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Session Chair: Toshiro Hiramoto, The University of Tokyo, Japan

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Sapphire Room National Chiao Tung University, Taiwan

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Ningbo University, China

P2-50 **Application of LDPC Codes on PUF Error Correction Based on Code-offset Construction.....867**
Oct. 27 Kai Sun, Yingjie Lao, Weiqiang Liu, Xiaohu You, Chuan Zhang
Southeast University, China

P2-51 **High Speed, Low Offset, Low Power Differential Comparator with Constant Common Mode Voltage.....871**
Oct. 27 Mehdi Nasrollahpour, Sotoudeh Hamedi-Hagh
San Jose State University, USA

P2-52 **A Programmable Divider with Extended Division Range for 24GHz FMCW Frequency Synthesizer.....875**
Oct. 27 Yuanyuan Xu, Wei Li, Dan Wu, Ning Li
Fudan University, China

P2-53 **A Capacitor-less LDO With Transient-Response Improvement.....N/A**
Oct. 27 Pengfei Liao, Hao Chen, Lin Tan, Liang Zhou, Fan Liu, Luncai Liu
Sichuan Institute of Solid-State Circuits, China

P2-54 **Large-Area High-Density Active Microelectrodes Array for Neural Signal Recording.....879**
Oct. 27 Weiye Cai, Hongge Li
BeiHang University, China

P2-55 **DC MUX PUF: A Highly Reliable Feed-Back MUX PUF Based on Measuring Duty Cycle.....883**
Oct. 27 Yunhao Xu, Yingjie Lao, Weiqiang Liu, Xiaohu You, Chuan Zhang
Southeast University, China

P2-56 **The D-band MMIC LNA circuit using 70nm InP HEMT Technology.....887**
Oct. 27 Yutong Wang, Hongjiang Wu, Jing Li, Xingchang Fu
The 13th Research Institute of CHINA Electronics Technology Group Corporation, China

P2-57 **FPGA-based Convolution Neural Network for Traffic Sign Recognition.....891**
Oct. 27 Yuchen Yao, Zhiqian Zhang, Zhen Yang, Jian Wang, Jinmei Lai
Fudan University, China

P2-58 **A Digital-Assistant Time-to-Amplitude Converter with Dynamic Range Improvement.....895**

Oct. 27 Zengxin Liu, Shaowei Zhen, Shuiqing Xi, Xinjiang Gao, Lei Yang, Jiongwei Zheng, He Tang, Yajuan He, Ping Luo, Bo Zhang
University of Electronic Science and Technology, China

P2-59 **The Implement of Digital Front End in All-Digital Quadrature RF Transmitter.....900**
Oct. 27 ChenYang Wang, Yilei Shen, Pan Xue, Zhiliang Hong
Fudan University, China

P2-60 **Efficient Fast Convolution Architectures for Convolutional Neural Network.....904**
Oct. 27 Weihong Xu, Zhongfeng Wang, Xiaohu You,Chuan Zhang
Southeast University

Technical Session

Saturday, Oct. 28

SA6 Special Session: Low Power Digital Circuits

Session Chair: Yajun Ha, ShanghaiTech University, China

10:15 **SA6-1** **Metallic-Carbon-Nanotube-Removal Tolerant SRAM Cell with 9 Transistors.....908**
Oct. 28 **(Invited)** Yanan Sun, Weifeng He, Zhigang Mao, Hailong Jiao, Volkan Kursun
Sapphire Room Shanghai Jiao Tong University, China

10:45 **SA6-2** **Analysis and Design of Energy-Efficient Data-Dependent SRAM.....912**
Oct. 28 **(Invited)** Wenfeng Zhao, Ang Li, Yi Wang, Yajun Ha
Sapphire Room University of Minnesota, USA

11:15 **SA6-3** **Low-Power Single-Phase Clocked Redundant-Transition-Free Flip-Flop Design with Conditional Charging Scheme.....916**
Oct. 28 **(Invited)** Ling Chen, Yanan Sun, Weifeng He
Sapphire Room Shanghai Jiao Tong University, China

11:45 **SA6-4** **Near-Threshold Processor Design Techniques for Power-Constrained Computing Devices.....920**
Oct. 28 **(Invited)** Jun Zhou, Tony Tae-Hyoung Kim, Yong Lian
Sapphire Room University of Electronic Science and Technology of China, China

SB6 Power Conversion and Management

Session Chair: Lin Cheng, University of Science and Technology, Hong Kong

10:15 **SB6-1** **Optimization compensation for Primary-Side-Regulated Flyback Converters in Continuous-Conduction-Mode and Discontinuous Conduction Mode.....924**
Oct. 28 **(Invited)** Gong Xiaowu
Jade Room 1 Infineon Technologies Asia Pacific Pte Ltd, Singapore

