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TECHNICAL PAPERS

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A1L-01 Data Converters (In-Person)

Time: Monday, May 30 (8:00-9:30)
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Time: Monday, May 30 (8:00-9:30)
Place: Room 2
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Time: Monday, May 30 (8:00-9:30)
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[1]Imperial College London, United Kingdom; [2]UK Dementia Research Institute, United Kingdom; [3]University of Southampton, United Kingdom

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Time: Tuesday, May 31 (13:30-15:00)
Place: Room 1
Chair(s): Jorge Fernandes, *INESC-ID / IST*
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[1]Arizona State University, United States; [2]University of Michigan, United States; [3]University of Wisconsin-Madison, United States; [4]The University of Texas at Austin, United States

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Martin Benjak, Niklas Aust, Yasser Samayoa, Jörn Ostermann
Leibniz Universität Hannover, Germany

14:24
B3L-04.4 **A Lightweight Model with Separable CNN and LSTM for Video Prediction** 516
Mareeta Mathai, Ying Liu, Nam Ling
Santa Clara University, United States

14:42
B3L-04.5 **A Template Matching Based Extension for Merge with Motion Vector Difference** 521
Mehdi Salehifar, Yuwen He, Kai Zhang, Na Zhang, Li Zhang
Bytedance Inc., United States

B3L-05 Energy-Efficient Solutions for Future Devices I (In-Person)

Time: Tuesday, May 31 (13:30-15:00)
Place: Room 5
Chair(s): Ronald Tetzlaff, *TU Dresden, Germany*

13:30
B3L-05.1 **Fast & Efficient Hysteretic Power Supplies for IoT Microsensors: Analysis & Design with Insight** 526
Tianyu Chang, Gabriel A. Rincón-Mora
Georgia Institute of Technology, United States

13:48
B3L-05.2 **A Highly Efficient Fully Integrated Active Rectifier for Ultrasonic Wireless Power Transfer** 531
Xinling Yue, Zhelun Chen, Yiwei Zou, Sijun Du
Delft University of Technology, The Netherlands

14:06
B3L-05.3 **A 50% Ripple Reduction Hybrid Multiphase Interleaving SC Converter with Bottom-Plate Charge Sharing** 536
Mohith Amara, Gajendranath Chowdary
Indian Institute of Technology Hyderabad, India

B4L-04 Recent Progress in Theory and Applications of Memristive Technologies Toward a New Era in Electronic VII (In-Person)

Time: Tuesday, May 31 (16:30-18:00)
Place: Room 4
Chair(s): Alejandro Linares-Barranco, *University of Seville*

16:30
B4L-04.1 **Spatiotemporal Spike Pattern Detection with Second-Order Memristive Synapses** 625
Yuting Wu, Sangmin Yoo, Fan-Hsuan Meng, Wei D. Lu
University of Michigan, Ann Arbor, United States

16:48
B4L-04.2 **Experimental and Theoretical Analysis of Stateful Logic in Passive and Active Crossbar Arrays for Computation-in-Memory** 629
Christopher Bengel[1], Hsin-Yu Chen[2], Henriette Padberg[1], Stefan Wiefels[3], Qing-Tai Zhao[4], Fengben Xi[4], Vikas Rana[2], Rainer Waser[1,2,3], Stephan Menzel[3]
[1]RWTH Aachen, Germany; [2]Peter Grünberg Institut 10, Forschungszentrum Jülich GmbH, Germany; [3]Peter Grünberg Institute PGI-7, Forschungszentrum Jülich GmbH, Germany; [4]Peter Grünberg Institute PGI-9, Forschungszentrum Jülich GmbH, Germany

17:06
B4L-04.3 **A Fully Memristive Spiking Neural Network with Unsupervised Learning** 634
Peng Zhou[1], Dong-Uk Choi[1], Jason K. Eshraghian[2,3], Sung-Mo Kang[1]
[1]University of California, Santa Cruz, United States; [2]University of Michigan, United States; [3]University of Western Australia, Australia

17:24
B4L-04.4 **Equilibrium Propagation and (Memristor-Based) Oscillatory Neural Networks** 639
Gianluca Zoppo, Francesco Marrone, Michele Bonnin, Fernando Corinto
Politecnico di Torino, Italy

B4L-05 Energy Harvesting I (In-Person)

Time: Tuesday, May 31 (16:30-18:00)
Place: Room 5
Chair(s): Hiroo Sekiya, *Chiba University*

16:30
B4L-05.1 **A PV-Assisted 10-mV Startup Boost Converter for Thermoelectric Energy Harvesting** 644
Yansong Liang[1], Ruizhi Wang[1], Zhongsheng Chen[2], Sijun Du[1]
[1]Delft University of Technology, The Netherlands; [2]Hunan University of Technology, China

16:48
B4L-05.2 **High-Voltage Triboelectric Energy Harvesting Using Multi-Shot Energy Extraction in 70 V BCD Process**
Madhav Pathak, Shuo Xie, Cheng Huang, Ratnesh Kumar
Iowa State University, United States

17:06
B4L-05.3 **A Reconfigurable Cold-Startup SSHI Rectifier with 4X Lower Input Amplitude Requirement for Piezoelectric Energy Harvesting** 649
Xinling Yue[1], Yiwei Zou[1], Zhelun Chen[1], Junrui Liang[2], Sijun Du[1]
[1]Delft University of Technology, The Netherlands; [2]ShanghaiTech University, China

C1L-01 Analog Signal Processing Circuits (In-Person)

Time: Wednesday, June 1 (8:00-9:30)
Place: Room 1
Chair(s): Jerald Yoo, *National University of Singapore*
Matthew Johnston, *Oregon State University*

8:00
C1L-01.1 **Fully Differential Power-Efficient AB Miller Op-Amp for a Wide Range of Capacitive and Resistive Loads** 654
Anindita Paul[1], Jaime Ramirez-Angulo[2], Héctor Vázquez-Leal[3], Jesús Huerta-Chua[2], Alejandro Diaz-Sánchez[4]
[1]Oregon Institute of Technology, United States; [2]Tecnológico Nacional de México, Mexico; [3]Universidad Veracruzana, Mexico; [4]INAOE, Mexico

8:18
C1L-01.2 **A Compact 0.0054mm² Multipurpose Analog Frontend for Ultrasound Digitizers in 40nm CMOS**
K. Pelzers, H. Xin, E. Cantatore, P. Harpe
Eindhoven University of Technology, The Netherlands

8:36
C1L-01.3 **An 12th-Order Active-RC Bandpass Filter with Programmable Bandwidth and Center Frequency for Synthetic Aperture Radar Application** 659
Ting Guo, Kai Tang, Zhongyuan Fang, Yuanjin Zheng
Nanyang Technological University, Singapore

8:54
C1L-01.4 **Analog Correlator by a Dynamically-Reconfigured Switched-Capacitor Circuit** 663
Fuminori Kobayashi
Kyushu Institute of Technology, Japan

9:12
C1L-01.5 **Hardware Security Vulnerability in Analog Signal Chain Filters** 667
Kwabena Oppong Banahene, Matthew R. Strong, Bryce Gadogbe, Degang Chen, Randall L. Geiger
Iowa State University, United States

C1L-02 Reconfigurable Architectures, Design Automation and 3D ICs (In-Person)

Time: Wednesday, June 1 (8:00-9:30)
Place: Room 2
Chair(s): Ricardo Reis, *Federal University of Rio Grande do Sul*

8:00
C1L-02.1 **A Templated VHDL Architecture for Terabit/s P4-Programmable FPGA-Based Packet Parsing** 672
Parisa Mashreghi-Moghadam, Tarek Ould-Bachir, Yvon Savaria
Polytechnique Montréal, Canada

8:18
C1L-02.2 **MinAC: Minimal-Area Approximate Compressor Design Based on Exact Synthesis for Approximate Multipliers** 677
Xuan Wang[1], Weikang Qian[1,2]
[1]University of Michigan-Shanghai Jiao Tong University Joint Institute, China; [2]Shanghai Jiao Tong University, China

8:36
C1L-02.3 **Artificial Neural Network Based Post-CTS QoR Report Prediction** 682
Arpit Jain, Pabitra Das, Amit Acharyya
Indian Institute of Technology Hyderabad, India

14:18
C2L-01.2 **A 0.5 V, 0.13 nW, 4-Transistor Over Temperature Protection Circuit for SoCs** 765
Indranil Bhattacharjee, Mohith Amara, Gajendranath Chowdary
Indian Institute of Technology Hyderabad, India

14:36
C2L-01.3 **Programmable Refractory Period Implementations in a Mixed-Signal Integrate-and-Fire Neuron** 770
Nishith N. Chakraborty, Garrett S. Rose
University of Tennessee Knoxville, United States

14:54
C2L-01.4 **Noise Optimization of a Resistively-Driven Ring Oscillator for VCO-Based ADCs** 775
Jonas Borgmans, Pieter Rombouts
Ghent University, Belgium

15:12
C2L-01.5 **A Fast Reference-Tracking Buck Converter for 5G Power Amplifier Supply Modulator** 780
Qizhun Zhou
University of Science and Technology of China, China

C2L-02 TCAS Papers: Mixed Mode Design Techniques (In-Person)

Time: Wednesday, June 1 (14:00-15:30)
Place: Room 2
Chair(s): Jose Silva-Martinez, *Texas A&M University*

14:00
C2L-02.1 **AI-Managed Cognitive Radio Digitizers**
José M. de la Rosa
Instituto de Microelectrónica de Sevilla and Universidad de Sevilla, Spain

14:18
C2L-02.2 **An Interference Tolerant Synchronization Scheme for Wireless Communication Systems Based on Direct Sequence Spread Spectrum**
Jian Shao[1], Aydin Ilker Karsilayan[1], Jose Silva-Martinez[1], Christopher T. Rodenbeck[2]
[1]Texas A&M University, United States; [2]United States Naval Research Laboratory, United States

14:36
C2L-02.3 **A Single-MOSFET Analog High Resolution-Targeted (SMART) Multiplier for Machine Learning Classification**
Farid Kenarangi, Inna Partin-Vaisband
University of Illinois at Chicago, United States

14:54
C2L-02.4 **Multiple Potential Well Precision Oscillators**
Gary L. Viviani
Montana Technological University / Vivatronx, United States

15:12
C2L-02.5 **A 96-Mb 3D-Stacked SRAM Using Inductive Coupling with 0.4-V Transmitter, Termination Scheme and 12:1 SerDes in 40-nm CMOS**
Kota Shiba[1], Tatsuo Omori[1], Kodai Ueyoshi[2], Shinya Takamaeda-Yamazaki[1], Masato Motomura[3], Mototsugu Hamada[1], Tadahiro Kuroda[1]
[1]The University of Tokyo, Japan; [2]Katholieke Universiteit Leuven, Belgium; [3]Tokyo Institute of Technology, Japan

C2L-03 Neuromorphic Applications (In-Person)

Time: Wednesday, June 1 (14:00-15:30)
Place: Room 3
Chair(s): Juan Antonio Leñero-Bardallo, *CSIC*

C2L-04 Nonlinear Systems and Complex Networks I (In-Person)

Time: Wednesday, June 1 (14:00-15:30)
Place: Room 4
Chair(s): Zbigniew Gallas, *AGH University of Science and Technology*

C2L-05 Neural Network-Based Video Coding I (In-Person)

Time: Wednesday, June 1 (14:00-15:30)
Place: Room 5
Chair(s): Li Zhang, *Bytedance Inc., San Diego*

14:00
C2L-05.1 **ViSTRA3: Video Coding with Deep Parameter Adaptation and Post Processing** 824
Chen Feng, Duolikun Danier, Charlie Tan, Fan Zhang, David Bull
University of Bristol, United Kingdom

14:18
C2L-05.2 **Learned Video Compression for YUV 4:2:0 Content Using Flow-Based Conditional Inter-Frame Coding** 829
Yung-Han Ho, Chih-Hsuan Lin, Peng-Yu Chen, Mu-Jung Chen, Chih-Peng Chang, Wen-Hsiao Peng, Hsueh-Ming Hang
National Yang Ming Chiao Tung University, Taiwan

14:36
C2L-05.3 **Improvements to a Temporal Filter for Video Coding** 834
Jack Enhorn, Christopher Hollmann, Rickard Sjöberg, Kenneth Andersson, Per Wennersten
Ericsson AB, Sweden

C3L-01 Interface and Biasing Circuits (In-Person)

Time: Wednesday, June 1 (16:00-17:30)
Place: Room 1
Chair(s): Matthew Johnston, *Oregon State University*
Jerald Yoo, *National University of Singapore*

16:00
C3L-01.1 **A Digitally-Controlled Fully Differential Low Noise Current Source** 839
Maximilian Scherzer[1,2], Mario Auer[2]
[1]Austrian Academy of Sciences, Austria; [2]Graz University of Technology, Austria

16:18
C3L-01.2 **Ultra-Low-Power IoT 30 nW 474 mV 19 ppm/°C Voltage Reference and 2 nA 470 ppm/°C Current Reference** 843
Darshan Shetty[1], Christoph Steffan[1], Wolfgang Bösch[2], Jasmin Grosinger[2]
[1]Infineon Technologies Austria AG, Austria; [2]Technische Universität Graz, Austria

16:36
C3L-01.3 **An Enhanced Start-Up Circuit Eliminating All Trojan States in Self-Biased Reference Generators** 848
Baijie Zhang, Jue Wang, Xu Cheng, Jun Han, Xiaoyang Zeng
Fudan University, China

16:54
C3L-01.4 **Power Efficient Echo-Cancellation Based Hybrid for Full-Duplex Chip-to-Chip Interconnects** 852
Prema Kumar Govindaswamy[1], Nijwm Wary[2], Vijaya Sankara Rao Pasupureddi[2]
[1]University of Hyderabad, India; [2]Indian Institute of Technology Bhubaneswar, India

17:12
C3L-01.5 **A Low-Power Half-Rate Charge-Steering Hybrid for Full-Duplex Chip-to-Chip Interconnects** 857
Prema Kumar Govindaswamy[1], Nijwm Wary[2], Vijaya Sankara Rao Pasupureddi[2]
[1]University of Hyderabad, India; [2]Indian Institute of Technology Bhubaneswar, India

C3L-02 Experimental Teaching Systems I (In-Person)

Time: Wednesday, June 1 (16:00-17:30)
Place: Room 2
Chair(s): Jamali Mohsin, *The University of Texas Permian Basin*

16:00
C3L-02.1 **The System of Personalized Learning Resource Recommendation and Experimental Teaching Based on Collaborative Filtering** 862
Bin Sun, Hua Tan, Dongxiao Yang, Yu Zhang, Yefei Wu, Xinyu Jin
Zhejiang University, China

16:18
C3L-02.2 **Research and Practice of Grain Depot Ecological Precision Measurement and Control Experimental Teaching System Based on 5G Edge Calculation** 867
Bin Sun[1], Hongtuo Han[1], Yuncheng Jin[1], Yusun Zhou[2], Ziyuan Wang[3], Xinyu Jin[1]
[1]Zhejiang University, China; [2]Zhejiang University City College, China; [3]Polytechnic Institute of Zhejiang University, China

C3L-03 Circuits and Systems for Non-Contact Sensing Applications I (In-Person)

Time: Wednesday, June 1 (16:00-17:30)
Place: Room 3
Chair(s): Elisabetta Moisello, *University of Pavia, Italy*

16:00
C3L-03.1 **A Novel CMOS-SOI High-Responsivity Thermopile for Thermal Sensing Applications** 871
Elisabetta Moisello[1], Michele Vaiana[2], Maria Eloisa Castagna[2], Antonella La Malfa[2], Giuseppe Bruno[2], Edoardo Bonizzoni[1], Piero Malcovati[1]
[1]Università degli Studi di Pavia, Italy; [2]STMicroelectronics, Italy

16:18
C3L-03.2 **Dynamic Tuning of Sensitivity and Bandwidth of High-Q Transducers via Nested Phase Modulations** 876
Aidan Fitzpatrick, Ajay Singhvi, Amin Arbabian
Stanford University, United States

16:36
C3L-03.3 **A One-Point Exponential Trimming Technique for an Effective Suppression of Process Spread in BJT-Based Temperature Processing Circuits** 881
Antonio Aprile[1], Michele Folz[2], Daniele Gardino[2], Piero Malcovati[1], Edoardo Bonizzoni[1]
[1]Università degli Studi di Pavia, Italy; [2]TDK InvenSense, Italy

C3L-04 Signal Separation and Nonlinear Processing (In-Person)

Time: Wednesday, June 1 (16:00-17:30)
Place: Room 4
Chair(s): Mrityunjoy Chakraborty, *Indian Institute of Technology Kharagpur, India*

16:00
C3L-04.1 **Dual Square Root Unscented Kalman Filter Based Single Channel Blind Source Separation Methodology** 885
Rashi Dutt[1], Amit Acharyya[1], Israr Sheikh[2]
[1]Indian Institute of Technology Hyderabad, India; [2]Intel Corporation, India

16:18
C3L-04.2 **Real-Time Power Amplifier Impairment Assessment Using Nonlinear Polynomial with Memory** 890
Ibrahim Fatungase, J.-F. Bousquet
Dalhousie University, Canada

16:36
C3L-04.3 **Real-Time FPGA Implementation of a Second Order Volterra Filter for Ultrasound Nonlinear Imaging** 895
Abhishek Sahoo, Emad S. Ebbini
University of Minnesota, United States

C3L-05 TCAS Papers: Memristors (In-Person)

Time: Wednesday, June 1 (16:00-17:30)
Place: Room 5
Chair(s): Samuel Palermo, *Texas A&M University*

