-16:40

### A Mapping Model of SNNs to Neuromorphic Hardware

Chne-Xiuping Cui, Xiaochen Hao, Yun Liang, Guangyu Sun, Xiaoxin Cui, Yuan Wang and Ru Huang  
Peking University, China

SS 3-3 (102)

16:40-16:55

### Hybrid Neuromorphic Systems: An Algorithm-Application-Hardware-Neuroscience Co-Design Perspective

Sen Lu and Abhronil Sengupta  
Pennsylvania State University, USA

SS 3-4 (129)

16:55-17:10

### A flexible energy-efficient hardware classifier exploiting temporal sparsity in ECG data

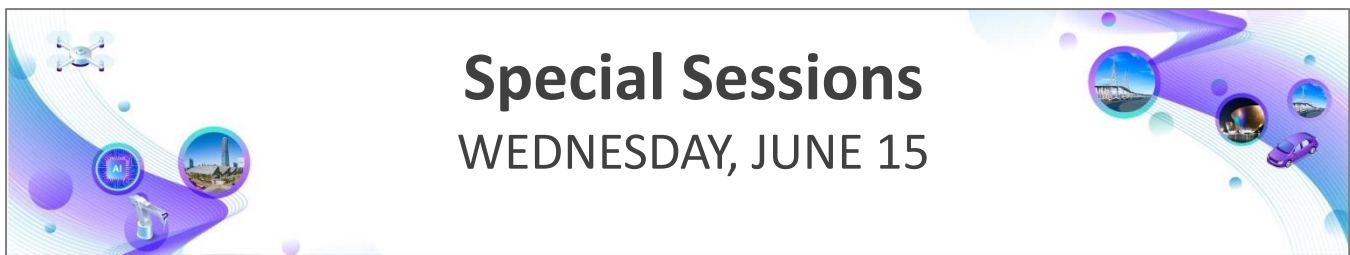
Matthias Jobst, Johannes Partzsch, Chen Liu, Liyuan Guo, Dennis Walter, Saif-Ur Rehman, Stefan Scholze, Sebastian Hppner and Christian Mayr  
Technische Universität Dresden, Germany

SS 3-4 (187)

17:10-17:25

### Biologically-inspired training of spiking recurrent neural networks with neuromorphic hardware

Thomas Bohnstingl<sup>1</sup>, Anja Surina<sup>1</sup>, Maxime Fabre<sup>1</sup>, Yigit Demirag<sup>2</sup>, Charlotte Frenkel<sup>2</sup>, Melika Payvand<sup>2</sup>, Giacomo Indiveri<sup>2</sup> and Angeliki Pantazi<sup>1</sup>  
<sup>1</sup>IBM Research, USA  
<sup>2</sup>University of Zurich and ETH Zurich, Switzerland



SS4

## Memory-Centric Accelerator Design for Energy-efficient Inferencing and Training

Chair:

08:30~09:30, Wednesday, June 15, 2022

Conference Room 201+202 (2F)

SS 4-1 (72)  
08:30-08:45

### A 200M-Query-Vector/s Computing-in-RRAM ADC-less k-Nearest-Neighbor Accelerator with Time-Domain Winner-Takes-All Circuits

Chen Mu, Yunzhengmao Wang, Jiapei Zheng, Shiwei Liu, Keji Zhou, Chixiao Chen and Qi Liu  
*Fudan university, China*

SS 4-2 (83)  
08:45-09:00

### A Vector Systolic Accelerator for Multi-Precision Floating-Point High-Performance Computing

Kai Li, Junzhuo Zhou, Boyu Li, Shuxin Yang, Sixiao Huang, Wei Mao and Hao Yu  
*Southern University of Science and Technology, China*

SS 3-3 (160)  
09:00-09:15

### An Efficient CNN Training Accelerator Leveraging Transposable Block Sparsity

Mingyang Xu, Jinming Lu, Zhongfeng Wang, Jun Lin  
*Nanjing University, China*

SS 4-4 (253)  
09:15-09:30

### Design Exploration of An Energy-Efficient Acceleration System for CNNs on Low-Cost Resource-Constraint SoC-FPGAs

Shao-Cheng Wen and Po-Tsang Huang  
*National Yang Ming Chiao Tung University, Taiwan*

SS5

**Performance-Power Scalable AI-Accelerator Design Techniques**

Chair:

08:30~09:30, Wednesday, June 15, 2022

*Conference Room 204+205 (2F)*

SS 5-1 (69)

**Extensible and Modularized Processing Unit Design and Implementation for AI Accelerator**

08:30-08:45

Chung-Bin Wu, Yu-Kuan Hsiao and WeiHsuan Chang

*National Chung-Hsing University, Taiwan*

SS 5-2 (74)

**Radar and Camera Fusion for Vacant Parking Space Detection**

08:45-09:00

Bo-Xun Wu<sup>1</sup>, Jia-Jheng Lin<sup>1</sup>, Hsien-Kai Kuo<sup>2</sup>, Po-Yu Chen<sup>2</sup> and Jiun-In Guo<sup>1</sup><sup>1</sup>*National Chiao Tung University, Taiwan*<sup>2</sup>*MediaTek, Taiwan*

SS 5-3 (93)

**An SoC Integration Ready VLIW-Driven CNN Accelerator with High Utilization and Scalability**

09:00-09:15

Chia-Heng Hu, I-Hao Tseng, Pei-Hsuan Kuo and Juinn-Dar Huang

*National Yang Ming Chiao Tung University, Taiwan*

SS 5-4 (178)

**A Novel DNN Accelerator for Light-weight Neural Networks: Concept and Design**

09:15-09:30

Yu-Guang Chen, Tsung-Han Hsieh, Yi-Chen Ho and Jing-Yang Jouc

*National Central University, Taiwan*

## SS6

## AI Challenges in Biomedical Engineering

Chair:

16:20~18:05, Wednesday, June 15, 2022

Conference Room 201+202 (2F)

SS 6-1 (67)

**Efficient Deep Learning Algorithm for Alzheimer's Disease Diagnosis using Retinal Images**

16:20-16:35

Doyoung Kim, Young Jun Lim, Joon Hyeon Park and Myung Hoon Sunwoo

*Ajou University, Korea*

SS 6-2 (98)

**A single-stage detector of cerebral microbleeds using 3D feature fused region proposal network (FFRP-Net)**

16:35-16:50

Jun-Ho Kim, Mohammed Al-masni, Haejoon Lee, Yoonseok Choi and Donghyun David Kim

*Yonsei University, Korea*

SS 6-3 (121)

**Contrast Agent Removal for Brain CT Angiography Using Switchable CycleGAN with AdaIN and Histogram Equalization**

16:50-17:05

Inhwa Han, Boah Kim, Eung-Yeop Kim and Jong Chul Ye

*KAIST, Korea*

SS 6-4 (128)

**Quality Evaluation Method for Chest X-Ray Images using the Representative Patterns**

17:05-17:20

Subin BEA, Ye-Seul Park, Joo-Sung Sun, Joo-Sung Sun and Jung-Won Lee

*Ajou University, Korea*

SS 6-5 (141)

**Lightweight End-to-End Stress Recognition using Binarized CNN-LSTM Models**

17:20-17:35

Myeongji Yun, Seungwoo Hong, Sunwoo Yoo, Sungmin Park, Junho Kim and Youngjoo Lee

*POSTECH, Korea*

SS 6-6 (227)

**Convolutional Neural Network Classification of Basal Cell Carcinoma in Harmonically Generated Microscopy Images**

17:35-17:50

*Chris Lee**National Cheng Kung University, Taiwan*

SS 6-7 (239)

**GAN-Based Medical Image Registration for Augmented Reality Applications**

17:50-18:05

*Lee Taeho<sup>1</sup>, Viduranga Munasinghe<sup>1</sup>, Yan-Mei Li<sup>1</sup>, Jiajie Xu<sup>1</sup>, Jinsung Kim<sup>2</sup> and Hyuk-Jae Lee<sup>1</sup>**<sup>1</sup>Seoul National University, Korea**<sup>2</sup>Sunmoon University, Korea*

## SS7

## Low Power Autonomous Systems

Chair:

16:20~18:05, Wednesday, June 15, 2022

Conference Room 204+205 (2F)

SS 7-1 (112)

**CMOS Implementation of Spiking Equilibrium Propagation for Real-Time Learning**

16:20-16:35

Brady G Taylor, Nicolas G Ramos, Eric C Yeats and Hai Li

*Duke Electrical and Computer Engineering, USA*

SS 7-2 (134)