10:45 **SB6-2** **Recent Progress in GaN Devices for Power and Integrated Circuit.....928**
Oct. 28 **(Invited)** Nobuyuki Otsuka, Yasufumi Kawai, Shuichi Nagai
Jade Room 1 Panasonic, Japan

11:15 **SB6-3** **A high-precision voltage regulator with dynamic load technique and overcurrent protection.....932**
Oct. 28 Zekun Zhou, Yue Shi
Jade Room 1 University of Electronic Science and Technology of China, China

11:30 **SB6-4** **Backscattering in Multicycle Q-modulation for Bio-Implants Wireless Power Transfer.....936**
Oct. 28 Yang Liu, Bin Li, Mo Huang, Zhaoquan Chen
Jade Room 1 South China University of Technology, China

11:45 **SB6-5** **A Single Inductor Tri-Input Dual-Output Buck-Boost DC-DC Converter with MPPT for Multi-Source Energy Harvesting.....940**
Oct. 28 Xiao Ge, Xiaofei Hu, Yajie Qin, Zhiliang Hong
Jade Room 1 Fudan University, China

SC6 Low-power SoCs

Session Chair: Na Yan, Fudan University, China

10:15 **SC6-1** **A High Utilization FPGA-Based Accelerator for Variable-Scale Convolutional Neural Network.....944**

Oct. 28
Xin Li, Yujie Cai, Jun Han, Xiaoyang Zeng
Jade Room 2
Fudan University, China

10:30 **SC6-2** **A Novel Mixed Reconfigurable System on Chip Based on Field Programmable Analog Array.....948**

Oct. 28
Lintao Liu, Yuhan Gao, Haoming Du
Jade Room 2
CETC, China

10:45 **SC6-3** **Parallel Implementations of SHA-3 on a 24-core Processor with Software and Hardware Co-Design.....953**

Oct. 28
Jianwei Yang, Weizhen Wang, Zhicheng Xie, Jun Han, Zhiyi Yu, Xiaoyang Zeng
Jade Room 2
Fudan University, China

11:00 **SC6-4** **A 3600 x 3600 Large-scale ISFET Sensor Array for High-throughput pH Sensing.....957**

Oct. 28
Yongxin Cong, Dongping Wu
Jade Room 2
Fudan University, China

11:15 **SC6-5** **Uniform Belief Propagation Processor for Massive MIMO Detection and GF(2^n) LDPC Decoding.....961**

Oct. 28
Shusen Jing, Anlan Yu, Xiao Liang, Xiaohu You, Chuan Zhang
Jade Room 2
Southeast University, China

11:30 **SC6-6** **Design of Router for Spiking Neural Networks.....965**

Oct. 28
Yewen Ni, Xiaoxin Cui, Yuanning Fan, Qiankun Han, Xiaole Cui
Jade Room 2
Peking University, China

11:45 **SC6-7** **A Fuel Injection Control SoC for Diesel Engine Management System.....969**

Oct. 28
Qinmiao Kang, Ming Zhou
Jade Room 2
Tsinghua University, China

SD6 CAD (3)

Session Chair: Ngai Wong, University of Hong Kong, HK

10:15 **SD6-1** **Efficient Algorithms for Resistance and Capacitance Calculation Problems in the Design of Flat Panel Display.....973**

Oct. 28 **(Invited)**
Wenjian Yu, Taotao Lu
Jade Room 3
Tsinghua University, China

10:45 **SD6-2** **Characterization of Single-Crystalline Graphene ESD Interconnects.....977**

Oct. 28 **(Invited)**
Qi Chen, Cheng Li[1], Fei Lu[1], Chenkun Wang[1], Feilong Zhang[1], Tianru Wu[2], Xiaoming Xie[2], Kun Zhang[2], Xinxin Li[2], Jimmy Ng[3], Ya-Hong Xie[3], Yuhua Cheng[4] and Albert Wang[1]*
Jade Room 3
University of California-Riverside, USA

11:15 **SD6-3** **Compact Modeling Approach for Electro-Mechanical System Simulation.....981**

Oct. 28 **(Invited)**
T.K. Maiti, D. Navarro, M. Miura-Mattausch, H. J. Mattausch
Jade Room 3
Hiroshima University, Japan

11:45 **SD6-4** **Short Path Padding with Multiple-Vt cells for Wide-Pulsed-Latch Based Circuits at Ultra-Low Voltage.....985**