16:00
C3L-05.1 **SIXOR: Single-Cycle In-Memristor XOR**
Nima TaheriNejad
Technische Universität Wien, Austria

16:18
C3L-05.2 **Analog Solutions of Discrete Markov Chains via Memristor Crossbars**
Gianluca Zoppo[1], Anil Korkmaz[2], Francesco Marrone[1], Samuel Palermo[2], Fernando Corinto[1], R. Stanley Williams[2]
[1]Politecnico di Torino, Italy; [2]Texas A&M University, United States

16:36
C3L-05.3 **Analog Neural Computing with Super-Resolution Memristor Crossbars**
A.P. James[1], L.O. Chua[2]
[1]Digital University Kerala, India; [2]University of California, Berkeley, United States

Virtual USA Central Time (UTC-5)

A1uL-01 Nyquist Data Converters (Virtual USA)

Time: Monday, May 30 (8:00-9:30)
Place: Room 1
Chair(s): Taimur Rabuske, *INESC-ID Lisboa*
Lei Zhang, *Tsinghua University*

8:00
A1uL-01.1 **Concurrent Effect of Redundancy and Switching Algorithms in SAR ADCs** 900
Luca Ricci, Lorenzo Scaletti, Gabriele Bè, Luca Bertulessi, Salvatore Levantino, Carlo Samori, Andrea Bonfanti
Politecnico di Milano, Italy

8:18
A1uL-01.2 **Integrated Foreground Calibration for a High Speed Time Interleaved SAR Converter** 905
Leonhard Klein, Matthias Voelker
Fraunhofer Institute For Integrated Circuits IIS, Germany

A1uL-02 Data Path and Arithmetic Circuits and Systems II (Virtual USA)

Time: Monday, May 30 (8:00-9:30)
Place: Room 2
Chair(s): Joseph Cavallaro, *Rice University*
Naeem Abbasi, *Qualcomm*

A1uL-03 Neuro and Neural Implant Circuits and Systems (Virtual USA)

Time: Monday, May 30 (8:00-9:30)
Place: Room 3
Chair(s): Timir Datta, *Feinstein Institutes*
Wei Tang, *New Mexico State University*

A1uL-05 Wireline and Optical Communications (Virtual-USA)

Time: Monday, May 30 (8:00-9:30)
Place: Room 5
Chair(s): Jiafeng Xie, *Villanova University*
Wei Xing Zheng, *Western Sydney University*

8:00
A1uL-05.1 **A 14-Gb/s PAM4 Reference-Less Half-Baud-Rate CDR** 985
M. Noormohammadi Khiarak, B. Gosselin
[1]Rambus Canada Inc., Canada;[2]Université Laval, Canada

8:18
A1uL-05.2 **Circuit Bandwidth Requirements for NRZ and PAM4 Signals** 990
Mahdi Forghani, Behzad Razavi
University of California, Los Angeles, United States

8:36
A1uL-05.3 **Single-Event Transient Tolerant Optical Receiver Using Triple Modular Redundancy** 995
Sami Sattar, Glenn Cowan
Concordia University, Canada

8:54
A1uL-05.4 **A Hybrid CMOS Photonic 25Gbps Microring Transmitter with a -0.5-1.2V Direct-Coupled Drive** 1000
Shubham Mishra, Md. Jubayer Shawon, Anuar Dorzhigulov, Vishal Saxena
University of Delaware, United States

9:12
A1uL-05.5 **Phase Noise Integration Limits for Jitter Calculation** 1005
Yu Zhao, Behzad Razavi
University of California, Los Angeles, United States

A1uL-06 Technologies for Electric and Autonomous Vehicles II (Virtual USA)

Time: Monday, May 30 (8:00-9:30)
Place: Room 6
Chair(s): Mohammed Ismail, *Wayne State University, USA*

8:00
A1uL-06.1 **Electrical Architecture and In-Vehicle Networking: Challenges and Future Trends** 1009
Haysam M. Kadry[1,2], Ajeya Gupta[1], James Martin Lawlis[1], Matthew Volpone[1]
[1]Ford Motor Company, United States; [2]Wayne State University, United States

8:18
A1uL-06.2 **Video Deep Learning Classification for Autonomous Vehicle Navigation** 1014
Fathi M. Salem
Michigan State University, United States

8:36
A1uL-06.3 **Automotive Sensor Infrastructure – Challenges and Opportunities** 1018
Sai Prasanth Velusamy[1], Mahmoud Yousef Ghannam[1], Haysam M. Kadry[1,2]
[1]Ford Motor Company, United States; [2]Wayne State University, United States

8:54
A1uL-06.4 **In-Vehicle Network Standards – Overview and Implementation Examples** 1023
Helia Ordouei, Friedel Gerfers, Silvio Waldmann
Technische Universität Berlin, Germany

A2uL-01 SoC and Security Circuits (Virtual USA)

Time: Monday, May 30 (11:20-12:30)
Place: Room 1
Chair(s): Arindam Sanyal, *Arizona State University*
Alfredo Arnaud, *Universidad Católica del Uruguay*

A2uL-02 Neuromorphic Systems II (Virtual USA)

Time: Monday, May 30 (11:20-12:30)
Place: Room 2
Chair(s): Ali Dabbous, *Istituto Italiano di Tecnologia, Università di Genova*

A2uL-03 Lab on a Chip and Biosensing Instrumentation (Virtual USA)

Time: Monday, May 30 (11:20-12:30)
Place: Room 3
Chair(s): Pamela Abshire, *University of Maryland College Park*
Pantelis Georgiou, *Imperial College London*

A2uL-04 Recent Progress in Theory and Applications of Memristive Technologies Toward a New Era in Electronic III (Virtual USA)

Time: Monday, May 30 (11:20-12:30)
Place: Room 4
Chair(s): Alon Ascoli, *TU Dresden, Germany*

A2uL-05 Millimeter Wave and Broadband Communications (Virtual USA)

Time: Monday, May 30 (11:20-12:30)
Place: Room 5
Chair(s): Vassilis Paliouras, *University of Patras*
Glenn Cowan, *Concordia University*

A2uL-06 Self Correcting Logic and Digital Late Breaking News I (Virtual USA)

Time: Monday, May 30 (11:20-12:30)
Place: Room 6
Chair(s): Nathan Neihart, *Iowa State University*

A3uL-01 Wearable, Portable and Physiological Circuit and Systems (Virtual USA)

Time: Monday, May 30 (15:10-16:20)
Place: Room 1
Chair(s): Vighnesh Das, *Biotronik*

A3uL-02 Cryptography and Hardware Security II (Virtual USA)

Time: Monday, May 30 (15:10-16:20)
Place: Room 2
Chair(s): Danella Zhao, *Old Dominion University*
Dur-e-Shahwar Kundi, *Queen's University Belfast*

A3uL-03 Circuits and Systems for Non-Contact Sensing Applications II (Virtual USA)

Time: Monday, May 30 (15:10-16:20)
Place: Room 3
Chair(s): Elisabetta Moisello, *University of Pavia, Italy*

A3uL-04 Recent Progress in Theory and Applications of Memristive Technologies Toward a New Era in Electronic VI (Virtual USA)

Time: Monday, May 30 (15:10-16:20)
Place: Room 4
Chair(s): Esteban Tlelo Cuautle, *INAOE, Mexico*

A3uL-05 Late Breaking News II (Virtual USA)

Time: Monday, May 30 (15:10-16:20)
Place: Room 5
Chair(s): Nathan Neihart, *Iowa State University*

A3uL-06 Deep Learning Applications (Virtual USA)

Time: Monday, May 30 (15:10-16:20)
Place: Room 6
Chair(s): Balaji Arumugam, *State University of New York at Buffalo*

B1uL-01 Sigma-Delta Converters (Virtual USA)

Time: Tuesday, May 31 (8:00-9:30)
Place: Room 1
Chair(s): Lei Zhang, *Tsinghua University*
Degang Chen, *Iowa State University*

8:00
B1uL-01.1 **Optimal Reconfiguration Instant in ΣΔ Modulators** 1225
Pablo Vera[1], Dietmar Straeussnigg[2], Victor Medina[1], Luis Hernandez[1], Susana Paton[1]
[1]Universidad Carlos III de Madrid, Spain; [2]Infineon Technologies Austria AG, Austria

8:18
B1uL-01.2 **A 3rd Order CT-ΣΔ Modulator with a Hybrid Loop Filter Employing Passive and Continuous-Time Delay Based Integrators** 1230
Jiu Xiong, Jennifer Zhao, Jin Liu, Hoi Lee
The University of Texas at Dallas, United States

8:36
B1uL-01.3 **Passive Third Order Continuous-Time ΔΣ Modulator with Q Enhancement Technique** 1234
Hang Hu, Vladimir Vesely, Un-Ku Moon
Oregon State University, United States

8:54
B1uL-01.4 **A Current-Mode ΣΔ Modulator with FIR Feedback and DC Servo Loop for an Improved Dynamic Range** 1239
Ayman Mohamed, Lars Baumgärtner, Jianyu Zhao, Denis Djekic, Jens Anders
University of Stuttgart, Germany

9:12
B1uL-01.5 **Ultra-Low OSR Calibration Free MASH Noise Shaping SAR ADC** 1244
Hang Hu, Vladimir Vesely, Un-Ku Moon
Oregon State University, United States

B1uL-02 Digital Circuits and Systems for Machine Learning (Virtual USA)

Time: Tuesday, May 31 (8:00-9:30)
Place: Room 2
Chair(s): Arindam Sanyal, *Arizona State University*
Tawfiq Musah, *Ohio State University*

8:00
B1uL-02.1 **Reduce Computing Complexity of Deep Neural Networks through Weight Scaling** 1249
Mohammed F. Tolba[1,2], Hani Saleh[1], Mahmoud Al-Qutayri[1], Baker Mohammad[1]
[1]Khalifa University, U.A.E.; [2]Nile University, Egypt

8:18
B1uL-02.2 **Wavelet Transform Assisted Neural Networks for Human Activity Recognition** 1254
Roshwin Sengupta[1], Ilia Polian[1], John P. Hayes[2]
[1]Universität Stuttgart, Germany; [2]University of Michigan, United States

8:36
B1uL-02.3 **A Mixed Precision, Multi-GPU Design for Large-Scale Top-K Sparse Eigenproblems** 1259
Francesco Sgherzi, Alberto Parravicini, Marco D. Santambrogio
Politecnico di Milano, Italy

8:54
B1uL-02.4 **A High-Performance RNS LSTM Block** **1264**
Vasileios Sakellariou[1], Vassilis Paliouras[2], Ioannis Kouretas[2], Hani Saleh[1], Thanos Stouraitis[1]
[1]Khalifa University, U.A.E.; [2]University of Patras, Greece

9:12
B1uL-02.5 **Mitigating Asynchronous QDI Drawbacks on MAC Operators with Approximate Multipliers** **1269**
Rodrigo N. Wuerdig[1], Marcos L.L. Sartori[2], Brunno A. Abreu[1], Sergio Bampi[1], Ney L.V. Calazans[2]
[1]Universidade Federal do Rio Grande do Sul, Brazil; [2]Pontifical Catholic University of Rio Grande do Sul, Brazil

B1uL-03 Filter Design and Image Processing (Virtual USA)

Time: Tuesday, May 31 (8:00-9:30)
Place: Room 3
Chair(s): Oscar Gustafsson, *Linköping University*
Xin Lou, *ShanghaiTech University*

8:00
B1uL-03.1 **Minimax Design of M-D Sparse FIR Filters with Arbitrary Frequency Response Using SOCP**
Ashira L. Jayaweera[1,2], Darukeesan Pakiyarajah[3], Chamira U.S. Edussooriya[1,4]
[1]University of Moratuwa, Sri Lanka; [2]University of Maryland College Park, United States; [3]University of Jaffna, Sri Lanka; [4]Florida International University, United States

8:18
B1uL-03.2 **Weighted Least-Squares Design of 2-D IIR Filters with Arbitrary Frequency Response Using Iterative Second-Order Cone Programming** **1274**
Darukeesan Pakiyarajah[1], Nadeeshan D.K. Dissanayake[2], Chamira U.S. Edussooriya[2,4], Chamith Wijenayake[3], Arjuna Madanayake[4]
[1]University of Jaffna, Sri Lanka; [2]University of Moratuwa, Sri Lanka; [3]University of Queensland, Australia; [4]Florida International University, United States

8:36
B1uL-03.3 **Fast Reconstruction of Three-Quarter Sampling Measurements Using Recurrent Local Joint Sparse Deconvolution and Extrapolation**
Simon Grosche, Andy Regensky, Alexander Sinn, Jürgen Seiler, André Kaup
Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

8:54
B1uL-03.4 **Classification of Alzheimer's Disease from MRI Data Using a Lightweight Deep Convolutional Model** **1279**
Emimal Jabason, M. Omair Ahmad, M.N.S. Swamy
Concordia University, Canada

9:12
B1uL-03.5 **DSegAN: A Deep Light-Weight Segmentation-Based Attention Network for Image Restoration** **1284**
Alireza Esmaeilzehi, M. Omair Ahmad, M.N.S. Swamy
Concordia University, Canada

B1uL-04 Deep Learning Systems II (Virtual USA)

Time: Tuesday, May 31 (8:00-9:30)
Place: Room 4
Chair(s): Inna Partin-Vaisband, *University of Illinois Chicago*

8:00
B1uL-04.1 **Histogram-Equalized Quantization for Logic-Gated Residual Neural Networks** **1289**
Van Thien Nguyen, William Guicquero, Gilles Sicard
CEA-Leti, France

B1uL-05 Wireless and Wireline Communications IV (Virtual USA)

Time: Tuesday, May 31 (8:00-9:30)
Place: Room 5
Chair(s): Joseph Cavallaro, *Rice University*

B1uL-06 Smart Sensors and Sensory Systems I (Virtual USA)

Time: Tuesday, May 31 (8:00-9:30)
Place: Room 6
Chair(s): Walter Leon-Salas, *Purdue University*
Bo Wang, *Hamad Bin Khalifa University*

8:00
B1uL-06.1 **Privacy-Preserving Social Distance Monitoring on Microcontrollers with Low-Resolution Infrared Sensors and CNNs** 1332
Chen Xie[1], Francesco Daghero[1], Yukai Chen[1], Marco Castellano[2], Luca Gandolfi[2], Andrea Calimera[1], Enrico Macii[1], Massimo Poncino[1], Daniele Jahier Pagliari[1]
[1]Politecnico di Torino, Italy; [2]STMicroelectronics, Italy

8:18
B1uL-06.2 **A Low Power, High Count Rate Radiation Detection Chip Using a Current Subtraction Technique** 1337
Samuel J. Murray, Joseph Schmitz, Sina Balkir, Michael W. Hoffman
University of Nebraska-Lincoln, United States

8:36
B1uL-06.3 **Amplitude and Phase Estimation of Backscatter Tag-to-Tag Channel** 1342
Abeer Ahmad, Xiao Sha, Akshay Athalye, Samir Das, Petar Djurić, Milutin Stanaćević
State University of New York at Stony Brook, United States

8:54
B1uL-06.4 **A Portable Electrochemical Impedance Spectroscopy Lab-on-Chip System for Biosensing Applications** 1347
Xuanjie Ye, Jiajun Li, Tianxiang Jiang, Bingxuan Li, Jie Chen
University of Alberta, Canada

B2uL-01 Feeding the Next Billion, Smart Agriculture and Food Technology (Virtual USA)

Time: Tuesday, May 31 (10:50-12:00)
Place: Room 1
Chair(s): Colleen Josephson, *University of California Santa Cruz*

10:50
B2uL-01.1 **Optimizing a Multispectral-Images-Based DL Model, through Feature Selection, Pruning and Quantization** 1352
Julio Torres-Tello[1,2], Seok-Bum Ko[1]
[1]University of Saskatchewan, Canada; [2]Universidad de las Fuerzas Armadas ESPE, Ecuador

11:04
B2uL-01.2 **Scheduling Problems for Robotics in Precision Agriculture** 1357
Stefano Carpin
University of California, Merced, United States

11:18
B2uL-01.3 **A Thermoacoustic Imaging System for Non-Invasive and Non-Destructive Root Phenotyping**
Ajay Singhvi, Aidan Fitzpatrick, Johannes Daniel Scharwies, José R. Dinneny, Amin Arbabian
Stanford University, United States

11:32
B2uL-01.4 **Early Characterization of Soil Microbial Fuel Cells** 1362
Gabriel Marcano[1], Colleen Josephson[2], Pat Pannuto[1]
[1]University of California, San Diego, United States; [2]University of California, Santa Cruz, United States

B2uL-02 Intelligent Sensors, Emerging Memories and Edge AI Accelerators (Virtual USA)

Time: Tuesday, May 31 (10:50-12:00)
Place: Room 2
Chair(s): Deepu John, *University College Dublin*

10:50
B2uL-02.1 **Hardware Accelerator Design for Healthcare Applications: Review and Perspectives** **1367**
Jai Narayan Tripathi, Binod Kumar, Dinesh Junjariya
Indian Institute of Technology Jodhpur, India

11:04
B2uL-02.2 **SCOLAR: A Spiking Digital Accelerator with Dual Fixed Point for Continual Learning** **1372**
Vedant Karia, Fatima Tuz Zohora, Nicholas Soures, Dhireesha Kudithipudi
The University of Texas at San Antonio, United States

B2uL-03 Power Electronics Circuit II (Virtual USA)

Time: Tuesday, May 31 (10:50-12:00)
Place: Room 3
Chair(s): Zhenyu Shan, *Beihang University*

10:50
B2uL-03.1 **Impact of Modular Multilevel Converters Impedances on the AC/DC Power System Stability** **1377**
Davide del Giudice, Federico Bizzarri, Daniele Linaro, Angelo Maurizio Brambilla
Politecnico di Milano, Italy