**Tiny-PULP-Dronets: Squeezing Neural Networks for Faster and Lighter Inference on Multi-Tasking Autonomous Nano-Drones**

16:35-16:50

Lorenzo Lamberti<sup>1</sup>, Vlad Niculescu<sup>2</sup>, Michał Barciś<sup>3</sup>, Lorenzo Bellone<sup>3</sup>, Enrico Natalizio<sup>3</sup>, Luca Benini<sup>2</sup> and Daniele Palossi<sup>4</sup><sup>1</sup>*University of Bologna, Italy*<sup>2</sup>*ETH Zurich, Switzerland*<sup>3</sup>*Technology Innovation Institute (TII), United Arab Emirates*<sup>4</sup>*Dalle Molle Institute for Artificial Intelligence - USI and SUPSI, Switzerland*

SS 7-3 (135)

**Robotic Computing on FPGAs: Current Progress, Research Challenges, and Opportunities**

16:50-17:05

Zishen Wan<sup>1</sup>, Ashwin Lele<sup>1</sup>, Bo Yu<sup>2</sup>, Shaoshan Liu<sup>2</sup>, Yu Wang<sup>3</sup>, Vijay Janapa Reddi<sup>4</sup>, Cong Hao<sup>5</sup> and Arijit Raychowdhury<sup>1</sup><sup>1</sup>*Georgia Institute of Technology, USA*<sup>2</sup>*PerceptIn, USA*<sup>3</sup>*Tsinghua University, China*<sup>4</sup>*Harvard University USA*<sup>5</sup>*UIUC, USA*

SS 7-4 (137)

**Tiny Robot Learning: Challenges and Directions for Machine Learning in Resource-Constrained Robots**

17:05-17:20

Sabrina M Neuman<sup>1</sup>, Brian Plancher<sup>1</sup>, Bardienu Duisterhof<sup>2</sup>, Srivatsan Krishnan<sup>1</sup>, Colby Banbury<sup>1</sup>, Mark Mazumder<sup>1</sup>, Shvetank Prakash<sup>1</sup>, Jason Jabbour<sup>3</sup>, Aleksandra Faust<sup>4</sup>, Guido de Croon<sup>5</sup> and Vijay Janapa Reddi<sup>1</sup><sup>1</sup>*Harvard University, USA*<sup>2</sup>*CMU, USA*<sup>3</sup>*University of Virginia*<sup>4</sup>*Google Brain, USA*<sup>5</sup>*TU Delft Nederland*

SS 7-5 (158)

**Low-power Autonomous Adaptation System with Deep Reinforcement Learning**

17:20-17:35

Juhyoung Lee, Wooyoung Jo and Hoi-Jun Yoo

*KAIST, Korea*

SS 7-6 (168)

**An Optimization Framework for Efficient Vision-Based Autonomous Drone Navigation**

17:35-17:50

Mozhgan Navardi<sup>1</sup>, Aidin Shiri<sup>1</sup>, Edward S Humes<sup>1</sup>, Nicholas R. Waytowich<sup>2</sup> and Tinoosh Mohseninn<sup>1</sup><sup>1</sup>*University of Maryland Baltimore County, USA*<sup>2</sup>*US Army Research Lab, USA*

## SS8

## Security and Privacy in Deployment of Deep Neural Networks

Chair:

16:20~18:05, Wednesday, June 15, 2022

Conference Room 206+207 (2F)

SS 8-1(70)

**A Buyer-traceable DNN Model IP Protection Method Against Piracy and Misappropriation**

16:20-16:35

Si Wang, Chaohui Xu, Yue Zheng and Chip Hong Chang

*Nanyang Technological University, Singapore*

SS 8-2 (73)

**A Survey on Side-Channel-based Reverse Engineering Attacks on Deep Neural Networks**

16:35-16:50

Yuntao Liu, Michael Zuzak, Daniel Xing, Isaac McDaniel, Priya Mittu, Olsan Ozbay, Abir A Akib and Ankur Srivastava

*University of Maryland at College Park, USA*

SS 8-3 (78)

**Sample-Specific Backdoor based Active Intellectual Property Protection for Deep Neural Networks**

16:50-17:05

Yinghao Wu<sup>1</sup>, Mingfu Xue<sup>1</sup>, Dajuan Gu<sup>2</sup>, Yushu Zhang<sup>1</sup> and Weiqiang Liu<sup>1</sup><sup>1</sup>*Nanjing University of Aeronautics and Astronautics, China*<sup>2</sup>*NSFOCUS Information technology CO., LTD, China*