Oct. 28
Yongming Ding, Wei Jin, Guanghui He, Weifeng He
Jade Room 3
Shanghai Jiao Tong University, China

12:00 **SD6-5** **A Fast HDL Model for Full-Custom FPGA Verification.....989**

Oct. 28
Kaixuan Zhang, Zhihua Feng, Hao Zhou

Jade Room 3 Fudan University, China

Coffee Break

SA7 Sensors and Display

Session Chair: Yuan Gao, University of Science and Technology, Hong Kong

13:30 **SA7-1** **Effects of Device Structures on Piezoresistive Behaviors of PEDOT: PSS Pressure Sensors.....N/A**

Oct. 28 **(Invited)** Jer-Chyi Wang

Sapphire Room Chang Gung University, Taiwan

14:00 **SA7-2** **Micro-LED arrays for display and communication: device structure and driver architecture.....993**

Oct. 28 **(Invited)** Kiat Seng Yeo, Wen Xian Ng, Mei Yu Soh, T. Hui Teo

Sapphire Room Singapore University of Technology and Design, Singapore

14:30 **SA7-3** **A biomedical microfluidic mixer in MEMS application Using Inkjet.....997**

Oct. 28 Robert K.F. Teng, Qian Hou, Jun chen, Zhanjiang Guo, Zeng Peng, Yuheng Nie

Sapphire Room California State University, USA

14:45 **SA7-4** **A Bulk-driven Pixel Circuit with Wide Data Voltage Range for OLEDoS Microdisplays.....1001**

Oct. 28 Huiyuan Lu, Hongge Li

Sapphire Room BeiHang University, China

15:00 **SA7-5** **A Low-Power Self-Calibration Digital-Output CMOS Temperature Sensor with ±0.1℃ Inaccuracy from -40℃ to 85℃.....1005**

Oct. 28 Yuze Niu, Wengao Lu, Yacong Zhang, Shanzhe Yu, Zhongjian Chen

Sapphire Room Peking University, China

15:15 **SA7-6** **A 58-dB SNDR 1.32-mW Chopper-Stabilized Analog Front-End for Graphene Hall Element Detecting Application.....1009**

Oct. 28 Chengying Chen, Liming Chen, Zhenli Lai

Sapphire Room Xiamen University of Technology, China

SB7 RF Design Techniques (2)

Session Chair: Yumei Huang, Fudan University, China

13:30 **SB7-1** **RF Mixer Design Techniques Using GaAs Process.....1013**

Oct. 28 **(Invited)** Jinna Yan, Bharatha Kumar Thangarasu, Kiat Seng Yeo

Jade Room Singapore University of Technology and Design, Singapore

14:00 **SB7-2** **5G FEM Design with Advanced SOI Processs.....1017**

Oct. 28 **(Invited)** Chaojiang Li, Min Wang, Taiyun Chi, Arvind Kumar, Myra Boenke, Dawn Wang, Ned Cahoon, Anirban Bandyopadhyay, Alvin Joseph, Hua Wang

Jade Room Globalfoundries, USA

14:30 **SB7-3** **Ultrafast Spintronic Integrated Circuits.....1021**

Oct. 28 **(Invited)** Jiaqi Wei, Liang Chang, Zhaohao Wang, Xiaoyang Lin, Kaihua Cao, Hushan Cui, Wang Kang, Haoxuan Chen, Lang Zeng, Youguang Zhang, Chao Zhao, Weisheng Zhao

Jade Room Beihang University, China

15:00 **SB7-4** **Ultra-High-Data-Rate 60-GHz CMOS Transceiver for Future Radio Access Network.....1025**

Oct. 28 （Invited） Rui Wu, Ryo Minami, Yuuki Tsukui, Seitaro Kawai, Yuuki Seo, Shinji Sato, Kento Kimura, Satoshi Kondo, Tomohiro Ueno, Nurul Fajri, Shoutarou Maki, Noriaki Nagashima, Yasuaki Takeuchi, Tatsuya Yamaguchi, Ahmed Musa, Korkut Kaan Tokgoz, Teerachot Siriburanon, Bangan Liu, Yun Wang, Jian Pang, Ning Li, Masaya Miyahara, Kenichi Okada, and Akira Matsuzawa

Jade Room Tokyo Institute of Technology, Japan

SC7 (Special Session) Neural Network: Efficient Implementations and Applications

Session Chair: Chuan Zhang, Southeast University, China

13:30 **SC7-1** **Neural Networks: Efficient Implementations and Applications.....1029**
Oct. 28 **(Invited)** Chuan Zhang, Weihong Xu
Jade Room 2 Southeast University, China