11:04
B2uL-03.2 **A New Submodule Structure with Parallel Capacitor Connection in Modular Multilevel Converters** **1382**
G. Veera Bharath[1], Ghanshyamsinh Gohil[2], Poras T. Balsara[1]
[1]The University of Texas at Dallas, United States; [2]Hitachi ABB Power Grids, United States

B2uL-04 Hardware for Neural Networks (Virtual USA)

Time: Tuesday, May 31 (10:50-12:00)
Place: Room 4
Chair(s): Lizeth Gonzalez Carabarin, *Eindhoven University of Technology*

10:50
B2uL-04.1 **An Efficient FPGA Implementation for Real-Time and Low-Power UAV Object Detection** **1387**
Guoqing Li[1,2], Jingwei Zhang[1], Meng Zhang[1], Henk Corporaal[2]
[1]Southeast University, China; [2]Eindhoven University of Technology, The Netherlands

11:04
B2uL-04.2 **Structured and Tiled-Based Pruning of Deep Learning Models Targeting FPGA Implementations** ... **1392**
Lizeth Gonzalez-Carabarin[1], Alexandre Schmid[2], Ruud J.G. van Sloun[1]
[1]Eindhoven University of Technology, The Netherlands; [2]École Polytechnique Fédérale de Lausanne, Switzerland

11:18
B2uL-04.3 **A Dynamic Charge-Transfer-Based Crossbar with Low Sensitivity to Parasitic Wire-Resistance** **1397**
Pengcheng Xu[1], Lei Zhang[1,2], Ferdinand Pscheidl[1,2], David Borggreve[1], Frank Vanselow[1], Ralf Brederlow[2]
[1]Fraunhofer Microsystems and Solid State Technologies EMFT, Germany;
[2]Technical University of Munich, Germany

B2uL-05 Radio-Frequency and Millimeter-Wave Integrated Circuits (Virtual USA)

Time: Tuesday, May 31 (10:50-12:00)
Place: Room 5
Chair(s): Paolo Crovetti, *Politecnico di Torino*
Oscar Moreira, *Texas A&M University*

10:50
B2uL-05.1 **Relaxation Digital-to-Analog Converter with Radix-Based Digital Correction** **1402**
Roberto Rubino, Francesco Musolino, Paolo Crovetti
Politecnico di Torino, Italy

11:04
B2uL-05.2 **Look Ahead CLS in Pipelined SAR ADCs** **1407**
Morgan Thomas, Marino De Jesus Guzman, Nima Maghari
University of Florida, United States

11:18
B2uL-05.3 **Software-Defined Cognitive Radar Implementation for Spectrum Management Using MATLAB** **1412**
Jacqueline A. Fairley[1], Joshua Phillips[1], Mike Baden[1], William L. Melvin[1], Anson Dixon[2], Edwin Culpepper[2]
[1]Georgia Tech Research Institute, United States; [2]Air Force Research Laboratory, United States

11:32
B2uL-05.4 **Ultra-Wideband Software Defined Radio Platform and Heterogeneous Fabric** **1417**
Helen L.N. Liu, Dan Pritsker, Benjamin Esposito, Gregory Nash
Intel Corporation, United States

B2uL-06 Sensory Circuits and Systems I (Virtual USA)

Time: Tuesday, May 31 (10:50-12:00)
Place: Room 6
Chair(s): Tobi Delbruck, *University of Zurich and ETH Zurich*
Wei Tang, *New Mexico State University*

10:50
B2uL-06.1 **A Reconfigurable 5-Channel Ring-Oscillator-Based TDC for Direct Time-of-Flight 3D Imaging**
Foad Arvani, Tony Chan Carusone
University of Toronto, Canada

11:04
B2uL-06.2 **A Phase-Encoded Voice Features Extraction Circuit Using Digital Mixers and Analog Filters Based on Ring Oscillators** **1420**
Ruben Garvi, Eric Gutierrez, Victor Medina, Luis Hernandez
Universidad Carlos III de Madrid, Spain

11:18
B2uL-06.3 **A DC to 12.5 MHz Fully Integrated and Galvanically Isolated Shunt-Resistor Current Sensor** **1425**
Diego Felix[1], Christian Cojocaru[2], Rony Amaya[1]
[1]Carleton University, Canada; [2]Huada Semiconductor, Canada

11:32
B2uL-06.4 **A 2-Tap Macro-Pixel-Based Indirect ToF CMOS Image Sensor for Multi-Frequency Demodulation** .. **1430**
Peyman F. Shahandashti[1], P. López[1], V.M. Brea[1], D. García-Lesta[1], Miguel Heredia-Conde[2]
[1]CiTIUS, Universidade de Santiago de Compostela, Spain; [2]University of Siegen, Germany

B3uL-01 DACs and TDCs (Virtual USA)

Time: Tuesday, May 31 (13:30-15:00)
Place: Room 1
Chair(s): Degang Chen, *Iowa State University*
Taimur Rabuske, *INESC-ID Lisboa*

13:30
B3uL-01.1 **Improved Analysis of Current-Steering DACs Using Equivalent Timing Errors** **1435**
Daniel Beauchamp[1,2], Keith M. Chugg[2]
[1]Jariet Technologies, United States; [2]University of Southern California, United States

13:48
B3uL-01.2 **A Multiplying Digital to Analog Converter Insensitive to Component Mismatch** **1440**
Amandeep Kaur
Indian Institute of Technology Jodhpur, India

14:06
B3uL-01.3 **A Diode-Based D-2D DAC Architecture with Leakage Current Compensation for Ultra-Low Power Application** **1445**
Jesse Coulon, Jin Liu
The University of Texas at Dallas, United States

14:24
B3uL-01.4 **Metastability Correction Techniques for TSPC-DFF with Applications in Vernier TDC** **1449**
Fei Yuan
Ryerson University, Canada

14:42
B3uL-01.5 **Design of Cyclic-Coupled Ring Oscillators with Guaranteed Maximal Phase Resolution** **1453**
Okko Järvinen, Vishnu Unnikrishnan, Ilia Kempi, Kari Stadius, Marko Kosunen, Jussi Ryynänen
Aalto University, Finland

B3uL-02 Memory and Compute-in-Memory Circuits and Architectures IV (Virtual USA)

Time: Tuesday, May 31 (13:30-15:00)
Place: Room 2
Chair(s): Tawfiq Musah, *Ohio State University*
Arindam Sanyal, *Arizona State University*

13:30
B3uL-02.1 **Non von-Neumann Anomaly Detection in Multi-Channel Time-Series Using Charge Trap Transistor Crossbars** **1457**
Ahish Shylendra, Priyesh Shukla, Amit Ranjan Trivedi
University of Illinois at Chicago, United States

13:48
B3uL-02.2 **Write-Verify Scheme for IGZO DRAM in Analog in-Memory Computing** **1462**
Michele Caselli[1,2,3], Subhali Subhechha[2], Peter Debacker[2], Arindam Mallik[2], Diederik Verkest[2]
[1]Katholieke Universiteit Leuven, Belgium; [2]imec, Belgium; [3]University of Parma, Italy

14:06
B3uL-02.3 **A Trim Bit One Time Programmable EPROM with Aggressively Reduced Area, Enhanced Functionality, and Extra Features** **1467**
Xiaowei Deng, Yunchen Qiu, David Toops, George Jamison
Texas Instruments Inc., United States

B3uL-03 Power IC Design IV (Virtual USA)

Time: Tuesday, May 31 (13:30-15:00)
Place: Room 3
Chair(s): Zhenyu Shan, *Beihang University*

B3uL-04 Multimedia Systems and Applications IV (Virtual USA)

Time: Tuesday, May 31 (13:30-15:00)
Place: Room 4
Chair(s): Jiande Sun, *Shandong Normal University*

14:06
B3uL-04.3 **C-NMT: A Collaborative Inference Framework for Neural Machine Translation** **1512**
Yukai Chen, Roberta Chiaro, Enrico Macii, Massimo Poncino, Daniele Jahier Pagliari
Politecnico di Torino, Italy

14:24
B3uL-04.4 **Does Video Compression Impact Tracking Accuracy?** **1517**
Takehiro Tanaka, Alon Harell, Ivan V. Bajić
Simon Fraser University, Canada

B3uL-05 Nonlinear Systems and Complex Networks III (Virtual USA)

Time: Tuesday, May 31 (13:30-15:00)
Place: Room 5
Chair(s): Marco Storace, *Università di Genova*

13:30
B3uL-05.1 **Behavioral Model of an Amorphous-Core Inductor Working Up to Partial Saturation** **1522**
Alberto Oliveri[1], Matteo Lodi[1], Cinzia Beatrice[2], Enzo Ferrara[2], Marco Storace[1], Fausto Fiorillo[2]
[1]Università di Genova, Italy; [2]Istituto Nazionale di Ricerca Metrologica, Italy

13:48
B3uL-05.2 **Reliable Comparison for Power Amplifiers Nonlinear Behavioral Modeling Based on Regression Trees and Random Forest** **1527**
Daniel Santiago Aguila-Torres[1], Jose Alejandro Galaviz-Aguilar[2], José Ricardo Cárdenas-Valdez[1]
[1]Instituto Tecnológico de Tijuana, Tecnológico Nacional de México, Mexico;
[2]Instituto Tecnológico y de Estudios Superiores de Monterrey, Mexico

14:06
B3uL-05.3 **Forget Partitions? Not Yet** **1531**
Matteo Lodi[1], Francesco Sorrentino[2], Marco Storace[1]
[1]Università di Genova, Italy; [2]University of New Mexico, United States

14:24
B3uL-05.4 **Phase-Change Memory in Neural Network Layers with Measurements-Based Device Models** **1536**
Carmine Paolino[1], Alessio Antolini[2], Fabio Pareschi[1,2], Mauro Mangia[2], Riccardo Rovatti[2], Eleonora Franchi Scarselli[2], Gianluca Setti[1,2], Roberto Canegallo[3], Marcella Carissimi[3], Marco Pasotti[3]
[1]Politecnico di Torino, Italy; [2]Università di Bologna, Italy; [3]STMicroelectronics, Italy

B3uL-06 Non-Traditional Areas in Digital Circuits and Systems (Virtual USA)

Time: Tuesday, May 31 (13:30-15:00)
Place: Room 6
Chair(s): Ettore Napoli, *Università degli Studi di Salerno*
Joseph Cavallaro, *Rice University*

13:30
B3uL-06.1 **Low-Complexity Pseudo Direct Learning Digital Pre-Distortion Architecture for Nonlinearity and Memory Effect of Power Amplifier in mmWave Baseband Transmitter** **1541**
Shen-Zhe Lu, Nai-Cheng Xue, Hung-Chih Liu, Chih-Wei Jen, Shyh-Jye Jou
National Yang Ming Chiao Tung University, Taiwan

13:48
B3uL-06.2 **3-Stage Pipelined Hierarchical SRAMs with Burst Mode Read in 65nm LSTP CMOS** **1546**
Mukesh Kumar Srivastav[1], Rimjhim [1], Roshan Mishra[1], Anuj Grover[1], Kedar Janardan Dhori[2], Harsh Rawat[2]
[1]Indraprastha Institute of Information Technology Delhi, India; [2]STMicroelectronics, India

B4uL-01 Testing, Verification and Design Tools (Virtual USA)

Time: Tuesday, May 31 (16:30-18:00)
Place: Room 1
Chair(s): Alfredo Arnaud, *Universidad Católica del Uruguay*
Elkim Roa-Fuentes, *Universidad Industrial de Santander*

B4uL-02 Reconfigurable Architectures, SoC and Testing (Virtual USA)

Time: Tuesday, May 31 (16:30-18:00)
Place: Room 2
Chair(s): Magdy El-Moursy, *Electronics Research Institute*
Emre Salman, *Stony Brook University*

16:30
B4uL-02.1 **Reliability Assessment of Many-Core Dynamic Thermal Management** 1590
Alzemiro Silva[1], Iaçanã Weber[1], André Luís del Mestre Martins[2], Fernando Gehm Moraes[1]
[1]Pontifical Catholic University of Rio Grande do Sul, Brazil; [2]Sul-Rio-Grandense Federal Institute, Brazil

16:48
B4uL-02.2 **Improving the Performance of RISC-V Softcores on FPGA by Exploiting PVT Variability and DVFS** 1595
Endri Taka[1], George Lentaris[1,2], Dimitrios Soudris[1]
[1]National Technical University of Athens, Greece; [2]University of West Attica, Greece

17:06
B4uL-02.3 **Using HLS for Designing a Parametric Optical Flow Hierarchical Algorithm in FPGAs** 1600
Ilias Bournias, Roselyne Chotin, Lionel Lacassagne
Sorbonne University, France

17:24
B4uL-02.4 **Power Delivery for Ultra-Large-Scale Applications on Si-IF** 1605
Yousef Safari, Anja Kroon, Boris Vaisband
McGill University, Canada

17:42
B4uL-02.5 **The Impact of Logic Gates Susceptibility in Overall Circuit Reliability Analysis** 1610
Matheus F. Pontes[1], Ingrid F.V. Oliveira[1], Rafael B. Schvittz[2], Leomar S. Rosa Jr.[1], Paulo F. Butzen[3]
[1]Universidade Federal de Pelotas, Brazil; [2]Universidade Federal do Rio Grande, Brazil; [3]Universidade Federal do Rio Grande do Sul, Brazil

B4uL-03 Non-Invasive Biomedical Circuits and Systems (Virtual USA)

Time: Tuesday, May 31 (16:30-18:00)
Place: Room 3
Chair(s): Jennifer Blain Christen, *Arizona State University*
Shahriar Mirabbasi, *University of British Columbia*

16:30
B4uL-03.1 **Power and Accuracy Optimization for Luminescent Transcutaneous Oxygen Measurements** 1615
Burak Kahraman[1], Ian Costanzo[1], Neal Kurfis[2], Guixue Bu[2], Jiayuan Wang[2], Foroohar Foroozan[2], Ulkuhan Guler[1]
[1]Worcester Polytechnic Institute, United States; [2]Analog Devices, Inc., United States

16:48
B4uL-03.2 **A 385µW Photoplethysmography-Based Vitals Monitoring SoC with 110dB Current-to-Digital Converter** 1620
Sameen Minto, Sarmad Salman, Wala Saadeh
Lahore University of Management Sciences, Pakistan

17:06
B4uL-03.3 **An ASIC Interface for CMUTs-Based Biosensors with High Voltage Boosting and Oscillator** 1625
Yihe Zhao[1,2], Gian Luca Barbruni[2], Zhikang Li[1], Libo Zhao[1], Zhuangde Jiang[1], Christian Enz[2], Sandro Carrara[2]
[1]Xi'an Jiaotong University, China; [2]École Polytechnique Fédérale de Lausanne, Switzerland

17:24
B4uL-03.4 **Collaborative Clustering Based on Adaptive Laplace Modeling for Neuroimaging Data Analysis** **1630**
Hangfan Liu[1,2], Karl Li[1], Jon B. Toledo[3], Mohamad Habes[1,2]
[1]University of Texas Health Science Center at San Antonio, United States;
[2]University of Pennsylvania, United States; [3]University of Florida, United States

17:42
B4uL-03.5 **Real-Time Sepsis Prediction Using Fusion of On-Chip Analog Classifier and Electronic Medical Record** **1635**
Sudarsan Sadasivuni[1], Monjoy Saha[2], Sumukh Prashant Bhanushali[4], Imon Banerjee[3], Arindam Sanyal[4]
[1]State University of New York at Buffalo, United States; [2]Emory University, United States;
[3]Mayo Clinic, United States; [4]Arizona State University, United States

B4uL-04 Approximate Computing Crossing Design (Virtual USA)

Time: Tuesday, May 31 (16:30-18:00)
Place: Room 4
Chair(s): Jorge Castro-Godínez, *Costa Rica Institute of Technology*

16:30
B4uL-04.1 **ART-MAC: Approximate Rounding and Truncation Based MAC Unit for Fault-Tolerant Applications** **1640**
Vishesh Mishra[1], Divy Pandey[1], Saurabh Singh[1], Sagar Satapathy[2,3], Kaustav Goswami[4], Babita Jajodia[1], Dip Sankar Banerjee[2]
[1]Indian Institute of Information Technology Guwahati, India; [2]Indian Institute of Technology Jodhpur, India;
[3]Synopsys India Pvt. Ltd., India; [4]University of California Davis, United States

16:48
B4uL-04.2 **AxLEAP: Enabling Low-Power Approximations through Unified Power Format** **1645**
Sagar Satapathy[1,4], Saurabh Singh[2], Kaustav Goswami[3], Vishesh Mishra[2], Divy Pandey[2], Dip Sankar Banerjee[1]
[1]Indian Institute of Technology Jodhpur, India; [2]Indian Institute of Information Technology Guwahati, India;
[3]University of California Davis, United States; [4]Synopsys India Pvt. Ltd., India

17:06
B4uL-04.3 **ConfAx: Exploiting Approximate Computing for Configurable FPGA CNN Acceleration at the Edge** **1650**
Guilherme Korol[1], Michael Guilherme Jordan[1], Mateus Beck Rutzig[2], Antonio Carlos Schneider Beck[1]
[1]Universidade Federal do Rio Grande do Sul, Brazil; [2]Universidade Federal de Santa Maria, Brazil

17:24
B4uL-04.4 **AxRSU: Approximate Radix-4 Squarer Unit** **1655**
Morgana M.A. da Rosa[1], Guilherme Paim[4], Jorge Castro-Godínez[2], Eduardo A. C. da Costa[3], Rafael I. Soares[1], Sergio Bampi[4]
[1]Federal University of Pelotas Brazil; [2]Instituto Tecnológico de Costa Rica, Costa Rica;
[3]Catholic University of Pelotas, Brazil; [4]Federal University of Rio Grande do Sul, Brazil