SS 8-4 (87)

**Dynamic Backdoors with Global Average Pooling**

17:05-17:20

Stefanos Koffas<sup>1</sup>, Stjepan Picek<sup>1</sup> and Mauro Conti<sup>2</sup><sup>1</sup>*Delft University of Technology, Nederland*<sup>2</sup>*University of Padu, Italy*

SS 8-5 (89)

**Shifting Decision Boundaries to Resist Transfer Attacks on DNNs during Network Compression**

17:20-17:35

Jonah O'Brien Weiss<sup>1</sup>, Tiago A.O. Alves<sup>2</sup> and Sandip Kundu<sup>1</sup><sup>1</sup>*University of Massachusetts Amherst, USA*<sup>2</sup>*State University of Rio de Janeiro, Brazil*

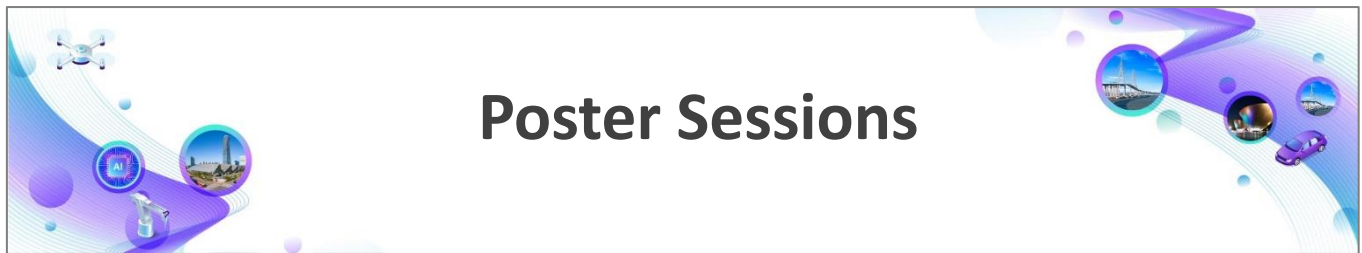
SS 8-6 (167)

**High-Fidelity Model Extraction Attacks via Remote Power Monitors**

17:35-17:50

Anuj Dubey, Emre Karabulut, Amro Awad, Aydın Aysu

*North Carolina State University, USA*



# Poster Sessions

## Poster Session

Chair:

Standing Time 13:10~14:40, Wednesday, June 15, 2022

Grand Ballroom Lobby (2F)

## AI Algorithms Development and Design Automation

- PS-1 (15) A Hybrid Spiking Recurrent Neural Network on Hardware for Efficient Emotion Recognition**  
Chenglong Zou, Xiaoxin Cui, Yisong Kuang, Yuan Wang and Xinan Wang  
*Peking University, China*
- PS-2 (62) An Adaptive High-Performance Quantization Approach for Resource-Constrained CNN Inference**  
Chin Hsu-Hsun, Ren-Song Tsay and Hsin I Wu  
*National Tsing Hua University, Taiwan*
- PS-3 (82) Irrelevant Pixels are Everywhere: Find and Exclude Them for More Efficient Computer Vision** Caleb Tung<sup>1</sup>, Abhinav Goel<sup>1</sup>, Xiao Hu<sup>1</sup>, Emmanuel S Amobi<sup>2</sup>, George K Thiruvathukal<sup>2</sup>, Vipin Chaudhary<sup>3</sup> and Yung-Hsiang Lu<sup>1</sup>  
<sup>1</sup>*Purdue University, USA*  
<sup>2</sup>*Loyola University Chicago, USA*  
<sup>3</sup>*Case Western Reserve University, USA*
- PS-4 (153) Power-Efficient Double-Cyclic Low-Precision Training for Convolutional Neural Networks**  
Sungrae Kim and Hyun Kim  
*Seoul National University of Science and Technology, Korea*
- PS-5 (154) Hardware-Friendly Logarithmic Quantization with Mixed-Precision for MobileNetV2ence**  
Dahun Choi and Hyun Kim  
*Seoul National University of Science and Technology, Korea*
- PS-6 (189) Navigating Local Minima in Quantized Spiking Neural Networks**  
Jason K Eshraghian<sup>1</sup>, Corey Lammie<sup>2</sup>, Mostafa Rahimi Azghadi<sup>2</sup> and Wei Lu<sup>1</sup>  
<sup>1</sup>*University of Michigan, USA*  
<sup>2</sup>*James Cook University, Australia*
- PS-7 (267) Tiny TCN model for Gesture Recognition With Multi-point Low power ToF-Sensors**  
Stephan Boner, Christian Vogt and Michele Magno  
*ETH Zürich, Switzerland*

