# 2020 IEEE Asian Solid-State Circuits Conference (A-SSCC 2020)

## Hiroshima, Japan
## 9 – 11 November 2020

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# Program Schedule

## Tuesday, November 10

### Opening Ceremony

**Session date and time:** 9:00 - 9:20, November 10, 2020

## Tuesday, November 10

### S1 Session: Plenary Talk 1

**Session date and time:** 9:20 - 10:05, November 10, 2020

**Session Chair: Robert Chen-Hao Chang, National Chung Hsing University**

**S1-1**

**Digital Innovation and AI semiconductor in the AI and Post-Corona era.....N/A**

Kiyoung Choi, PhD, Ministry of Science and ICT, Republic of Korea

## Tuesday, November 10

### S1 Session: Plenary Talk 2

**Session date and time:** 10:05 - 10:50, November 10, 2020

**Session Chair: Robert Chen-Hao Chang, National Chung Hsing University**

**S1-2**

**Intelligent Chips and Technologies for AIoT Era.....1**

Yu-Chin Hsu, PhD, BigObject, Inc.

## Tuesday, November 10

### S2 Session: Low-Power Industry Solutions

**Session date and time:** 11:10 - 12:25, November 10, 2020

**Session Chairs:** Yi Kang, Univ. of Science and Technology/Saki Hatta, Nippon Telegraph and Telephone

**S2-1 (1118) 11:10-11:35**

**A 12.1 TOPS/W Mixed-Precision Quantized Deep Convolutional Neural Network Accelerator for Low Power on Edge / Endpoint Device.....5**

Takanori Isono, Makoto Yamakura, Satoshi Shimaya, Isao Kawamoto, Nobuhiro Tsuboi, Masaaki Mineo, Wataru Nakajima, Kenichi Ishida, Shin Sasaki, Toshio Higuchi, Masahiro Hoshaku, Daisuke Murakami, Toshifumi Iwasaki, Hiroshi Hirai

Socionext Inc, Japan

## Tuesday, November 10

### S3 Session: AI/ML Accelerators on FPGA

**Session date and time:** 11:10 - 12:25, November 10, 2020

**Session Chairs:** Ji-Hoon Kim, Ewha Womans University/Yong-Pan Liu. Tsinghua University

## Tuesday, November 10

### S4 Session: High Resolution ADCs with Linearity Enhancement Techniques

**Session date and time:** 11:10 - 12:00, November 10, 2020

**Session Chairs:** Yan Zhu, University of Macau/Sanroku Tsukamoto, Fujitsu Laboratories Ltd.



## Tuesday, November 10

### Special Session: Women-in-Circuits (WiC) & Young Professionals Joint Event

**Session date and time:** 12:25 - 13:30, November 10, 2020

**Session Chairs: Milin Zhang, Tsinghua University/Zeynep Lulec, Analog Devices**

Three separated rooms will be provided by topics. Select the room and join the live discussion.

Topics:
Room 1) what is my advisor talking about every day?
Room 2) what does the life look like in academia?
Room 3) How to find a good job in industry?

## Tuesday, November 10

### S5 Session: Power Management

**Session date and time:** 13:30 - 15:35, November 10, 2020

**Session Chairs:** Makoto Takamiya, University of Tokyo/Hyun-Sik Kim, KAIST

## Tuesday, November 10

### S6 Session: Low-Power Digital Circuits & Systems

**Session date and time:** 13:30 - 15:10, November 10, 2020

**Session Chairs:** Taejoong Song, Samsung Electronics/Yoonmyung Lee, Sungkyunkwan University

## Tuesday, November 10

### S7 Session: RF & mm-Wave Chip Systems

**Session date and time:** 13:30 - 15:35, November 10, 2020

**Session Chairs:** Minjae Lee, Gwangju Institute of Science and Technology/Bo Zhao, Zhejiang University



## Tuesday, November 10

### S8 Session: Panel Session: What other technologies, together with circuit technology, are necessary for AIoT (AI + IoT)

**Session date and time:** 15:50 - 17:30, November 10, 2020

| | | |
|---|---|---|
| Moderators: | Jerald Yoo | National University of Singapore |
| | Milin Zhang | Tsinghua University |
| Panelists: | Shigeki Tomishima | Intel |
| | Massimo Alioto | National Univ. of Singapore |
| | Sukhwan Lim | Samsung Electronics |
| | Chen-Yi Lee | National Chiao Tung Univ. |
| | Yoshinori Miyamae | ROHM Inc. |
| | Hanjun Jiang | Tsinghua Univ. |

## Tuesday, November 10

### Special Q&A Session

**Session date and time:** 18:30 - 19:30, November 10, 2020

This session provides all participants an opportunity to verbally with the authors in the virtual rooms separated by sessions of S2 through S7 on November 10.
The track E which shows 1.5-minute summary presentation helps to give essence of each presentation for those who do not listen to the presentations on that day,
All authors of the following sessions join their rooms.