B4uL-05 Nonlinear Systems and Complex Networks IV (Virtual USA)

Time: Tuesday, May 31 (16:30-18:00)
Place: Room 5
Chair(s): Ljiljana Trajković, *Simon Fraser University*

16:30
B4uL-05.1 **Comparison of Virtual Network Embedding Algorithms for Data Center Networks** **1660**
Hardeep Kaur Takhar, Ana Laura Gonzalez Rios, Ljiljana Trajković
Simon Fraser University, Canada

16:48
B4uL-05.2 **Efficient Sound Event Localization and Detection in the Quaternion Domain**
Christian Brignone, Gioia Mancini, Eleonora Grassucci, Aurelio Uncini, Danilo Comminiello
Sapienza University of Rome, Italy

17:06
B4uL-05.3 **A CMOS Compatible Bistable Resistively-Coupled Ising Machine-BRIM** **1665**
Yiqiao Zhang, Richard Afoakwa, Uday Kumar Reddy Vengalam, Michael Huang, Zeljko Ignjatovic
University of Rochester, United States

17:24
B4uL-05.4 **A Low-Complexity Method to Address Process Variability in True Random Number Generators Based on Digital Nonlinear Oscillators** **1670**
T. Addabbo[1], A. Fort[1], M. Mugnaini[1], R. Moretti[1], V. Vignoli[1], D. Papini[2]
[1]Università degli Studi di Siena, Italy; [2]Università degli Studi di Udine, Italy

B4uL-06 Energy Efficient and Reconfigurable Hardware (Virtual USA)

Time: Tuesday, May 31 (16:30-18:00)
Place: Room 6
Chair(s): Oscar Moreira, *Texas A&M University*

16:30
B4uL-06.1 **A Resource-Saving Energy-Efficient Reconfigurable Hardware Accelerator for BERT-Based Deep Neural Network Language Models Using FFT Multiplication** **1675**
Rodrigue Rizk, Dominick Rizk, Frederic Rizk, Ashok Kumar, Magdy Bayoumi
University of Louisiana at Lafayette, United States

16:48
B4uL-06.2 **An Economic Uniqueness-Improved Reliable Reconfigurable RO PUF for IoT Security** **1680**
Dominick Rizk, Rodrigue Rizk, Frederic Rizk, Ashok Kumar
University of Louisiana at Lafayette, United States

17:06
B4uL-06.3 **A Cost-Efficient Reversible-Based Reconfigurable Ring Oscillator Physical Unclonable Function** **1685**
Frederic Rizk, Dominick Rizk, Rodrigue Rizk, Ashok Kumar
University of Louisiana at Lafayette, United States

17:24
B4uL-06.4 **An Open-Source Co-Processor for Solving Lotka-Volterra Equations** **1690**
Andrew Hollabough, Dwaipayan Chakraborty
Rowan University, United States

17:42
B4uL-06.5 **An Implementation of a Low Complexity Integer Carrier Frequency Offset Estimator for OFDM** **1695**
Daniel Garcia Urdaneta, Claudio Ferreira Dias, Fabio Kelm Pereira, Leonardo Sulato de Moraes, André Távora, Eduardo Rodrigues De Lima
Eldorado Research Institute, Brazil

C1uL-01 PLL Circuits (Virtual USA)

Time: Wednesday, June 1 (8:00-9:30)
Place: Room 1
Chair(s): Igor Filanovsky, *University of Alberta*
Elkim Roa-Fuentes, *Universidad Industrial de Santander*

8:00
C1uL-01.1 **A Dual VCO Based L5/S Band PLL with Extended Range Divider for IRNSS Application** 1699
Rizwan Shaik Peerla[1], Purushothama Chary[1], Ashudeb Dutta[1], Bibhu Datta Sahoo[2]
[1]Indian Institute of Technology Hyderabad, India; [2]Indian Institute of Technology Kharagpur, India

8:18
C1uL-01.2 **A Radiation-Hardened Frequency-Locked Loop On-Chip Oscillator with 33.6ppm/°C Stability for Space Applications** 1704
F. Passos[1], R. Vieira[1], A. Canelas[1], R. Póvoa[1,2], N. Lourenço[1], N. Horta[1], J. Guilherme[1,3]
[1]Instituto de Telecomunicações, Portugal; [2]Escola Superior Nautica Infante D. Henrique, Portugal; [3]Escola Superior de Tecnologia de Tomar, Portugal

8:36
C1uL-01.3 **Reference Spur Reduction in Sampled-Loop Filter PLLs by Oversampling** 1709
Chembiyan Thambidurai, Preetham N. Reddy, Raghurama Gunaje
Birla Institute of Technology and Science, Pilani, India

8:54
C1uL-01.4 **A Low-Ripple Resistor-Less Hybrid Loop Filter Based PLL in 3nm FinFET** 1714
Ping Lu, Charlie Boecker, Bupesh Pandita, Minhan Chen, Sheethal Nayak
Microsoft Corporation, United States

9:12
C1uL-01.5 **Design Considerations for Time-Modulated Injection-Locked Phase Interpolators and Rotators** 1719
Yi Fan Zhang[1], Joshua Liang[2], Tony Chan Carusone[1]
[1]University of Toronto, Canada; [2]Alphawave IP, Canada

C1uL-02 Hardware Security and Design Automation (Virtual USA)

Time: Wednesday, June 1 (8:00-9:30)
Place: Room 2
Chair(s): Malgorzata Chrzanowska-Jeske, *Portland State University*
Naeem Abbasi, *Qualcomm*

8:00
C1uL-02.1 **Mitigating EM Side-Channel Attacks with Dynamic Delay Insertion and Data Bus Inversion** 1724
Minmin Jiang[1], Eleni Maragkoudaki[1], Vasilis F. Pavlidis[1,2]
[1]University of Manchester, United Kingdom; [2]Aristotle University of Thessaloniki, Greece

8:18
C1uL-02.2 **A Hierarchical Parallel Discrete Gaussian Sampler for Lattice-Based Cryptography** 1729
Sirui Shen[1], Wenqing Song[1], Xinyu Wang[1], Xinyu Shao[1], Yuxiang Fu[1], Zhonghai Lu[2], Li Li[1]
[1]Nanjing University, China; [2]KTH Royal Institute of Technology, Sweden

8:36
C1uL-02.3 **Synthesis of Coupling Capacitance Based Hidden State Transitions for Sequential Logic Locking** 1734
Pratik Shrestha, Ioannis Savidis
Drexel University, United States

C1uL-03 Biomedical Circuits and Systems (Virtual USA)

Time: Wednesday, June 1 (8:00-9:30)
Place: Room 3
Chair(s): Aydin Karsilayan, *Texas A&M University, USA*

C1uL-04 Education in Circuits and Systems (Virtual USA)

Time: Wednesday, June 1 (8:00-9:30)
Place: Room 4
Chair(s): Ljiljana Trajković, *Simon Fraser University*
Wolfgang Mathis, *Leibniz University Hannover*

C1uL-05 Algorithms and Hardware for Low-Complexity Visual Signal Processing (Virtual USA)

Time: Wednesday, June 1 (8:00-9:30)
Place: Room 5
Chair(s): Guilherme Ribeiro Corrêa, *Federal University of Pelotas (UFPel), Brazil*

C1uL-06 Circuits for Machine Learning and Hardware Security II and Edge Intelligence (Virtual USA)

Time: Wednesday, June 1 (8:00-9:30)
Place: Room 6
Chair(s): Paul Gratz, *Texas A&M University*

8:00
C1uL-06.1 **Tiny ci-SAR A/D Converter for Deep Neural Networks in Analog In-Memory Computation** 1823
Michele Caselli[1,2,3], Debjyoti Bhattacharjee[2], Arindam Mallik[2], Peter Debacker[2], Diederik Verkest[2]
[1]Katholieke Universiteit Leuven, Belgium; [2]imec, Belgium; [3]University of Parma, Italy

8:18
C1uL-06.2 **Hybrid CMOS-RRAM Spiking CNNs with Time-Domain Max-Pooling and Integrator Re-Use** 1828
Anuar Dorzhigulov, Shubham Mishra, Vishal Saxena
University of Delaware, United States

8:36
C1uL-06.3 **Towards Enabling Dynamic Convolution Neural Network Inference for Edge Intelligence** 1833
Adewale Adeyemo, Travis Sandefur, Tolulope A. Odetola, Syed Rafay Hasan
Tennessee Technological University, United States

8:54
C1uL-06.4 **Efficient Fine-Tuning of BERT Models on the Edge** 1838
Danilo Vucetic, Mohammadreza Tayaranian, Maryam Ziaeefard, James J. Clark,
Brett H. Meyer, Warren J. Gross
McGill University, Canada

C2uL-01 RF Receiver Circuits (Virtual USA)

Time: Wednesday, June 1 (14:00-15:30)
Place: Room 1
Chair(s): Elkim Roa-Fuentes, *Universidad Industrial de Santander*
Arindam Sanyal, *Arizona State University*

14:00
C2uL-01.1 **Super-Regenerative Receiver for OFDM Communication** 1843
F. Xavier Moncunill-Geniz, Jordi Bonet-Dalmau, Francisco del Águila-López,
Ilker Demirkol, Pere Palà-Schönwälder
Universitat Politècnica de Catalunya, Spain

14:18
C2uL-01.2 **Rapid Spectrum Sweeping Scanner Exploiting Mixer Harmonics for Cognitive Radio Applications** 1848
Amr Abdelhamid[1], Murat Torlak[2], Won Namgoong[1]
[1]State University of New York at Albany, United States; [2]The University of Texas at Dallas, United States

14:36
C2uL-01.3 **A Quadrature Hybrid Transimpedance-Amplifier-Based Mixer-First Receiver** 1853
Erez Zolkov, Emanuel Cohen
Technion - Israel Institute of Technology, Israel

14:54
C2uL-01.4 **A Widely-Tunable RF Receiver Employing Synthetic Diversity for Interference Mitigation** 1858
Sanaz Sadeghi, Sweta Soni, Alyosha Molnar
Cornell University, United States

C2uL-02 Unconventional Computing Techniques for Emerging Technology Applications II (Virtual USA)

Time: Wednesday, June 1 (14:00-15:30)
Place: Room 2
Chair(s): Nikos Temenos, *National Technical University of Athens, Greece*
Paul Sotiriadis, *University of California, San Diego*

C2uL-03 Implantable and Intraoperative Biomedical Circuits and Systems (Virtual USA)

Time: Wednesday, June 1 (14:00-15:30)
Place: Room 3
Chair(s): Aydin Karsilayan, *Texas A&M University, USA*

C2uL-04 Regulators and References (Virtual USA)

Time: Wednesday, June 1 (14:00-15:30)
Place: Room 4
Chair(s): Tawfiq Musah, *Ohio State University*
Shahriar Mirabbasi, *University of British Columbia*

C2uL-05 Video Coding Beyond the Standardization of Versatile Video Coding (Virtual USA)

Time: Wednesday, June 1 (14:00-15:30)
Place: Room 5
Chair(s): Peng Yin, *Dolby Labs*

14:00
C2uL-05.1 **Advanced Block Partitioning Methods Beyond VVC** **1928**
Kai Zhang, Li Zhang, Zhipin Deng, Na Zhang, Yang Wang
Bytedance Inc., United States

14:18
C2uL-05.2 **Multi-Level Latent Fusion in Learning-Based Image Coding** **1933**
Jay N. Shingala[1], Arunkumar Mohananchettiar[1], Pankaj Sharma[1], Peng Yin[2], Arjun Arora[2], Sean McCarthy[2], Taoran Lu[2], Fangjun Pu[2]
[1]Ittiam Systems, India; [2]Dolby Laboratories Inc., United States

14:36
C2uL-05.3 **Optimized Bit Allocation for Learning-Based Video Compression** **1938**
Zhaobin Zhang, Yue Li, Kai Zhang, Li Zhang, Yuwen He
Bytedance Inc., United States

14:54
C2uL-05.4 **pyNeurode: A Real-Time Neural Signal Processing Framework** **1943**
Wing-Kin Tam, Matthew F. Nolan
University of Edinburgh, United Kingdom

C2uL-06 Video Encoder Control and Neural Network Implementation (Virtual USA)

Time: Wednesday, June 1 (14:00-15:30)
Place: Room 6
Chair(s): Daniel Palomino, *Federal University of Pelotas (UFPel), Brazil*

14:00
C2uL-06.1 **Fast Transform Decision Scheme for VVC Intra-Frame Prediction Using Decision Trees** **1948**
Mário Saldanha[1], Gustavo Sanchez[2], César Marcon[3], Luciano Agostini[1]
[1]Universidade Federal de Pelotas, Brazil; [2]Instituto Federal Farroupilha, Brazil; [3]Pontifical Catholic University of Rio Grande do Sul, Brazil

14:18
C2uL-06.2 **CNN-Based Partitioning Structure Prediction for VVC Intra Speedup: Bottom-Up-Based and Top-Down-Based** **1953**
Yue Li, Li Zhang, Jizheng Xu
Bytedance Inc., United States

14:36
C2uL-06.3 **Fast Affine Motion Estimation for VVC Using Machine-Learning-Based Early Search Termination** **1958**
Adson Duarte, Paulo Gonçalves, Luciano Agostini, Bruno Zatt, Guilherme Corrêa, Marcelo Porto, Daniel Palomino
Universidade Federal de Pelotas, Brazil

C3uL-01 RF and Microwave Circuits (Virtual USA)

Time: Wednesday, June 1 (16:00-17:30)
Place: Room 1
Chair(s): Arindam Sanyal, *Arizona State University*
Shahriar Mirabbasi, *University of British Columbia*

C3uL-02 Emergent Devices, Circuits and Applications (Virtual USA)

Time: Wednesday, June 1 (16:00-17:30)
Place: Room 2
Chair(s): Themistoklis Prodromakis, *Southampton University*

16:00
C3uL-02.1 **Logic Gate for Sequenced Data with Nonlinear Nanomechanical Resonator Driven by Weak Signals** 1998
Yukihiro Tadokoro[1], Hiroya Tanaka[2]
[1]Toyota Central R&D Labs., Inc., Toyota Research Institute of North America, United States; [2]Toyota Central R&D Labs., Inc., Japan

16:18
C3uL-02.2 **Superconductive Logic Using 2Φ-Josephson Junctions with Half Flux Quantum Pulses**
Issa Salameh[1], Eby G. Friedman[2], Shahar Kvatinsky[1]
[1]Technion - Israel Institute of Technology, Israel; [2]University of Rochester, United States

16:36
C3uL-02.3 **A Wide Dynamic Range Read-Out System for Resistive Switching Technology** 2003
Lijie Xie, Jiawei Shen, Andrea Mifsud, Chaohan Wang, Abdulaziz Alshaya, Christos Papavassiliou
Imperial College London, United Kingdom

16:54
C3uL-02.4 **Resolving Unusual Gate Current and Dielectric Breakdown of Solution Processed Carbon Nanotube Thin Film Transistor** 2008
Sean F. Romanuik, Bishakh Rout, Pierre-Luc Girard-Lauriault, Sharmistha Bhadra
McGill University, Canada

C3uL-03 Efficient Circuits and Systems for Visual Signal Coding, Processing, and Communications (Virtual Asia)

Time: Wednesday, June 1 (16:00-17:30)
Place: Room 3
Chair(s): Yibo Fan, *Fudan University, China*

16:00
C3uL-03.1 **An Area-Efficient Unified Transform Architecture for VVC** 2012
Zhijian Hao[1], Qi Zheng[1], Yibo Fan[1], Guoqing Xiang[2], Peng Zhang[2], Heming Sun[3,4]
[1]Fudan University, China; ;[2]Peking University, China; [3]Waseda University, Japan;[4]JST PRESTO, Japan

16:18
C3uL-03.2 **A 3.1 Gbin/s Advanced Entropy Coding Hardware Design for AVS3** 2017
Yujie Cai[1], Wei Li[1], Xiaoyang Zeng[1], Yibo Fan[1], Peng Zhang[2], Guoqing Xiang[2], Haibing Yin[3]
[1]Fudan University, China; [2]Peking University, China; [3]Hangzhou Dianzi University, China

16:36
C3uL-03.3 **UCViT: Hardware-Friendly Vision Transformer via Unified Compression** 2022
HongRui Song, Ya Wang, Meiqi Wang, Zhongfeng Wang
Nanjing University, China

16:54
C3uL-03.4 **Intra Encoding Complexity Control with a Time-Cost Model for Versatile Video Coding** 2027
Yan Huang[1], Jizheng Xu[2], Li Zhang[2], Yan Zhao[1], Li Song[1]
[1]Shanghai Jiao Tong University, China; [2]Bytedance Inc., United States

C3uL-04 Amplifiers and Read-Out Circuits (Virtual USA)

Time: Wednesday, June 1 (16:00-17:30)
Place: Room 4
Chair(s): Tawfiq Musah, *Ohio State University*
Igor Filanovsky, *University of Alberta*

C3uL-05 TCAS Papers: Circuits and Systems II (Virtual USA)

Time: Wednesday, June 1 (16:00-17:30)
Place: Room 5
Chair(s): Aydin Karsilayan, *Texas A&M University, USA*