13:40 **SC7-2** **Using Fermat Number Transform to Accelerate Convonlutional Nerual Network.....1033**
Oct. 28 **(Invited)** Weihong Xu, Xiaohu You, and Chuan Zhang
Jade Room 2 Southeast University, China

14:05 **SC7-3** **A Layer-based Structured Design of CNN on FPGA.....1037**
Oct. 28 Chao Huang, Siyu Ni, Gengsheng Chen
Jade Room 2 Fudan University, China

14:30 **SC7-4** **Automatic Classification of Leukocytes Using Deep Neural Network.....1041**
Oct. 28 **(Invited)** Wei Yu, Jing Chang, Cheng Yang, Limin Zhang, Han Shen, Yongquan Xia, Jin Sha
Jade Room 2 Nanjing University, China

14:55 **SC7-5** **Energy Efficient SVM Classifier Using Approximate Computing.....1045**
Oct. 28 **(Invited)** Yangcan Zhou, Jun Lin, Zhongfeng Wang
Jade Room 2 Nanjing University, China

SD7 New Devices and Advanced Tehnologies (4)

Session Chair: Chunxiao Cong, Fudan University, China

13:30 **SD7-1** **Ultra low power and high performance nanoelectronic devices.....1049**
Oct. 28 **(Invited)** Francis Balestra
Jade Room 3 Grenoble INP/CNRS, France

14:00 **SD7-2** **High performance transistors based on two dimensional materials.....1053**
Oct. 28 **(Invited)** Mingqiang Huang, Xiong Xiong, Tiaoyang Li, Yanqing Wu
Jade Room 3 Huazhong Univ. of Science and Technology, China

14:30 **SD7-3** **NiGe Metal Source/Drain Ge pMOSFETs for Future High Performance VLSI Circuits Applications.....1057**
Oct. 28 **(Invited)** Rui Zhang, Jinghui Han, Junkang Li, Xiaoyu Tang, Yi Zhao
Jade Room 3 Zhejiang University, China

15:00 **SD7-4** **Deeply Scaled VLSI Analog Transistor Design and Optimization.....1061**
Oct. 28 **(Invited)** Jason C.S. Woo, Peng Lu, Po-Yen Chien, Xicheng Duan
Jade Room 3 University of California, Los Angeles, USA

Coffee Break

SA8 Low Power VLSI for Communication

Session Chair: Yun Chen, Fudan University, China

15:45 **SA8-1** **Toward Real-time 3D Modeling System with Cubic-Millimeters Wireless Sensor Nodes.....1065**
Oct. 28 **(Invited)** Masanori Hashimoto, Ryo Shirai, Yuichi Itoh, Tetsuya Hirose
Sapphire Room Osaka University, Japan

16:15 **SA8-2** **Joint Detection and Decoding for Non-Binary LDPC Coded MIMO Systems.....1069**
Oct. 28 Yiqian Cai, Jin Sha, Shusen Jing, Xiaohu You, Chuan Zhang

Sapphire Room — Nanjing University, China

16:30 **SA8-3** **The VLSI Architecture for Channel Estimation Based on ADMA.....1073**
Oct. 28 — Xiaozhen Liu, Hongxiang Xie, Jin Sha, Feifei Gao, Shi Jin, Xiaohu You, Chuan Zhang
Sapphire Room — Nanjing University, China

16:45 **SA8-4** **An Efficient Successive Cancellation Polar Decoder Based on New Folding Approaches.....1077**
Oct. 28 — Xiao Liang, Yechao She, Harish Vangala, Xiaohu You, Chuan Zhang, Emanuele Viterbo
Sapphire Room — Southeast University, China

17:00 **SA8-5** **RC6 Architecture-Adaptive Implementation for Coarse-Grained Reconfiguration Array.....1081**
Oct. 28 — Anqi Yin, Zibin Dai, Longmei Nan, Wei Li
Sapphire Room — Insitute of Information Science and Technology, Zhengzhou, China

17:15 **SA8-6** **DRFNet: A Lightweight and High Accuracy Network for Resource-limited Implementation.....1086**
Oct. 28 — Hengliang Xiang, Liang Chen, Wei Xu
Sapphire Room — Fudan University, China

17:30 **SA8-7** **Design of Digital Control Unit for Implantable Stimulator Chip.....1090**
Oct. 28 — Guoqing Sun, Xiaohong Peng, Jun Zhao, Rui Wang, Xiaodan Li
Sapphire Room — Beijing University of technology, China

SB8 RF Design Techniques (3)