S2 Low-Power Industry Solutions
S3 AI/ML Accelerators on FPGA
S4 High Resolution ADCs with Linearity Enhancement Techniques
S5 Power Management
S6 Low-Power Digital Circuits & Systems
S7 RF & mm-Wave Chip Systems

## Tuesday, November 10

### Student Design Contest (SDC) Exhibition/ FPGA Demo

**Session date and time:** 18:30 - 19:30, November 10, 2020

This session provides all participants an opportunity to communicate verbally with the authors of Student Design Contest in the virtual rooms separated by paper/demo.
Take a look at the track D which shows 3-minute demo presentation.

**SDC 1/FPGA Demo S3-1 (1157)**
An Energy-Efficient GAN Accelerator with On-Chip Training for Domain Specific Optimization
Soyeon Kim, Sanghoon Kang, Donghyeon Han, Sangyeob Kim, Sangjin Kim, Hoi-Jun Yoo
KAIST, Korea

**SDC 2/FPGA Demo S3-2 (1039)**
A 112-765 GOPS/W FPGA-Based CNN Accelerator Using Importance Map Guided Adaptive Activation Sparsification for Pix2pix Applications
Wenyu Sun, Chen Tang, Zhuqing Yuan, Zhe Yuan, Huazhong Yang, Yongpan Liu
Tsinghua University, China

**SDC 3 S7-1 (1153)**
A W-Band 4 GHz-BW Multi-User Interference-Tolerant Radar with 28-nm CMOS Front-Ends
Rulin Huang{2}, Ching-Wen Chiang{1}, Chia-Jen Liang{1}, Yanghyo Kim{2}, Yen-Cheng Kuan{1}, Mau-Chung Chang{2}
{1}National Chiao Tung University, Taiwan; {2}University of California, Los Angeles, United States

**SDC 4 S11-2 (1115)**
Digital Evolution of the Quadrature Balanced Power Amplifier Transceiver for Full Duplex Wireless
Nimrod Ginzberg{1}, Dror Regev{2}, Emanuel Cohen{1}
{1}Technion - Israel Institute of Technology, Israel; {2}Toga Networks, a Huawei Company, Israel

**SDC 5 S12-2 (1079)**
A Power-Efficient Current Readout Circuit with VCO-Based 2nd-Order CT ﾎ采」ADC for Electrochemistry Acquisition
Hao-Yun Lee, Peng-Wei Huang, Ding-Siang Ciou, Zhan-Xian Liao, Shuenn-Yuh Lee
National Cheng Kung University, Taiwan

**SDC 6 S13-2 (1065)**
A 0.14 pJ/Conversion Fully Energy-Autonomous Temperature-to-Time Converter for Biomedical Applications
Joanne Si Ying Tan, Jeong Hoan Park, Jiamin Li, Yilong Dong, Kwok Hoe Chan, Ghim Wei Ho, Jerald Yoo
National University of Singapore, Singapore

**SDC 7 S14-1 (1002)**
Fully-Synthesizable All-Digital Unified Dynamic Entropy Generation, Extraction and Utilization Within the Same Cryptographic Core
Sachin Taneja, Massimo Alioto
National University of Singapore, Singapore

**SDC 8 S16-1 (1061)**
A 65.5dB SNDR 8.1-11.1nW ECG SAR ADC with Adaptive Latching OSC Based Comparator and DAC Calibration
Kejin Li, Wai-Hong Zhang, Yan Zhu, Chi-Hang Chan, Rui Paulo Martins
University of Macau, Macau

**SDC 9 S18-3 (1078)**
Wireless Charging EEG Monitoring SoC with AI Algorithm-Driven Electrical and Optogenetic Stimulation for Epilepsy Control
Zhan-Xian Liao{2}, Yao-Tse Chang{2}, Chieh Tsou{2}, Po-Hao Cheng{2}, Hao-Yun Lee{2}, Peng-Wei Huang{2}, Shuenn-Yuh Lee{2}, Chou-Ching Lin{3}, Gia-Shing Shieh{1}
{1}Ministry of Health and Welfare Tainan Hospital, Taiwan; {2}National Cheng Kung University, Taiwan; {3}National Cheng Kung University Hospital, Taiwan