16:36
C3uL-05.3 **How to Build a Memristive Integrate-and-Fire Model for Spiking Neuronal Signal Generation**
Sung-Mo Kang[1], Donguk Choi[1], Jason K. Eshraghian[3], Peng Zhou[1], Jieun Kim[5], Bai-Sun Kong[5], Xiaojian Zhu[2], Ahmet S. Demirkol[4], Alon Ascoli[4], Ronald Tetzlaff[4], Wei D. Lu[3], Leon Chua[6]
[1]University of California, Santa Cruz, United States; [2]Institute of Materials Technology, Chinese Academy of Sciences, China; [3]University of Michigan, Ann Arbor, United States; [4]Technische Universität Dresden, Germany; [5]SungKyunKwan University, Korea; [6]University of California, Berkeley, United States

16:54
C3uL-05.4 **NoPUF: A Novel PUF Design Framework Towards Modeling Attack Resistant PUFs**
Antian Wang[1], Weihang Tan[1], Yuejiang Wen[2], Yingjie Lao[1]
[1]Clemson University, United States; [2]North Carolina State University, United States

17:12
C3uL-05.5 **PhaseCamouflage: Leveraging Adiabatic Operation to Thwart Reverse Engineering**
Ivan Miketic, Emre Salman
State University of New York at Stony Brook, United States

C3uL-06 Error Correction Codes and Compute-in-Memory (Virtual USA)

Time: Wednesday, June 1 (16:00-17:30)
Place: Room 6
Chair(s): Hoyoung Yoo, *Chungnam National University, South Korea*

16:00
C3uL-06.1 **High-Throughput Split-Tree Architecture for Nonbinary SCL Polar Decoder** 2057
Yaoyu Tao, Cedric Choi
Qualcomm Wireless R&D, United States

16:18
C3uL-06.2 **Efficient Check Node Processing for Min-Max NB-LDPC Decoding over Lower-Order Finite Fields** 2062
Xinmiao Zhang
The Ohio State University, United States

16:36
C3uL-06.3 **Efficient Nested Key Equation Solver for Short Generalized Integrated Interleaved BCH Codes** 2067
Zhenshan Xie, Xinmiao Zhang
The Ohio State University, United States

Virtual Region 10 Friendly Time (UTC-8)

A1aL-01 Smart Sensors and Sensory Systems II (Virtual Asia)

Time: Monday, May 30 (9:00-10:30)
Place: Room 1
Chair(s): Xiaojin Zhao, *Shenzhen University*
Cheng-Ta Chiang, *National Chia Yi University*

9:00
A1aL-01.1 **System-Level Modeling and Design of a Temperature Compensated CMOS MEMS Thermal Flow Sensor** 2072
Zhijuan Li[1], Zetao Fang[1], Bo Wang[2], Moaaz Ahmed[2], Xiaofang Pan[1], Su-Ting Han[1], Xiaojin Zhao[1], Wei Xu[1]
[1]Shenzhen University, China; [2]Hamad Bin Khalifa University, Qatar

A1aL-02 Data Path and Arithmetic Circuits and Systems I (Virtual Asia)

Time: Monday, May 30 (9:00-10:30)
Place: Room 2
Chair(s): Duncan Elliott, *The University of Alberta*
Robert Chen-Hao Chang, *National Chung Hsing University*

A1aL-03 Experimental Teaching Systems II (Virtual Asia)

Time: Monday, May 30 (9:00-10:30)
Place: Room 3
Chair(s): Mohsin M. Jamali, *The University of Texas Permian Basin*

9:00
A1aL-03.1 **Cross-Grade Curriculum Group Based Teaching Experiment System for Innovative Design of IoT Intelligent Dynamic Measurement and Control** 2122
Yu Zhang, Hongqing Ma, Peihong Li, Xihua Li, Xiangdong Jin, Qimin Zhou, Xiaoxing Shi, Xinyu Jin, Huizhong Li
Zhejiang University, China

9:18
A1aL-03.2 **Project-Based Learning: Bridging the Gap between Algorithm and Architecture in Neural Network Course** 2127
Heming Sun[1,2], Lu Yu[3]
[1]Waseda University, Japan; [2]JST PRESTO, Japan; [3]Zhejiang University, China

9:36
A1aL-03.3 **Design of Network Security Experiment Teaching System Based on Honeypot Technology** 2132
Chen Zhu[1], Qiang Li[1], Bin Sun[1], Xinyu Jin[1], Yusun Zhou[2], Muhan Xie[1]
[1]Zhejiang University, China; [2]Zhejiang University City College, China

9:54
A1aL-03.4 **Addressing Retention and Improving Performance in Gateway Engineering Courses** 2137
Mohsin M. Jamali, Sepehr Arbabi, Hossein Hosseini, Harishchandra Aryal
The University of Texas Permian Basin, United States

10:12
A1aL-03.5 **Systematic Development of CMOS Fixed-Transconductance Bias Circuits**
Shanthi Pavan
Indian Institute of Technology Madras, India

A1aL-04 Spiking Neural Networks and Systems (Virtual Asia)

Time: Monday, May 30 (9:00-10:30)
Place: Room 4
Chair(s): Jörg Velten, *Bergische University Wuppertal*
Timir Datta, *Feinstein Institutes*

9:00
A1aL-04.1 **Unsupervised Learning Based on Temporal Coding Using STDP in Spiking Neural Networks** 2142
Congyi Sun[1], Qinyu Chen[2], Kai Chen[1], Guoqiang He[1], Yuxiang Fu[1], Li Li[1]
[1]Nanjing University, China; [2]University of Shanghai for Science and Technology, China

9:18
A1aL-04.2 **A Compact Online-Learning Spiking Neuromorphic Biosignal Processor** 2147
Chaoming Fang[1,2], Ziyang Shen[2,3], Fengshi Tian[2,4], Jie Yang[2], Mohamad Sawan[2]
[1]Zhejiang University, China; [2]Westlake University, China; [3]Fudan University, China; [4]Hong Kong University of Science and Technology, China

9:36
A1aL-04.3 **A Spiking Neural Network with Resistively Coupled Synapses Using Time-to-First-Spike Coding Towards Efficient Charge-Domain Computing** 2152
Yusuke Sakemi[1], Kai Morino[2], Takashi Morie[3], Takeo Hosomi[4], Kazuyuki Aihara[5]
[1]Chiba Institute of Technology, Japan; [2]Kyushu University, Japan; [3]Kyushu Institute of Technology, Japan; [4]NEC Corporation, Japan; [5]The University of Tokyo, Japan

A1aL-05 Wireless and Wireline Communications II (Virtual Asia)

Time: Monday, May 30 (9:00-10:30)
Place: Room 5
Chair(s): Xiangyu Meng, *Sun Yat-Sen University*
Junghwan Han, *Chungnam National University*

A1aL-06 Renewable Energy System (Virtual Asia)

Time: Monday, May 30 (9:00-10:30)
Place: Room 6
Chair(s): Dong Liu, *The City University of Hong Kong*

9:18
A1aL-06.2 **Impedance Model and Stability Analysis of Offshore Wind Farm via AC Submarine Cable** 2197
Jiaqi Yang[1], Zhen Li[1], Bin Liu[3], Chengze Li[2], He Li[2], Xiangdong Liu[1]
[1]Beijing Institute of Technology, China; [2]Shenyang Polytechnic College, China; [3]Tsinghua University, China

9:36
A1aL-06.3 **I-V Curve Tracer Based Intermittent Maximum Power Point Tracking for Photovoltaic System** 2202
Jonghyun Park, Yun Chan Im, Yong Sin Kim
Korea University, Korea

9:54
A1aL-06.4 **HERIC Based PV Inverter Using Partial Sinewave Tracking Dual Mode Control** 2206
Kazunori Ito, Hirotaka Koizumi
Tokyo University of Science, Japan

10:12
A1aL-06.5 **A Novel Approach to the Maximum Peak Power Tracking under Partial Shading Conditions** 2210
Imran Pervez, Charalampos Antoniadis, Yehia Massoud
King Abdullah University of Science and Technology, Saudi Arabia

A1aL-07 RF Circuits and Systems (Virtual Asia)

Time: Monday, May 30 (9:00-10:30)
Place: Room 7
Chair(s): Jusung Kim, *Hanbat National University*

9:00
A1aL-07.1 **A Two-Way Current-Combining W-Band Power Amplifier Achieving 17.4-dBm Output Power with 19.4% PAE in 65-nm Bulk CMOS** 2215
Zhiyang Zhang, Xi Wang, Junyan Ren, Shunli Ma
Fudan University, China

A2aL-01 TCAS Papers: Circuits and Systems I (Virtual Asia)

Time: Monday, May 30 (10:45-12:15)
Place: Room 1
Chair(s): Jose Silva-Martinez, *Texas A&M University*

10:45
A2aL-01.1 **A Foreground Calibration for M-Channel Time-Interleaved Analog-to-Digital Converters Based on Genetic Algorithm**
Yang Azevedo Tavares, Minjae Lee
Gwangju Institute of Science and Technology, Korea

11:03
A2aL-01.2 **A Reconfigurable Differential-to-Single-Ended Autonomous Current Adaptation Buffer Amplifier Suitable for Biomedical Applications**
Zu-Jia Lo[1], Yuan-Chuan Wang[1], Yun-Jieper Huang[1], Ren-Yong Hung[1], Yi-Heng Wu[1], Tzu-Yun Wang[1], Yang-Jing Huang[1], Hui-Chun Huang[1], Yu-Cheng Lu[1], Sheng-Yu Peng[1], Chia-Yuan Chang[2], Wen-Sung Lai[2], Yu-Juei Hsu[3]
[1]National Taiwan University of Science and Technology, Taiwan; [2]National Taiwan University, Taiwan; [3]National Defense Medical Center, Taiwan

11:21
A2aL-01.3 **TMS-Crossbars with Tactile Sensing**
R. Chitra, A.R. Aswani, A.P. James
Digital University Kerala, India

A2aL-02 TCAS Papers: Advanced Design Techniques (Virtual Asia)

Time: Monday, May 30 (10:45-12:15)
Place: Room 2
Chair(s): Zhiyong Zhang, *Texas A&M University*

10:45
A2aL-02.1 **Dynamic Range Enhancement via Linearized Output in Nanoelectromechanical Systems by Combining High-Order Harmonics**
Keita Funayama[1], Hiroya Tanaka[1], Keiichi Shimaoka[1], Yukihiro Tadokoro[1], Jun Hirotani[2], Yutaka Ohno[2]
[1]Toyota Central R&D Labs., Inc., Japan; [2]Nagoya University, Japan

11:03
A2aL-02.2 **Shift Register with Coupled Bidirectional Bifurcation Amplifiers**
Hiroya Tanaka, Yukihiro Tadokoro
Toyota Central R&D Labs., Inc., Japan

11:21
A2aL-02.3 **High Performance Deterministic Stochastic Computing Using Residue Number System**
Kamyar Givaki[1], Reza Hojabr[2], M. H. Gholamrezaei[3], Ahmad Khonsari[1], Saeid Gorgin[3], Dara Rahmati[4], M. Hassan Najafi[5]
[1]University of Tehran, Iran; [2]Simon Fraser University, Canada; [3]Chosun University, Korea; [4]Shahid Beheshti University, Iran; [5]University of Louisiana at Lafayette, United States

A2aL-03 Sensors, Memories and Edge AI Accelerators for Biomedical and Healthcare (Virtual Asia)

Time: Monday, May 30 (10:45-12:15)
Place: Room 3
Chair(s): Zhiyong Zhang, *Texas A&M University*

10:45
A2aL-03.1 **Energy-Efficient Intelligent Pulmonary Auscultation for Post COVID-19 Era Wearable Monitoring Enabled by Two-Stage Hybrid Neural Network** 2220
Bingqiang Liu[1], Ziyuan Wen[1], Hongling Zhu[1], Jinsheng Lai[1], Jiajun Wu[1], Heng Ping[1], Wenqing Liu[2], Guoyi Yu[1], Jianmin Zhang[2], Zuozhu Liu[3], Hesong Zeng[1], Chao Wang[1]
[1]Huazhong University of Science and Technology, China; [2]Jianghan University, China; [3]Zhejiang University, China

11:03
A2aL-03.2 **Silk Piezoelectric Tactile Sensors: The Way Forward to Developing Intelligent Implantable Sensors** 2225
Satish Bonam[1], Jose Joseph[2], Aditya Bhagavathi[1], Shiv Govind Singh[1], Siva Rama Krishna Vanjari[1]
[1]Indian Institute of Technology Hyderabad, India; [2]Digital University Kerala, India

A2aL-04 Recent Progress in Theory and Applications of Memristive Technologies Toward a New Era in Electronic V (Virtual Asia)

Time: Monday, May 30 (10:45-12:15)
Place: Room 4
Chair(s): Esteban Tlelo Cuautle, *INAOE, Mexico*

10:45
A2aL-04.1 **Entrenching Decision Trees in a Robust Molecular Circuit Element** 2229
T Venkatesan[1], Sreebrata Goswami[2], R. Stanley Williams[3], Sreetosh Goswami[4]
[1]University of Oklahoma, United States; [2]Indian Association for the Cultivation of Science, India; [3]Texas A&M University, United States; [4]Indian Institute of Science Bangalore, India

11:03
A2aL-04.2 **Molecular Building Blocks for Non-Linear Circuits** **2233**
T. Venkatesan[1], R. Stanley Williams[2], Sreebrata Goswami[3], Sreetosh Goswami[4]
[1]University of Oklahoma, United States; [2]Texas A&M University, United States; [3]Indian Association for the Cultivation of Science, India; [4]Indian Institute of Science Bangalore, India

11:21
A2aL-04.3 **Compact Thermo-Diffusion Based Physical Memristor Model** **2237**
Iosif-Angelos Fyrigos[1], Theodoros Panagiotis Chatzinikolaou[1], Vasileios Ntinas[1,3], Stavros Kitsios[2], Panagiotis Bousoulas[2], Michail-Antisthenis Tsompanas[1], Dimitris Tsoukalas[2], Andrew Adamatzky[4], Antonio Rubio[3], Georgios Ch. Sirakoulis[1]
[1]Democritus University of Thrace, Greece; [2]National Technical University of Athens, Greece; [3]Universitat Politècnica de Catalunya, Spain; [4]University of the West of England, United Kingdom

A2aL-05 Cryptography and Hardware Security I (Virtual Asia)

Time: Monday, May 30 (10:45-12:15)
Place: Room 5
Chair(s): Dur-e-Shahwar Kundi, *Queen's University Belfast*
Chuan Zhang, *Southeast University*

10:45
A2aL-05.1 **Efficient VLSI Architecture of Bluestein's FFT for Fully Homomorphic Encryption** **2242**
Shi-Yong Wu, Kuan-Yu Chen, Ming-Der Shieh
National Cheng Kung University, Taiwan

11:03
A2aL-05.2 **Non-Profiling Based Correlation Optimization Deep Learning Analysis** **2246**
Juncheng Chen, Jun-Sheng Ng, Nay Aung Kyaw, Ne Kyaw Zwa Lwin, Kwen-Siong Chong, Zhiping Lin, Joseph Sylvester Chang, Bah-Hwee Gwee
Nanyang Technological University, Singapore

11:21
A2aL-05.3 **A Lightweight and Efficient Schoolbook Polynomial Multiplier for Saber** **2251**
Yuantuo Zhang[1], Yijun Cui[1], Ziyin Ni[1], Dur-E-Shahwar Kundi[2], Dongsheng Liu[3], Weiqiang Liu[1]
[1]Nanjing University of Aeronautics and Astronautics, China; [2]Queen's University Belfast, United Kingdom; [3]Huazhong University of Science and Technology, China

11:39
A2aL-05.4 **An Asynchronous-Logic Masked Advanced Encryption Standard (AES) Accelerator and its Side-Channel Attack Evaluations** **2256**
Jun-Sheng Ng, Juncheng Chen, Nay Aung Kyaw, Ne Kyaw Zwa Lwin, Kwen-Siong Chong, Joseph Chang, Bah-Hwee Gwee
Nanyang Technological University, Singapore

A2aL-06 Nonlinear Systems and Complex Networks II (Virtual Asia)

Time: Monday, May 30 (10:45-12:15)
Place: Room 6
Chair(s): Wei Xing Zheng, *Western Sydney University*

10:45
A2aL-06.1 **Multi-Robot Formation Control Using Collective Behavior Model and Reinforcement Learning** **2261**
Jung-Chun Liu, Tsung-Te Liu
National Taiwan University, Taiwan

A3aL-02 Machine Learning for Neural Applications (Virtual Asia)

Time: Monday, May 30 (14:00-15:30)
Place: Room 2
Chair(s): Milutin Stanaćević, *Stony Brook University*
Samson Yu, *Deakin University*

14:00
A3aL-02.1 **Short Floating-Point CNN Accelerator for Brain-Computer Interface to Decode Visual Information** 2299
Shin-Ichi O'uchi, Ryusuke Hayashi
National Institute of Advanced Industrial Science and Technology, Japan

14:18
A3aL-02.2 **SaleNet: A Low-Power End-to-End CNN Accelerator for Sustained Attention Level Evaluation Using EEG** 2304
Chao Zhang[1], Zijian Tang[1], Taoming Guo[1], Jiaxin Lei[1], Jiaxin Xiao[1], Anhe Wang[2], Shuo Bai[2], Milin Zhang[1]
[1]Tsinghua University, China; [2]Chinese Academy of Sciences, China

14:36
A3aL-02.3 **Multiphysiological Shallow Neural Network-Based Mental Stress Detection System for Wearable Environment** 2309
Muhammad Sheeraz, Abdul Rehman Aslam, Muhammad Awais Bin Altaf
Lahore University of Management Sciences, Pakistan

14:54
A3aL-02.4 **A Miniaturized Flexible Functional Near-Infrared Spectroscopy System for Obstructive Sleep Apnea Detection** 2314
Xude Huang, Shuwei Zhang, Chen Chen, Wei Chen
Fudan University, China