PS-8 (278) **A Lightweight Detector for Small Objects**  
Akshay Kumar Sharma and Kyung Ki Kim  
Daegu University, Korea

## Analog Circuits, Neuromorphic, and New Device for AI

PS-9 (29) **Real-time Radar Gesture Classification with Spiking Neural Network on SpiNNaker 2 Prototype**  
Jiaxin Huang  
Infineon Technologies Dresden, Germany

PS-10 (111) **AI driven Wide Dynamic Range CMOS Image Sensor**  
Wilfred Kisku, Mohit Bhushan, Amandeep Kaur and Deepak Mishra  
*Indian Institute of Technology Jodhpur, India*

PS-11 (145) **An overview to SENECA: Scalable Energy efficient Neuromorphic Computer Architecture**  
Amirreza Yousefzadeh, Gert-Jan van Schaik, Mohammad Tahghighi, Paul Detterer, Stefano Traferro, Martijn Hijdra, Jan Stuijt, Federico Corradi and Manolis Sifalakis  
Stichting IMEC Nederland, Nederland

PS-12 (196) **Analog LSTM for Keyword Spotting**  
Kofi Odame and Maria T Nyamukuru  
*Dartmouth College Thayer School of Engineering, USA*

PS-13 (241) **Neuromorphic Event-Based Spatio-temporal Attention using Adaptive Mechanisms**  
Amélie Gruel<sup>1</sup>, Antonio Vitale<sup>2</sup>, Jean Martinet<sup>1</sup> and Michele Magno<sup>2</sup>  
<sup>1</sup>*I3S / CNRS, France*  
<sup>2</sup>*ETH Zurich, Switzerland*

## Digital Circuits and Systems for AI

PS-14 (63) **MARSv2: Multicore and Programmable Reconstruction Architecture SRAM CIM-Based Accelerator with Lightweight Network**  
Chia-Yu Hsieh, Shih-Ting Lin, Zhaofang Li, Chih-Cheng Lu, Meng-Fan Chang and Kea-Tiong Tang  
*National Tsinghua university, Taiwan*

PS-15 (65) **Efficient Hardware Implementation for Online Local Learning in Spiking Neural Networks**  
Wenzhe Guo<sup>1</sup>, Mohammed Fouda<sup>2</sup>, Ahmed Eltawil<sup>1</sup> and Khaled Salama<sup>1</sup>  
<sup>1</sup>*King Abdullah University of Science and Technology, Saudi Arabia*  
<sup>2</sup>*UCI, USA*

PS-16 (68) **FPGA Accelerator for Radar-Based Human Activity Recognition**  
Kangjie Long, Chaolin Rao, Xiangyu Zhang, Wenbin Ye and Xin Lou  
*ShanghaiTech University, China*

PS-17 (88) **A Winograd-Based Highly-Parallel Convolution Engine for 8-bit CNN Acceleration**  
Yong-Tai Chen, Yufeng Ou and Chao-Tsung Huang  
*National Tsing Hua University, Taiwan*



**PS-18 (105) Row-wise Accelerator for Vision Transformer**

Hong Yi Wang and Tian-Sheuan Chang  
National Yang Ming Chiao Tung University, Taiwan

**PS-19 (194) A Real-Time Sparsity-Aware 3D-CNN Processor for Mobile Hand Gesture Recognition**

SeungBin Leom Kim, Jueun Jung, Wuyoung Jang, Hoichang Jeong and Kyuho Lee  
*Ulsan National Institute of Science and Technology (UNIST), Korea*

**PS-20 (212) Bin-Specific Quantization in Spectral-Domain Convolutional Neural Network Accelerators**

Jinho Park<sup>1</sup>, Jaewon Lee<sup>2</sup>, Gain Kim<sup>2</sup> and Hyeon-Min Bae<sup>1</sup>  
<sup>1</sup>*KAIST, Korea*  
<sup>2</sup>*DGIST, Korea*