Session Chair: Yann Deval, University of Bordeaux, France

15:45 **SB8-1** **Digital RF transmitter architectures exploiting FIRDACs in various configurations.....1094**
Oct. 28 **(Invited)** — Andreas Kaiser, Antoine Frappe
Jade Room 1 — Univ. Lille, France

16:15 **SB8-2** **Terahertz CMOS Transceiver for Tera-bps Wireless Link.....1098**
Oct. 28 **(Invited)** — Minoru Fujishima
Jade Room 1 — Hiroshima University, Japan

16:45 **SB8-3** **125KHz Wake-up Receiver and 433MHz Data Transmitter for Battery-less TPMS.....1101**
Oct. 28 — Qinmiao Kang, Ming Zhou
Jade Room 1 — Tsinghua University, China

17:00 **SB8-4** **A Low Power High Integrated BLE Transceiver.....1105**
Oct. 28 — Zhang Cuncai, Zhao Hui, Liang Jie
Jade Room 1 — Nationz Technologies Inc, China

17:15 **SB8-5** **A Low-Power Digital GFSK Receiver with Mid-value Filtering Frequency Offset Estimator and Soft Anti-Overlap Slicer.....1109**
Oct. 28 — Yu Li, Ziqian Wang, Song Chen, Fujiang Lin
Jade Room 1 — University of Science and Technology of China (USTC), China

17:30 **SB8-6** **A 1.0-3.0GHz LTE Transmitter with CIM Enhancement.....1113**
Oct. 28 — Yun Yin, Tong Li, Xiaoyong Xue
Jade Room 1 — Fudan University, China

SC8 Circuit and Systems for IoT

Session Chair: Lan Wei, University of Waterloo, Canada

15:45 **SC8-1** **Tensor-Network-Based Predistorter Design for Multiple-Input Multiple-Output Nonlinear Systems.....1117**

Oct. 28 **(Invited)** Cong Chen, Kim Batselier, Mihai Telescu, Stephane Azou, Noel Tanguy, Ngai Wong

Jade Room 2 University of Hong Kong, HK

16:15 SC8-2 **Towards An LC Passive Wireless Sensor Platform.....1121**

Oct. 28 **(Invited)** Qing-An Huang, Lei Dong, Li-Feng Wang

Jade Room 2 Southeast University, China

16:45 SC8-3 **Design and Development of a Self-contained and Non-Invasive Integrated System for Electricity Monitoring Applications.....1125**

Oct. 28 Sid Zarabi, Egon Fernandes, Armaghan Salehian, David Nairn, Lan Wei

Jade Room 2 University of Waterloo, Canada

17:00 SC8-4 **Integrating Operation Scheduling and Binding for Functional Unit Power-Gating in High-Level Synthesis.....1129**

Oct. 28 Nan Wang, Hengxiao Wang, Yue Jin, Jiongyao Ye

Jade Room 2 School of Information Science and Engineering, ECUST, China

17:15 SC8-5 **New 2-D Quadrantal- and Diagonal-Symmetry Filter Architectures Using Delta Operator.....1133**

Oct. 28 Pei-Yu Chen, Lan-Da Van, I. H. Khoo, Hari C. Reddy

Jade Room 2 National Chiao Tung University, Taiwan

SD8 New Devices and Advance Technologies (4)

Session Chair: Francis Balestra, Grenoble INP/CNRS, France

15:45 SD8-1 **3D Scaling for Insulated Gate Bipolar Transistors (IGBTs) with Low Vce(sat).....1137**

Oct. 28 **(Invited)** Kazuo Tsutsui, K. Kakushima, T. Hoshii, A. Nakajima, S. Nishizawa, H. Wakabayashi, I. Muneta, K. Sato, T. Matsudai, W. Saito, T. Saraya, K. Itou, M. Fukui, S. Suzuki, M. Kobayashi, T. Takakura, T. Hiramoto, A. Ogura, Y. Numasawa, I. Omura, H. Ohashi, and H. Iwai

Jade Room 3 Tokyo Institute of Technology, Japan

16:15 SD8-2 **World Changing Innovation from Semiconductor Technology.....N/A**

Oct. 28 **(Invited)** Ellen Shen

Jade Room 3 Tektronix

16:45 SD8-3 **Advanced FinFET Technologies for Boosting SRAM Performance.....1141**

Oct. 28 **(Invited)** Kazuhiko Endo

Jade Room 3 National Institute of Advanced Industrial Science and Technology, Japan

17:15 SD8-4 **High-Voltage Bidirectional Current Sensor.....1145**

Oct. 28 **(Invited)** Zong-You Hou, Hsiu-Chun Tsai, Chua-Chin Wang

Jade Room 3 National Sun Yat-Sen University, Taiwan