15:12
A3aL-02.5 **A 73μW Single Channel Photoplethysmography-Based Blood Pressure Estimation Processor** 2318
Abdul Rehman, Muhammad Awais Bin Altaf, Wala Saadeh
Lahore University of Management Sciences, Pakistan

A3aL-03 Image Processing and Fast Transform (Virtual Asia)

Time: Monday, May 30 (14:00-15:30)
Place: Room 3
Chair(s): Daniel Lun, *Hong Kong Polytechnic University*
Soontorn Oraintara, *Mahidol University*

14:00
A3aL-03.1 **Multispectral and Multimodal Image Registration Based on a Dynamic Fusion Index** 2323
Junxue Zheng, Cheolkon Jung
Xidian University, China

14:18
A3aL-03.2 **Multi-Scale Adaptive Dual Attention for Image Defocus Blur Detection** 2328
Yue Li, Xuechun Han, Wei Wang
Nankai University, China

14:36
A3aL-03.3 **SUNet: Swin Transformer UNet for Image Denoising** 2333
Chi-Mao Fan[1], Tsung-Jung Liu[1], Kuan-Hsien Liu[2]
[1]National Chung Hsing University, Taiwan; [2]National Taichung University of Science and Technology, Taiwan

14:54
A3aL-03.4 **An End-to-End Computer Vision System Architecture** 2338
Ling Zhang, Wei Zhou, Xiangyu Zhang, Xin Lou
ShanghaiTech University, China

15:12
A3aL-03.5 **Energy-Efficient Fast Fourier Transform for Real-Valued Applications**
Charalampos Eleftheriadis, Georgios Karakonstantish
Queen's University Belfast, United Kingdom

A3aL-04 Neuromorphic and Event-Based Systems/Applications (Virtual Asia)

Time: Monday, May 30 (14:00-15:30)
Place: Room 4
Chair(s): Deepu John, *University College Dublin*
Dongsheng Yu, *University of Mining and Technology*

14:00
A3aL-04.1 **An MPSoC-Based On-Line Edge Infrastructure for Embedded Neuromorphic Robotic Controllers** ... 2343
E. Piñero-Fuentes, S. Canas-Moreno, A.P. Ríos-Navarro, D. Cascado-Caballero,
Á. Jiménez-Fernández, A. Linares-Barranco
University of Seville, Spain

14:18
A3aL-04.2 **Comparison of the Resilience of Convolutional and Cellular Neural Networks against Adversarial Attacks** 2348
András Horváth
Pázmány Péter Catholic University, Hungary

14:36
A3aL-04.3 **Hotspot Prediction of Network-on-Chip for Neuromorphic Processor with Liquid State Machine** 2353
Ziyang Kang, Xun Xiao, Shiming Li, Lei Wang, Yao Wang
National University of Defense Technology, China

14:54
A3aL-04.4 **Improve 3D Feature Extraction and Fusion for Stage Diagnosis of Alzheimer's Disease** 2358
Mingjin Liu, Wenxin Yu, Jialiang Tang, Ning Jiang, Kang Xu, Chang Liu
Southwest University of Science and Technology, China

15:12
A3aL-04.5 **Exploring the Impact of Adding Adversarial Perturbation Onto Different Image Regions** 2363
Ruijie Yang, Yuanfang Guo, Ruikui Wang, Xiaohan Zhao, Yunhong Wang
Beihang University, China

A3aL-05 Intelligent Analysis and Decision-Making of Large-Scale Nonlinear Complex Systems I (Virtual Asia)

Time: Monday, May 30 (14:00-15:30)
Place: Room 5
Chair(s): Hassan Najafi, *University of Louisiana*

14:00
A3aL-05.1 **Pearson Correlation Coefficient-Based Performance Enhancement of Broad Learning System for Stock Price Prediction**
Guanzhi Li[1], Aining Zhang[1], Qizhi Zhang[1], Di Wu[2], Choujun Zhan[1]
[1]South China Normal University, China; [2]Norwegian University of Science and Technology, Norway

14:18
A3aL-05.2 **Event-Based Resilient Consensus of Second-Order Multi-Agent Systems under DoS Attacks** 2368
Mei Sun, Deguang Lyu, Qiang Jia
Jiangsu University, China

14:36
A3aL-05.3 **Delay Propagation for a High-Speed Railway Network with the Consideration of Primary Delay Derivation** 2373
Wenbo Lian[1], Xingtang Wu[1,2], Min Zhou[1], Qingpei Duan[3], Hairong Dong[1]
[1]Beijing Jiaotong University, China; [2]Beihang University, China;
[3]China Railway Beijing Bureau Group Co., Ltd, China

14:54
A3aL-05.4 **Ethereum Account Classification Based on Graph Convolutional Network**
Tao Huang[1], Dan Lin[1], Haibing Xia[2], Jiajing Wu[1]
[1]Sun Yat-sen University, China; [2]Merchants Union Consumer Finance Company Limited, China

15:12
A3aL-05.5 **Analyzing Robustness of Complex Networks against Incomplete Information**
Weijun Ma[1], Junyuan Fang[2], Jiajing Wu[1]
[1]Sun Yat-sen University, China; [2]City University of Hong Kong, China

A3aL-06 Energy-Efficient Power Solutions for Future IoT Devices II (Virtual Asia)

Time: Monday, May 30 (14:00-15:30)
Place: Room 6
Chair(s): Sijun Du, *Delft University of Technology*

14:00
A3aL-06.1 **A Multiple Charge Extractions and Multiple Precharge Interface Circuit for Piezoelectric Energy Harvesting** 2378
Yi Yang[1], Zhiyuan Chen[1], Jingjing Liu[1], Ziyu Guo[1], Junmin Jiang[2], Xiaoyang Zeng[1]
[1]Fudan University, China; [2]Southern University of Science and Technology, China

14:18
A3aL-06.2 **A Nano-Power Wake-Up Circuit for Energy-Driven IoT Applications** 2383
Li Teng[1], Junrui Liang[1], Sijun Du[2]
[1]ShanghaiTech University, China; [2]Delft University of Technology, The Netherlands

14:36
A3aL-06.3 **Quality-Aware Merge Candidate Construction for Video Coding** 2388
Lei Zhao[1], Kai Zhang[2], Li Zhang[2]
[1]Bytedance Network Technology, China; [2]Bytedance Inc., United States

14:54
A3aL-06.4 **An Always-on tinyML Acoustic Classifier for Ecological Applications** 2393
H.R. Sabbella[1], A.R. Nair[1], V. Gumme[1], S.S. Yadav[1], S. Chakrabartty[2], C.S. Thakur[1]
[1]Indian Institute of Science Bangalore, India; [2]Washington University in St. Louis, United States

A4aL-01 Sensory Circuits and Systems II (Virtual Asia)

Time: Monday, May 30 (15:45-17:15)
Place: Room 1
Chair(s): Milin Zhang, *Tsinghua University*

15:45
A4aL-01.1 **Single-Axis Capacitive Accelerometer Chip with AC Offset Suppression Loop** 2397
Heng-Yu Chiu, Shih-Meng Tseng, Yi-Chen Chen, Chia-Ling Wei
National Cheng Kung University, Taiwan

16:03
A4aL-01.2 **A Compact Low-Noise Digital Pixel with 15-Bit Two-Step PFM-Based ADC for IRFPAs** 2401
Shanzhe Yu, Yacong Zhang, Ye Zhou, Runkun Zhu, Wengao Lu, Zhongjian Chen
Peking University, China

16:21
A4aL-01.3 **A Nanowatt Comparator with Feedforward Slew Rate Enhancement and PVT-Insensitive Bias for Always-on MEMS Switch Wake-Up Sensor** 2405
Jinhen Lee[1,2], Jianming Zhao[2], Yuan Gao[2]
[1]Nanyang Technological University, Singapore; [2]Agency for Science, Technology and Research, Singapore

16:39
A4aL-01.4 **Electronic Technique and System for Non-Contact Reading of Temperature Sensors Based on Piezoelectric MEMS Resonators** 2409
Marco Bau'[1], Marco Zini[1], Alessandro Nastro[1], Marco Ferrari[1], Vittorio Ferrari[1], Joshua E.-Y. Lee[2,3]
[1]Università degli Studi di Brescia, Italy; [2]City University of Hong Kong, China;
[3]Agency for Science, Technology and Research, Singapore

16:57
A4aL-01.5 **tinyRadar: mmWave Radar Based Human Activity Classification for Edge Computing** 2414
Satyapreet Singh Yadav[1], Radha Agarwal[1], Kola Bharath[1], Sandeep Rao[2], Chetan Singh Thakur[1]
[1]Indian Institute of Science Bangalore, India; [2]Texas Instruments, India

A4aL-02 Circuits and Systems for Hardware Security (Virtual Asia)

Time: Monday, May 30 (15:45-17:15)
Place: Room 2
Chair(s): Yue Zheng, *Nanyang Technological University*
Itamar Levi, *Bar-Ilan University*

15:45
A4aL-02.1 **Mirror^N PUF: Harvesting Multiple Independent Bits from Each PUF Cell in 65nm** 2418
Yizhak Shifman, Alexander Fish, Joseph Shor
Bar-Ilan University, Israel

16:03
A4aL-02.2 **Semi-Supervised Trojan Nets Classification Using Anomaly Detection Based on SCOAP Features** 2423
Pei-Yu Lo[1], Chi-Wei Chen[1], Wei-Ting Hsu[1], Chih-Wei Chen[2], Chin-Wei Tien[1], Sy-Yen Kuo[1]
[1]National Taiwan University, Taiwan; [2]Institute for Information Industry, Taiwan

16:21
A4aL-02.3 **Horizontal Correlation Analysis Without Precise Location on Schoolbook Polynomial Multiplication of Lattice-Based Cryptosystem** 2428
Chuanchao Lu[1], Yijun Cui[1], Yang Li[2], Dur-E-Shahwar Kundi[3], Chenghua Wang[1], Weiqiang Liu[1]
[1]Nanjing University of Aeronautics and Astronautics, China; [2]University of Electro-Communications, China;
[3]Queen's University Belfast, United Kingdom

A4aL-03 Intelligent Micro-Sensor Techniques for Continuous Health Monitoring I (Virtual Asia)

Time: Monday, May 30 (15:45-17:15)
Place: Room 3
Chair(s): Yuanjin Zheng, *Nanyang Technological University*
Hanjun Jiang, *Tsinghua University*

A4aL-04 Pattern Recognition, Deep Learning and Learning Systems III (Virtual Asia)

Time: Monday, May 30 (15:45-17:15)
Place: Room 4
Chair(s): Wenrui Dai, *Shanghai Jiao Tong University, China*
Mohsin M. Jamali, *The University of Texas Permian Basin*

15:45
A4aL-04.1 **Spectre Attack Detection with Neutral Network on RISC-V Processor** 2467
Anh-Tien Le[1], Trong-Thuc Hoang[1], Ba-Anh Dao[1], Akira Tsukamoto[2], Kuniyasu Suzaki[2], Cong-Kha Pham[1]
[1]University of Electro-Communications, Japan; [2]National Institute of Advanced Industrial Science and Technology, Japan; [2]University of Electro-Communication, Vietnam

16:03
A4aL-04.2 **An Energy-Efficient YOLO Accelerator Optimizing Filter Switching Activity** 2472
Kyeongjong Lim, Gyuri Kim, Taehyung Park, Xuan Truong Nguyen, Hyuk-Jae Lee
Seoul National University, Korea

16:21
A4aL-04.3 **Appearance-Motion United Auto-Encoder Framework for Video Anomaly Detection**
Yang Liu[1], Jing Liu[1], Jieyu Lin[2], Mengyang Zhao[1], Liang Song[1]
[1]Fudan University, China; [2]University of Toronto, Canada

16:39
A4aL-04.4 **A Novel Deep Learning Model for Link Prediction of Knowledge Graph** 2477
Shuai Ding, Qinghan Lai, Zihan Zhou, Jinghao Gong, Jin'An Cui, Song Liu
Qilu University of Technology, China

16:57
A4aL-04.5 **RARN: A Real-Time Skeleton-Based Action Recognition Network for Auxiliary Rehabilitation Therapy** 2482
Mengqi Shen, Hong Lu
Fudan University, China

A4aL-05 Wireless and Wireline Communications III (Virtual Asia)

Time: Monday, May 30 (15:45-17:15)
Place: Room 5
Chair(s): Jienan Chen, *University of Electronic Science and Technology of China*
Yong Chen, *University of Macau*

15:45
A4aL-05.1 **A High-Linearity 14GHz 7b Phase Interpolator for Ultra-High-Speed Wireline Applications** 2487
Ninghuang Li, Weixin Gai, Bingyi Ye, Haowei Niu, Lei Lu
Peking University, China

16:03
A4aL-05.2 **A Two-Stage Digital Predistortion Method for Quadrature Digital Power Amplifiers** 2491
Fu Gao, Yun Yin, Yicheng Li, Jie Lin, Hongtao Xu
Fudan University, China

16:21
A4aL-05.3 **Compressive Sensing Based Hardware Design for Channel Estimation of Wideband Millimeter Wave Hybrid MIMO System** 2496
Chung-Lun Tu[1], Tse-Yuan Lin[1], Kang-Lun Chiu[1], Shyh-Jye Jou[1], Pei-Yun Tsai[2]
[1]National Yang Ming Chiao Tung University, Taiwan; [2]National Central University, Taiwan

16:39
A4aL-05.4 **A 23.5-28.5 GHz High-Gain CMOS Transceiver Based on LO Phase-Shifting Architecture with Broadband LO/IF for 5G Communications** 2501
Qingfeng Zhang[1], Chenxi Zhao[1], Yiming Yu[1], Yunqiu Wu[1], Huihua Liu[1], Wenquan Che[2], Quan Xue[2], Kai Kang[1]
[1]University of Electronic Science and Technology of China, China; [2]South China University of Technology, China

16:57
A4aL-05.5 **A Low-Latency Carrier Phase Recovery Hardware for Coherent Optical Communication** 2506
Liyu Lin, Kaihui Wang, Yun Chen, Jianjun Yu, Xiaoyang Zeng
Fudan University, China

A4aL-06 Power IC Design II (Virtual Asia)

Time: Monday, May 30 (15:45-17:15)
Place: Room 6
Chair(s): Yan Lu, *University of Macau*

15:45
A4aL-06.1 **A Wide-Load-Range Tri-Mode Buck Converter with Seamless Mode Transition** 2511
Yanxia Yao, Menglian Zhao, Xiaobo Wu
Zhejiang University, China

16:03
A4aL-06.2 **A Digital-Control Buck Converter with Dual Pulse-Skipping Modes for Internet of Things** 2516
Tsung-Wen Sun, Kuan-Yu Liao, Tsung-Heng Tsai
National Chung Cheng University, Taiwan

16:21
A4aL-06.3 **Partitioning Scheme and Performance Analysis of Distributed Digital Low-Dropout Regulators in SoC** 2520
Xuliang Wang, Wing-Hung Ki
Hong Kong University of Science and Technology, China

16:39
A4aL-06.4 **A Self-Regulating Negative Charge Pump Using Multi-Phase Clock for Wideband ADCs** 2525
Haoran Wang, Junjie Jing, Fule Li
Tsinghua University, China

B1aL-01 Reconfigurable Architectures, SoC and 3D ICs (Virtual Asia)

Time: Tuesday, May 31 (9:00-10:30)
Place: Room 1
Chair(s): Chung-An Shen, *Taiwan University of Science*
Hao Zhang, *Ocean University of China*

9:00
B1aL-01.1 **An FPGA-Based HW/SW Co-Verification Environment for Programmable Network Devices** 2529
Mengyue Su, Jean-Pierre David, Yvon Savaria, Bill Pontikakis, Thomas Luinaud
Polytechnique Montréal, Canada

9:18
B1aL-01.2 **Entropy-Based Thermal Sensor Allocation for Temperature-Aware Multi-Core Platforms** 2534
Kun-Chih Chen, Chia-Hsin Chen
National Sun Yat-sen University, Taiwan

B1aL-02 Memory and Compute-in-Memory Circuits and Architectures II (Virtual Asia)

Time: Tuesday, May 31 (9:00-10:30)
Place: Room 2
Chair(s): Tony Tae-Hyoung Kim, *Nanyang Technological University*
Youngjoo Lee, *POSTECH*

B1aL-03 Biomedical Analog to Digital Converters (Virtual Asia)

Time: Tuesday, May 31 (9:00-10:30)
Place: Room 3
Chair(s): Bo Zhao, *Zhejiang University*
Nicole McFarlane, *University of Tennessee Knoxville*

9:00
B1aL-03.1 **A VCO-Based 2nd-Order Continuous Time Sigma-Delta Modulator for Current-Sensing Systems** 2576
Yi-Ting Hsieh[1], Shih-Shuo Chang[1], Hao-Yun Lee[1], Ju-Yi Chen[2], Shuenn-Yuh Lee[1]
[1]National Cheng Kung University, Taiwan; [2]National Cheng Kung University Hospital, Taiwan

9:18
B1aL-03.2 **High-Pass Sigma–Delta Modulator with Operational Amplifier Sharing and Noise-Coupling Technique for Biomedical Signal Acquisition** 2580
Hao-Yun Lee[1], Chia-Ho Kung[1], Po-Han Su[1], Ju-Yi Chen[2], Shuenn-Yuh Lee[1]
[1]National Cheng Kung University, Taiwan; [2]National Cheng Kung University Hospital, Taiwan