**PS-21 (245) Efficient Nonlinear Autoregressive Neural Network Architecture for Real-Time Biomedical Applications**

Brooks A Olney, Shakil Mahmud and Robert Karam  
*University of South Florida, USA*

**PS-22 (252) Real-Time Low Power Audio Distortion Circuit Modeling: a TinyML Deep Learning Approach**

Davide Plozza, Marco Giordano and Michele Magno  
*ETH Zürich, Switzerland*

**Emerging Applications Inspired by AI****PS-23 (11) Improving Embedded Target Tracking Systems Based on Siamese Networks with Infrared Images**

Shi-Jinn Horng  
*NTUST, Taiwan*

**PS-24 (40) Hand Gesture Recognition Using IR-UWB Radar with Spiking Neural Networks**

Shule Wang<sup>1</sup>, Yulong Yan<sup>1</sup>, Haoming Chu<sup>1</sup>, Guangxi Hu<sup>1</sup>, Zhi Zhang<sup>2</sup>, Zhuo Zou<sup>1</sup> and Lirong Zheng<sup>1</sup>  
<sup>1</sup>*Fudan University, China*  
<sup>2</sup>*Zhejiang College of Zhejiang University of Technology, China*

**PS-25 (55) Real-time Biosignal Recording and Machine-Learning Analysis System**

Hanrui Li, Junzhe Wang, Shiqi Zhao, Fengshi Tian, Jie Yang and Mohamad Sawan  
*Westlake University, China*

**PS-26 (64) An Attention-based Neural Network on Multiple Speaker Diarization**

Shao Wen Cheng, Kai -Jyun Hung, Hsie -Chia Chang and Yen-Chin Liao  
*National Yang Ming Chiao Tung University, Taiwan*

**PS-27 (115) Disparity Estimation using Light Ray Pair in Stacked 3D Light Field**

Hyunmin Jung, Hyuk-Jae Lee and Chae Eun Rhee  
*Seoul National University, Korea*  
*Inha University, Korea*

**PS-28 (125) Adversarially-Trained Tiny Autoencoders for Near-Sensor Continuous Structural Health Monitoring**Alessio Burrello<sup>1</sup>, Giacomo Sintoni<sup>1</sup>, Davide Brunelli<sup>1</sup> and Luca Benini<sup>2</sup><sup>1</sup>University of Bologna, Italy<sup>2</sup>ETHZ, Switzerland**PS-29 (162) A machine learning enhanced approximate message passing massive MIMO accelerator**Stefan Brennsteiner<sup>1</sup>, Tughrul Arslan<sup>1</sup>, John Thompson<sup>1</sup> and Andrew McCormick<sup>2</sup><sup>1</sup>University of Edinburgh, United Kingdom<sup>2</sup>Alpha Data Parallel Systems Ltd, United Kingdom**PS-30 (265) A Feature Selection and Channel Selection Methodology for Medical Event-Detection**

Reza Ranjandish

Synsense, Switzerland

**New Memory Technology and Processing in Memory for AI****PS-31 (218) CIM-based Robust Logic Accelerator using 28 nm STT-MRAM Characterization Chip Tape-out**Abhairaj Singh<sup>1</sup>, Mahdi Zahedi<sup>1</sup>, Taha Shahroodi<sup>1</sup>, Mohit Gupta<sup>2</sup>, Anteneh Gebregiorgis<sup>1</sup>, Manu Perumkunnil<sup>2</sup>, Rajiv Joshi<sup>3</sup>, Francky Catthoor<sup>2</sup>, Rajendra Bishnoi<sup>1</sup> and Said Hamdiou<sup>1</sup><sup>1</sup>Technische Universiteit Delft, Nederland<sup>2</sup>IMEC, Belgium<sup>3</sup>IBM, USA**PS-32 (229) A 10T SRAM Compute-In-Memory Macro with Analog MAC Operation and Time Domain Conversion**

Hyunchul Park, Kyeongho Lee and Jongsun Park

Korea University, Korea

**PS-33 (264) A Process and Data Variations Tolerant Capacitive Coupled 10T1C SRAM for In-Memory Compute (IMC) in Deep Neural Network Accelerators**Belal Iqbal<sup>1</sup>, Anuj Grover<sup>1</sup> and harsh rawat<sup>2</sup><sup>1</sup>Indraprastha Institute of Information Technology Delhi, India<sup>2</sup>STMicroelectronics, Switzerland