**FPGA Demo 10 S3-3 (1122)**
An Energy-Efficient Multi-Core Restricted Boltzmann Machine Processor with On-Chip Bio-Plausible Learning and Reconfigurable Sparsity
Jiajun Wu{1}, Xuan Huang{1}, Le Yang{1}, Liang Wang{1}, Jipeng Wang{1}, Zuozhu Liu{3}, Kwen-Siong Chong{2}, Shaowei Lin{4}, Chao Wang{1}
{1}Huazhong University of Science and Technology, China; {2}Nanyang Technological University, Singapore; {3}National University of Singapore, Singapore; {4}Singapore University of Technology and Design, Singapore

## Tuesday, November 10

### Virtual Banquet/Award Ceremony

**Session date and time:** 19:30 - 21:00, November 10, 2020

## Wednesday, November 11

### S9 Session: Plenary Talk 3

**Session date and time:** 8:30 - 9:15, November 11, 2020

**Session Chair: Woogeun Rhee, Tsinghua University**



## Wednesday, November 11

### S9 Session: Plenary Talk 4

**Session date and time:** 9:15 - 10:00, November 11, 2020

**Session Chair: Woogeun Rhee, Tsinghua University**



## Wednesday, November 11

### S10 Session: Analog Techniques

**Session date and time:** 10:30 – 12:10, November 11, 2020

**Session Chairs:** Michael Choi, Samsung/ Vanessa Chen,Carnegie Mellon University

## Wednesday, November 11

### S11 Session: RF Building Blocks

**Session date and time:** 10:30 – 12:10, November 11, 2020

**Session Chairs:** Satoshi Tanaka, Murata/Giovanni Mangraviti, imec



## Wednesday, November 11

### S12 Session: Circuits and Systems for Emerging Applications

**Session date and time:** 10:30 – 12:35, November 11, 2020

**Session Chairs:** Noriyuki Miura, Osaka University/Inhee Lee, University of Pittsburgh

## Wednesday, November 11

### S13 Session: Bandgap and Temperature Sensors

**Session date and time:** 13:40 – 15:20, November 11, 2020

**Session Chairs:** Wanyuan Qu, Zhejiang University/Milin Zhang, Tsinghua University

## Wednesday, November 11

### S14 Session: SoC for AIoT

**Session date and time:** 13:40 – 15:20, November 11, 2020

**Session Chairs:** Pei-Yun Tsai, National Central Univ, Taiwan/Kazutami Arimoto, Okayama Prefectural Univ.

## Wednesday, November 11

### S15 Session: Wireline Transceiver Techniques

**Session date and time:** 13:40 – 15:20, November 11, 2020

**Session Chairs:** Ziqiang Wang, Tsinghua University/Tetsuya Iizuka, University of Tokyo



## Wednesday, November 11

### S16 Session: High-Speed and Low-Power Techniques for SAR-Based ADCs

**Session date and time:** 15:50 – 17:05, November 11, 2020

**Session Chairs:** Zule Xu, University of Tokyo/Yong Lim, Samsung Electronics

## Wednesday, November 11

### S17 Session: Biomedical & Bioinspired SoCs

**Session date and time:** 15:50 – 17:30, November 11, 2020

**Session Chairs:** Yun Chen, Fudan University, China/Jun Zhou, University of Electronic Science and Technology of China

## Wednesday, November 11

### S18 Session: Intelligent Memory & AI/ML-Assisted Biomedical SoCs

**Session date and time:** 15:50 – 17:30, November 11, 2020
**Session Chairs:** Ken Takeuchi, University of Tokyo/Chao Wang, Huazhong University of Science and Technology



## Wednesday, November 11

### Special Q&A Session

**Session date and time:** 18:30 - 19:30, November 11, 2020

This session provides all participants an opportunity to verbally with the authors in the virtual rooms separated by sessions of S10 through S18 on November 11.
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S10 Analog Techniques
S11 RF Building Blocks
S12 Circuits and Systems for Emerging Applications
S13 Bandgap and Temperature Sensors
S14 SoC for AIoT
S15 Wireline Transceiver Techniques
S16 High-Speed and Low-Power Techniques for SAR-Based ADCs
S17 Biomedical & Bioinspired SoCs
S18 Intelligent Memory & AI/ML-Assisted Biomedical SoCs