9:36
B1aL-03.3 **A 100dB-TCMRR 8-Channel Bio-Potential Front-End with Multi-Channel Common-Mode Replication** 2584
Borui Tan, Sanfeng Zhang, Chen Gao, Xiong Zhou, Qiang Li
University of Electronic Science and Technology of China, China

B1aL-04 Sparsity, Adaptive Filtering and Data Fusion (Virtual Asia)

Time: Tuesday, May 31 (9:00-10:30)
Place: Room 4
Chair(s): Wei Xing Zheng, *Western Sydney University*
Wei Liu, *University of Sheffield*

9:00
B1aL-04.1 **Robust Recovery of Sparse Signal from Compressed Measurements for Wireless Sensor Networks** 2589
Ketan Atul Bapat, Mrityunjoy Chakraborty
Indian Institute of Technology Kharagpur, India

9:18
B1aL-04.2 **Robust Diffusion Average Strategy over Distributed Networks with Impulsive Link Noise** 2594
Zhao Zhang[1], Sheng Zhang[1], Wei Xing Zheng[2]
[1]Southwest Jiaotong University, China; [2]Western Sydney University, Australia

9:36
B1aL-04.3 **Adaptive Combination of Two Multi-Sample Multiband-Structured Subband Adaptive Filters** 2599
Yishu Peng[1], Sheng Zhang[1], Wei Xing Zheng[2]
[1]Southwest Jiaotong University, China; [2]Western Sydney University, Australia

9:54
B1aL-04.4 **Antenna Selection Design of Crossed-Dipole Arrays for Multi-Beam Multiplexing Based on a Hybrid Beamforming Structure** 2604
Junwei Zhang, Wei Liu
University of Sheffield, United Kingdom

10:12
B1aL-04.5 **Multi-Level Attention Fusion for Multimodal Driving Maneuver Recognition** 2609
Jing Liu, Yang Liu, Chengwen Tian, Mengyang Zhao, Xinhua Zeng, Liang Song
Fudan University, China

B1aL-05 Late Breaking News III (Virtual Asia)

Time: Tuesday, May 31 (9:00-10:30)
Place: Room 5
Chair(s): Hoi Lee, *University of Texas at Dallas*

9:00
B1aL-05.1 **A RISC-V-Based Research Platform for Rapid Design Cycle** 2614
Esteban Garzón[1,2], Roman Golman[1], Odem Harel[1], Tzachi Noy[1], Yehuda Kra[1], Asaf Pollock[1], Slava Yuzhaninov[1], Yonatan Shoshan[1], Yehuda Rudin[1], Yoav Weitzman[1], Marco Lanuzza[2], Adam Teman[1]
[1]Bar-Ilan University, Israel; [2]University of Calabria, Italy

9:18
B1aL-05.2 **A Bio-Mimetic Leaf Wetness Sensor** 2616
Brian H. Nguyen, Gregory S. Gilbert, Marco Rolandi
University of California, Santa Cruz, United States

9:36
B1aL-05.3 **Improving Pin Accessibility of Standard Cells through Fin Depopulation** 2621
Doyeon Won, Taewhan Kim
Seoul National University, Korea

9:54
B1aL-05.4 **Optimizing Timing in Placement through I/O Signal Flipping on Multi-Bit Flip-Flops** 2623
Soomin Kim, Taewhan Kim
Seoul National University, Korea

B1aL-06 Power Electronics Circuit I (Virtual Asia)

Time: Tuesday, May 31 (9:00-10:30)
Place: Room 6
Chair(s): Xiaolu Li, *The City University of Hong Kong*

9:00
B1aL-06.1 **A Wireless Power Transfer System with Regulated Receiver Based on LCC-S Compensation and Global Control** 2625
Haoyu Cai, Yilin Zhao, Xian Tang
Tsinghua University, China

9:18
B1aL-06.2 **A Current-Injection-Based Flying Capacitor Balancing Circuit for Three-Level DC-DC Converter** 2630
Zhitong Chen, Shiying Liu, Yong Chen, Xiaoya Fan, Yanzhao Ma
Northwestern Polytechnical University, China

9:36
B1aL-06.3 **Achievement of CV and CC Output Modes on Class-E/F Inverter with One Auxiliary Switch** 2635
Wenqi Zhu, Yutaro Komiyama, Kien Nguyen, Hiroo Sekiya
Chiba University, Japan

B2aL-01 SAR ADCs (Virtual Asia)

Time: Tuesday, May 31 (10:45-12:15)
Place: Room 1
Chair(s): Jusung Kim, *Hanbat National University*
Thierry Taris, *University of Bordeaux*

10:45
B2aL-01.1 **A Low-Input Capacitance 12-Bit SAR ADC for Use in Self-Powered IoT Nodes** 2640
Nima Shahpari[1], Mehdi Habibi[1], Piero Malcovati[2], Jose M. de la Rosa[3]
[1]University of Isfahan, Iran; [2]Università degli Studi di Pavia, Italy; [3]Instituto de Microelectrónica de Sevilla IMSE-CNM CSIC and Universidad de Sevilla, Spain

11:03
B2aL-01.2 **Editable Asynchronous Control Logic for SAR ADCs** 2645
Tian Lan, Fei Xia, Gang Mao, Shengqi Yu, Rishad Shafik, Alex Yakovlev
Newcastle University, United Kingdom

11:21
B2aL-01.3 **A 3Bit/Cycle 1GS/s 8-Bit SAR ADC Employing Asynchronous Ping-Pong Quantization Scheme** 2650
Yuekang Guo, Xiaoming Liu, Jing Jin, Jianjun Zhou
Shanghai Jiao Tong University, China

11:39
B2aL-01.4 **A 2.5-GS/s Time-Interleaved SAR-Assisted Ringamp-Based Pipelined ADC with Digital Background Calibration** 2655
Jingchao Lan[1], Danfeng Zhai[1], Yongzhen Chen[2], Zhekan Ni[3], Xingchen Shen[1], Fan Ye[1], Junyan Ren[1]
[1]Fudan University, China; [2]Tongji University, China; [3]Hangzhou Dianzi University, China

11:57
B2aL-01.5 **An Auxiliary-Loop-Enhanced Fast-Transient FVF LDO as Reference Buffer of a SAR ADC** 2660
Yi Zeng, Chi-Hang Chan, Yan Zhu, Rui P. Martins
University of Macau, China

B2aL-02 Digital Circuits, Systems and Architectures for Machine Learning II (Virtual Asia)

Time: Tuesday, May 31 (10:45-12:15)
Place: Room 2
Chair(s): Yeong-Kang Lai, *National Chung Hsing University*
Yuan Du, *Nanjing University*

10:45
B2aL-02.1 **A Real Time Super Resolution Accelerator with Tilted Layer Fusion** 2665
An-Jung Huang, Kai-Chieh Hsu, Tian-Sheuan Chang
National Yang Ming Chiao Tung University, Taiwan

11:03
B2aL-02.2 **An Efficient Hardware Accelerator for Sparse Transformer Neural Networks** 2670
Chao Fang[1], Shouliang Guo[1], Wei Wu[1], Jun Lin[1], Zhongfeng Wang[1], Ming Kai Hsu[2], Lingzhi Liu[2]
[1]Nanjing University, China; [2]Kuaishou Technology, United States

11:21
B2aL-02.3 **PCFBCD: An Innovative Approach to Accelerating Collaborative Filtering** 2675
Bin Zhang, Haitao Du, Song Chen, Yi Kang
University of Science and Technology of China, China

11:39
B2aL-02.4 **0.08mm² 128nW MFCC Engine for Ultra-Low Power, Always-on Smart Sensing Applications** 2680
Yi Sheng Chong[1], Wang Ling Goh[1], Yew Soon Ong[1], Vishnu P. Nambiar[2], Anh Tuan Do[2]
[1]Nanyang Technological University, Singapore; [2]Agency for Science, Technology and Research, Singapore

11:57
B2aL-02.5 **A Reconfigurable Approach for Deconvolutional Network Acceleration with Fast Algorithm** 2685
Peixiang Yang, Wendong Mao, Zhongfeng Wang, Jun Lin
Nanjing University, China

B2aL-03 Biomedical Circuits and Systems (Virtual Asia)

Time: Tuesday, May 31 (10:45-12:15)
Place: Room 3
Chair(s): Joseph Chang, *Nanyang Technological University*
Nicole McFarlane, *University of Tennessee Knoxville*

10:45
B2aL-03.1 **An Event-Driven Compressive Neuromorphic System for Cardiac Arrhythmia Detection** 2690
Jinbo Chen[1,2], Fengshi Tian[2,3], Jie Yang[2], Mohamad Sawan[2]
[1]Zhejiang University, China; [2]Westlake University, China; [3]Hong Kong University of Science and Technology, China

11:03
B2aL-03.2 **NIMBLE: A Neuromorphic Learning Scheme and Memristor Based Computing-In-Memory Engine for EMG Based Hand Gesture Recognition** 2695
Fengshi Tian, Jingwen Jiang, Jinhao Liang, Zhiyuan Zhang, Jiahe Shi, Chaoming Fang, Hui Wu, Xiaoyong Xue, Xiaoyang Zeng
Fudan University, China

11:21
B2aL-03.3 **An Alignment-Based Hardware Accelerator for Rapid Prediction of RNA Secondary Structures** 2700
Shih-Shiuan Weng[1], Yang-Ming Yeh[1], Yu-Cheng Li[2], Yi-Chang Lu[1]
[1]National Taiwan University, Taiwan; [2]Academia Sinica, Taiwan

11:39
B2aL-03.4 **Design of a Multi-Mode Animal Behavior Analysis System with Dual-View Video and Wireless Bio-Potential Acquisition** 2705
Jiaxin Lei[1], Shimeng Wang[1], Weining Li[1], Deng Luo[1], Xiaoyan Ma[2], Dandan Hui[2], Zhe Zhao[1], Xiong Zhong[2], Milin Zhang[1]
[1]Tsinghua University, China; [2]Beijign Ningju Technology, China

11:57
B2aL-03.5 **A 16-Channel Neural Recorder with 2.8 nJ/Bit, 971.4 kbps Sub-2.4 GHz Polar Transmitter** 2710
Wei Song[1], Heng Huang[1], Yusong Wu[1], Xiliang Liu[2], Chao Sun[2], Zijian Tang[1], Xiaoyan Ma[2], Tianhe Jiang[2], Xiong Zhong[2], Milin Zhang[1]
[1]Tsinghua University, China; [2]Beijing Ningju Technology Co., Ltd., China

B2aL-04 Pattern Recognition, Deep Learning and Learning Systems I (Virtual Asia)

Time: Tuesday, May 31 (10:45-12:15)
Place: Room 4
Chair(s): Yongxiang Xia, *Hangzhou Dianzi University*

10:45
B2aL-04.1 **RGBD-Based Hardware Friendly Head Pose Estimation System via Convolutional Attention Module** 2715
Yen-Yu Cheng, Ching-Te Chiu, Yi-Fan Chen
National Tsing Hua University, Taiwan

11:03
B2aL-04.2 **S-SIM: A Simulator for Systolic Array-Based DNN Accelerators with Tile Access Awareness** 2720
Yuhang Li, Mei Wen, Renyu Yang, Junzhong Shen, Yasong Cao, Jianan Wang
National University of Defense Technology, China

11:21
B2aL-04.3 **A Heterogeneous FPGA-Based Accelerator Design for Efficient and Low-Cost Point Clouds Deep Learning Inference** 2725
Jinling Xu[1], Yonggui Wang[2], Wenbiao Zhou[1]
[1]Beijing Institute of Technology, China; [2]Zhejiang Qianjiang Robot Co., China

11:39
B2aL-04.4 **CSL-YOLO: A Cross-Stage Lightweight Object Detector with Low FLOPs** 2730
Yu-Ming Zhang[1], Chun-Chieh Lee[1], Jun-Wei Hsieh[2], Kuo-Chin Fan[1]
[1]National Central University, Taiwan; [2]National Yang Ming Chiao Tung University, Taiwan

11:57
B2aL-04.5 **Music to Dance: Motion Generation Based on Multi-Feature Fusion Strategy** 2735
Yufei Gao[1], Wenxin Yu[1], Xuewen Zhang[1], Xin Deng[1], Zhiqiang Zhang[2]
[1]Southwest University of Science and Technology, China; [2]Hosei University, Japan

B2aL-05 Oscillators and Synthesizers (Virtual Asia)

Time: Tuesday, May 31 (10:45-12:15)
Place: Room 5
Chair(s): Luis Oliveira, *Universidade Nova de Lisboa*
Sohmyung Ha, *New York University Abu Dhabi*

10:45
B2aL-05.1 **A Class-C Injection-Locked Tripler with 48 dB Sub-Harmonic Suppression and 15 fs Additive RMS Jitter in 0.13µm BiCMOS Process** 2740
Sonam Sadhukhan[1,2], Pranav Kumar[2], Arpan Thakkar[2], Apoorva Bhatia[2], Saurabh Saxena[1]
[1]Indian Institute of Technology Madras, India; [2]Texas Instruments Pvt. Ltd., India

11:03
B2aL-05.2 **A 24 GHz FMCW/Doppler Dual-Mode Frequency Synthesizer with 68.8 kHz RMS FM Error and 1.25 GHz Chirp Bandwidth**
Jinge Li[1], Chunqi Shi[1], Zhaoqi Chen[1], Runxi Zhang[1], Hao Deng[2], Jinghong Chen[2]
[1]East China Normal University, China; [2]University of Houston, United States

11:21
B2aL-05.3 **A Quantization Noise Reduction Method for Delta-Sigma Fractional-N PLLs Using Cascaded Injection-Locked Oscillators**
Liqun Feng, Woogeun Rhee, Zhihua Wang
Tsinghua University, China

B2aL-06 Energy Harvesting II (Virtual Asia)

Time: Tuesday, May 31 (10:45-12:15)
Place: Room 6
Chair(s): Junrui Liang, *Shanghaitech University*

B3aL-01 Nyquist Converters (Virtual Asia)

Time: Tuesday, May 31 (14:00-15:30)
Place: Room 1
Chair(s): Qiang Li, *University of Electronic Science and Technology of China*
Nuno Paulino, *Universidade Nova de Lisboa*

B3aL-02 Digital Circuits, Systems and Architectures for Machine Learning III (Virtual Asia)

Time: Tuesday, May 31 (14:00-15:30)
Place: Room 2
Chair(s): Hongbin Sun, *Xian Jiaotong University*
Robert Chen-Hao Chang, *National Chung Hsing University*

B3aL-03 Intelligent Micro-Sensor Techniques for Continuous Health Monitoring II (Virtual Asia)

Time: Tuesday, May 31 (14:00-15:30)
Place: Room 3
Chair(s): Hanjun Jiang, *Tsinghua University*
Yuanjin Zheng, *Nanyang Technological University*

14:00
B3aL-03.1 **An Ultra Compact Neural Front-End with CT-NEO Based Spike Detection for Implantable Applications** 2826
Tongtong Guo, Huaiyu Liu, Yan Liu
Shanghai Jiao Tong University, China

14:18
B3aL-03.2 **A High Resolution Chemical Sensing Front-End with Integrated Sigma Delta Quantisation** 2831
Xiuli Zhang, Jinge Ma, Yuanqi Hu
Beihang University, China

14:36
B3aL-03.3 **Photoacoustic Dual-Mode Microsensor Based on PMUT Technology** 2836
Yiyun Wang[1], Junxiang Cai[1,2,3], Tao Wu[1,2,3], Fei Gao[1]
[1]ShanghaiTech University, China; [2]Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China; [3]University of Chinese Academy of Sciences, Beijing, China

14:54
B3aL-03.4 **Pulse Transition Characterization from Electrocardiography and Photoplethysmography for Non-Invasive Blood Pressure Estimation** 2841
Hazem Mohammed[1,2], Hao Wu[3], Guoxing Wang[1]
[1]Shanghai Jiao Tong University, China; [2]Shanghai Jiao Tong University and Assiut University, China; [3]Shenzhen University, China

15:12
B3aL-03.5 **Organic Thin-Film Transistor Technology for Flexible Analog Front-End Towards Wearable Sensors** ..... N/A
Li'ang Deng, Wei Tang, Sujie Chen
Shanghai Jiao Tong University, China

B3aL-04 Pattern Recognition, Deep Learning and Learning Systems II (Virtual Asia)

Time: Tuesday, May 31 (14:00-15:30)
Place: Room 4
Chair(s): Xiaolu Li, *The City University of Hong Kong*
Jörg Velten, *Bergische University Wuppertal*

14:00
B3aL-04.1 **A Question Embedding-Based Method to Enrich Features for Knowledge Base Question Answering** 2851
Xin Wang[1,2], Meng Lin[2], Qianqian Lu[2]
[1]University of Chinese Academy of Sciences, China; [2]Chinese Academy of Sciences, China

14:18
B3aL-04.2 **A Point Matching Strategy of 3D Loss Function for Single RGB Images Deep Mesh Reconstruction** 2856
Xin Deng, Ning Jiang, Shiyu Chen, Jiarui Cheng, Yufei Gao, Wenxin Yu
Southwest University of Science and Technology, China

B3aL-05 Synthesizable and Programmable Analog Circuits (Virtual Asia)

Time: Tuesday, May 31 (14:00-15:30)
Place: Room 5
Chair(s): Sohmyung Ha, *New York University Abu Dhabi*
Raafat Lababidi, *ENSTA Bretagne*

B3aL-06 Power IC Design III (Virtual Asia)

Time: Tuesday, May 31 (14:00-15:30)
Place: Room 6
Chair(s): Junmin Jiang, *Southern University of Science and Technology*

14:00
B3aL-06.1 **A Hybrid Boost Converter with Regulated Flying Capacitor Voltage and Reduced Inductor Current for LED Lighting** 2900
Chuang Wang[1,2], Zixiao Lin[1], Yan Lu[1], Xiuping Li[2], Rui P. Martins[1,3]
[1]University of Macau, China; [2]Beijing University of Posts and Telecommunications, China; [3]Instituto Superior Técnico, Universidade de Lisboa, China

14:18
B3aL-06.2 **A Novel Constant Current Control Strategy with Seamless Switching between CC and CV** 2905
Yue Shi[1,2], Xue Ai[1], Junyuan Rong[1], Zekun Zhou[1], Bo Zhang[1]
[1]University of Electronic Science and Technology of China, China; [2]Chengdu University of Information Technology, China

14:36
B3aL-06.3 **A High-Voltage Inverting Converter Based on COT Controlled Buck Regulator with On-Chip Ripple Compensation Technique** 2909
Yanzhao Ma[1], Zhitong Chen[1], Xiaoxu Chen[1], Xue Xia[2], Long Zhang[2], Xiaoya Fan[1]
[1]Northwestern Polytechnical University, China; [2]Xi'an Aerosemi Technology, China

14:54
B3aL-06.4 **A 6.78MHz Regulating Rectifier with Constant On-Time Control for High Resolution and Ultra-Fast Transient Response** 2914
Kai Cui, Yufei Sun, Xiaoya Fan, Yanzhao Ma
Northwestern Polytechnical University, China

15:12
B3aL-06.5 **Triple Binary SAR Control in Distributive Digital Low Dropout Regulators for 3.6ns Fast Transient Response and 0.4mV Low Output Voltage Ripple** 2919
Bo-Kuan Wu[1], Tzu-Ying Wu[1], Sheng Cheng Lee[1], Ke-Horng Chen[1], Ying-Hsi Lin[2], Shian-Ru Lin[2], Tsung-Yen Tsai[2]
[1]National Chiao Tung University, Taiwan; [2]Realtek Semiconductor Corp, Taiwan

B4aL-01 Amplifiers (Virtual Asia)

Time: Tuesday, May 31 (15:45-17:15)
Place: Room 1
Chair(s): Mohamad Sawan, *Westlake University*
Roberto Gomez-Garcia, *Universidad de Alcala*

15:45
B4aL-01.1 **A 40-nm CMOS Wide Input Range and Variable Gain Time-Difference Amplifier Based on Current Source Architecture** 2923
Li Lin, Lean Karlo S. Tolentino, Chua-Chin Wang
National Sun Yat-sen University, Taiwan

16:03
B4aL-01.2 **An Accurate Modelling of CMOS Folded Cascode Op-Amp with Negative Transconductance** 2928
Krishnanunni B., Devraj M. Rajagopal, Rohan Sinha
Texas Instruments Inc., India

B4aL-02 Memory and Compute-in-Memory Circuits and Architectures III (Virtual Asia)

Time: Tuesday, May 31 (15:45-17:15)
Place: Room 2
Chair(s): Yuan Du, *Nanjing University*
Tony Tae-Hyoung Kim, *Nanyang Technological University*

B4aL-03 Multimedia Systems and Applications II (Virtual Asia)

Time: Tuesday, May 31 (15:45-17:15)
Place: Room 3
Chair(s): Hong-Han Shuai, *National Yang Ming Chiao Tung University*

15:45
B4aL-03.1 **INIT: Inpainting Network for Incomplete Text** 2973
Fanfu Xue, Jia Zhang, Jiande Sun, Jinghui Yin, Liming Zou, Jing Li
Shandong Normal University, China

16:03
B4aL-03.2 **An 81.92Gpixels/s Fast Reconstruction of Images from Compressively Sensed Measurements** 2978
Jiayao Xu, Pham Do Kim Chi, Chen Fu, Jinjia Zhou
Hosei University, Japan

16:21
B4aL-03.3 **The Hierarchical Ensemble Model for Network Intrusion Detection in the Real-World Dataset** 2983
Lei Chen, Shao-En Weng, Chu-Jun Peng, Yin-Chi Li, Hong-Han Shuai, Wen-Huang Cheng
National Yang Ming Chiao Tung University, Taiwan

16:39
B4aL-03.4 **Collaborative Scalable Visual Compression for Human-Centered Videos** 2988
Haofeng Huang[1], Wenhan Yang[1], Wei Xiang[2], Jiaying Liu[1], Ling-Yu Duan[1]
[1]Peking University, China; [2]Bigo Technology, Singapore

16:57
B4aL-03.5 **Multi-Concept Mining for Video Captioning Based on Multiple Tasks** 2993
Qinyu Zhang[1], Pengjie Tang[2], Hanli Wang[1,3], Jinjing Gu[1]
[1]Tongji University, China; [2]Jinggangshan University, China; [3]Frontiers Science Center for Intelligent Autonomous Systems, China

B4aL-04 Neural Systems Based on Emerging Device and Circuit Technologies II (Virtual Asia)

Time: Tuesday, May 31 (15:45-17:15)
Place: Room 4
Chair(s): Mohsin M. Jamali, *The University of Texas Permian Basin*

15:45
B4aL-04.1 **Automated Quantization Range Mapping for DAC/ADC Non-Linearity in Computing-in-Memory** 2998
Chi-Tse Huang, Yu-Chuan Chuang, Ming-Guang Lin, An-Yeu Wu
National Taiwan University, Taiwan

16:03
B4aL-04.2 **SpikingSIM: A Bio-Inspired Spiking Simulator** 3003
Junwei Zhao[1], Shiliang Zhang[1], Lei Ma[1,2], Zhaofei Yu[1], Tiejun Huang[1,2]
[1]Peking University, China; [2]Beijing Academy of Artificial Intelligence, China

16:21
B4aL-04.3 **Multi-View RGB-D Based 3D Point Cloud Face Model Reconstruction System** 3008
Jie-Yu Luo, Ching-Te Chiu, An-Ting Hsieh
National Tsing Hua University, Taiwan

16:39
B4aL-04.4 **Efficient Neural Networks with Spatial Wise Sparsity Using Unified Importance Map** 3013
Chen Tang[1], Wenyu Sun[2], Wenxun Wang[1], Zhuqing Yuan[1], Yongpan Liu[1]
[1]Tsinghua University, China; [2]Tsinghua Shenzhen International Graduate School, China

16:57
B4aL-04.5 **Bayesian Deep Active Learning for Analog Circuit Performance Classification** 3018
Lining Zhang, Salahuddin Raju, Ashish James, Rahul Dutta, Gregoire Fournier, Damien Lancry, Kevin Chair Tshun Chuan, Vijay Ramaseshan Chandrasekhar, Chuan Sheng Foo
Agency for Science, Technology and Research, Singapore

B4aL-05 Image/Video Coding and Standardization (Virtual Asia)

Time: Tuesday, May 31 (15:45-17:15)
Place: Room 5
Chair(s): Heming Sun, *Waseda University, Japan*

15:45
B4aL-05.1 **LCU-Level Rate-Distortion Optimization for Versatile Video Coding** 3023
Gencheng Xu[1], Shiyu Jin[1], Kaicheng Tang[1], Zijing Zhang[1], Yimin Zhou[2]
[1]University of Electronic Science and Technology of China, China; [2]Chengdu University of Information Technology, China

16:03
B4aL-05.2 **Fast Intra Mode Decision for VVC Based on Histogram of Oriented Gradient** 3028
Aorui Gou[1], Heming Sun[2,3], Jiro Katto[1], Tingting Li[1], Xiaoyang Zeng[1], Yibo Fan[1]
[1]Fudan University, China; [2]Waseda University, Japan; [3]JST PRESTO, Japan

16:21
B4aL-05.3 **An Online SVM Based VVC Intra Fast Partition Algorithm with Pre-Scene-Cut Detection** 3033
Chao Shu, Chao Yang, Ping An
Shanghai University, China

16:39
B4aL-05.4 **An Optimization Algorithm for Color Table Coding of Palette for VVC Based on DPCM and CCLP** 3038
Minghong Mo[1], Fan Liang[1,2], Jun Wang[1,3]
[1]Sun Yat-sen University, China; [2]Peng Cheng Laboratory, China; [3]Southern Marine Science and Engineering Guangdong Laboratory, China

16:57
B4aL-05.5 **Hierarchical Coding for Talking-Head Video** 3043
Yu Liu[1], Shibo Li[1], Shuyuan Zhu[1], Siu-Kei Au Yeung[2], Xing Wen[3], Bing Zeng[1]
[1]University of Electronic Science and Technology of China, China; [2]Hong Kong Metropolitan University, China; [3]Kuaishou, China

B4aL-06 Single-Physical Entity Ultra-Subminiature Power Management for Next-Generation Internet-of-Things (Virtual Asia)

Time: Tuesday, May 31 (15:45-17:15)
Place: Room 6
Chair(s): Victor Adrian, *Nanyang Technological University (NTU), Singapore*

15:45
B4aL-06.1 **A 0.6V 150mA 4-Stage Output-Capacitorless LDO Regulator Using Feedforward with Embedded Miller-RC Compensation** 3048
Jinhen Lee, Pak Kwong Chan
Nanyang Technological University, Singapore

C1aL-01 Microwave and RF Circuits (Virtual Asia)

Time: Wednesday, June 1 (9:00-10:30)
Place: Room 1
Chair(s): Jusung Kim, *Hanbat National University*
Thierry Taris, *University of Bordeaux*

C1aL-02 Digital Circuits, Systems and Architectures for Machine Learning IV (Virtual Asia)

Time: Wednesday, June 1 (9:00-10:30)
Place: Room 2
Chair(s): Hao Zhang, *Ocean University of China*
Chip Hong Chang, *Nanyang Technological University*

9:00
C1aL-02.1 **An Automated Compiler for RISC-V Based DNN Accelerator** 3097
Zheng Wu[1], Wuzhen Xie[1], Xiaoling Yi[1], Haitao Yang[1], Ruiyao Pu[1], Xiankui Xiong[2,3], Haidong Yao[2,3], Chixiao Chen[1], Jun Tao[1], Fan Yang[1]
[1]Fudan University, China; [2]ZTE Corporation, China; [3]State Key Laboratory of Mobile Network and Mobile Multimedia Technology, China

9:18
C1aL-02.2 **Algorithm-Hardware Co-Optimization for Cost-Efficient ML-Based ISP Accelerator** 3102
Dongyoung Rim, Hyeokjun Kwon, Youngjoo Lee
Pohang University of Science and Technology, Korea

9:36
C1aL-02.3 **Dynamically Swappable Digit-Serial Multi-Precision Deep Neural Network Accelerator with Early Termination** 3107
Shen-Fu Hsiao, Hung-Ching Li, Yu-Che Yen, Po-Chang Li
National Sun Yat-sen University, Taiwan

9:54
C1aL-02.4 **An Ultra Energy Efficient Streaming-Based FPGA Accelerator for Lightweight Neural Network** 3111
Shaoyi Chen[1,2,4], Zhiqi Zhou[1,4], Yajun Ha[1,3]
[1]ShanghaiTech University, China; [2]Shanghai Institute of Technical Physics, Chinese Academy of Sciences, China; [3]Shanghai Engineering Research Center of Energy Efficient and Custom AI IC, China; [4]University of Chinese Academy of Sciences, China

10:12
C1aL-02.5 **Variable-Precision Approximate Floating-Point Multiplier for Efficient Deep Learning Computation**
Hao Zhang[1], Seok-Bum Ko[2]
[1]Ocean University of China, China; [2]University of Saskatchewan, Canada

C1aL-03 Multimedia Systems and Applications III (Virtual Asia)

Time: Wednesday, June 1 (9:00-10:30)
Place: Room 3
Chair(s): Dong Liu, *University of Science and Technology of China*

9:00
C1aL-03.1 **Approximate In-Memory Computing Using Memristive Imply Logic and its Application to Image Processing** 3115
Seyed Erfan Fatemieh[1], Mohammad Reza Reshadinezhad[1], Nima TaheriNejad[2]
[1]University of Isfahan, Iran; [2]Technische Universität Wien, Austria

9:18
C1aL-03.2 **Meta-Interpolation: Time-Arbitrary Frame Interpolation via Dual Meta-Learning** 3120
Shixing Yu[1], Yiyang Ma[1], Wenhan Yang[1], Wei Xiang[2], Jiaying Liu[1]
[1]Peking University, China; [2]Bigo Technology, Singapore

C1aL-04 Pattern Recognition, Deep Learning and Learning Systems IV (Virtual Asia)

Time: Wednesday, June 1 (9:00-10:30)
Place: Room 4
Chair(s): Jiajing Wu, *Sun Yat-sen University*

C1aL-05 Image/Video Quality Assessment and Enhancement (Virtual Asia)

Time: Wednesday, June 1 (9:00-10:30)
Place: Room 5
Chair(s): Guangtao Zhai, *Shanghai Jiao Tong University, China*
Wenrui Dai, *Shanghai Jiao Tong University, China*

9:00
C1aL-05.1 **A Full-Reference Image Quality Assessment Method with Saliency and Error Feature Fusion** .. 3165
Da Ai[1], Yunhong Liu[1], Yurong Yang[1], Mingyue Lu[1], Ying Liu[1], Nam Ling[2]
[1]Xi'an University of Posts and Telecommunications, China; [2]Santa Clara University, United States

9:18
C1aL-05.2 **A No-Reference Deep Learning Quality Assessment Method for Super-Resolution Images Based on Frequency Maps** 3170
Zicheng Zhang, Wei Sun, Xiongkuo Min, Wenhan Zhu, Tao Wang, Wei Lu, Guangtao Zhai
Shanghai Jiao Tong University, China

9:36
C1aL-05.3 **Recurrent Deformable Fusion for Compressed Video Artifact Reduction** 3175
Liuhan Peng[1], Askar Hamdulla[1], Mao Ye[2], Shuai Li[3], Hongwei Guo[4]
[1]Xinjiang University of China, China; [2]University of Electronic Science and Technology of China, China; [3]Shandong University, China; [4]Honghe University, China

9:54
C1aL-05.4 **Luminance-Guided Chrominance Image Enhancement for HEVC Intra Coding** 3180
Hewei Liu[1], Renwei Yang[1], Shuyuan Zhu[1], Xing Wen[2], Bing Zeng[1]
[1]University of Electronic Science and Technology of China, China; [2]Kuaishou, China

10:12
C1aL-05.5 **Improving Optical Flow Inference for Video Colorization** 3185
Rulin Huang, Shaohui Li, Wenrui Dai, Chenglin Li, Junni Zou, Hongkai Xiong
Shanghai Jiao Tong University, China

C1aL-06 Neural Network-Based Video Coding II (Virtual Asia)

Time: Wednesday, June 1 (9:00-10:30)
Place: Room 6
Chair(s): Li Zhang, *Bytedance Inc., San Diego*

9:00
C1aL-06.1 **Wavelet-Based Learned Scalable Video Coding** 3190
Cunhui Dong[1], Haichuan Ma[1], Dong Liu[1], John W. Woods[2]
[1]University of Science and Technology of China, China; [2]Rensselaer Polytechnic Institute, United States

9:18
C1aL-06.2 **A QP-Adaptive Mechanism for CNN-Based Filter in Video Coding** 3195
Chao Liu[1], Heming Sun[2,3], Jiro Katto[1,3], Xiaoyang Zeng[1], Yibo Fan[1]
[1]Fudan University, China; [2]JST PRESTO, Japan; [3]Waseda University, Japan

9:36
C1aL-06.3 **Deep Video Compression for P-Frame in Sub-Sampled Color Spaces** 3200
Rongqun Lin, Pingping Zhang, Meng Wang, Shiqi Wang, Sam Kwong
City University of Hong Kong, China

9:54
C1aL-06.4 **Joint Luma and Chroma Multi-Scale CNN In-Loop Filter for Versatile Video Coding** 3205
Yanchen Zhao, Kai Lin, Shanshe Wang, Siwei Ma
Peking University, China

10:12
C1aL-06.5 **Deep Learning-Assisted Video Compression Framework** 3210
Hengyu Man, Chang Yu, Feng Xing, Yang Cheng, Bo Zheng, Xiaopeng Fan
Harbin Institute of Technology, China

C2aL-01 Circuits and Techniques for Converters (Virtual Asia)

Time: Wednesday, June 1 (10:45-12:15)
Place: Room 1
Chair(s): Qiang Li, *University of Electronic Science and Technology of China*
Nuno Paulino, *Universidade Nova de Lisboa*

10:45
C2aL-01.1 **A Second-Order VCO-Based ΔΣ ADC with Fully Digital Feedback Summation** 3215
Chaoyang Xing[1], Yi Zhong[1], Jin Shao[2], Pengpeng Chen[3], Lu Jie[1], Nan Sun[1]
[1]Tsinghua University, China; [2]Beijing Smartchip Microelectronics Technology Co., Ltd, China; [3]Hangzhou Vango Technologies, Inc., China

11:03
C2aL-01.2 **Systematic Design for Multistage Feed-Forward Op-Amp for High-Speed Continuous-Time ΣΔ ADCs** 3219
Marco Saif[1,2], Alhassan Sayed[2,3], Michel Vasilevski[4], Mohamed Dessouky[1], Hassan Aboushady[2]
[1]Ain Shams University, Egypt; [2]Sorbonne University, France; [3]Minia University, Egypt; [4]Seamless Waves, France

11:21
C2aL-01.3 **A Charge-Redistribution Multi-Bit Stochastic-Resonance ADC Enhancing SNDR for Weak Input Signal** 3224
Ryoya Shibata[1], Zule Xu[1], Yasushi Hotta[2], Hitoshi Tabata[1], Tetsuya Iizuka[1]
[1]The University of Tokyo, Japan; [2]University of Hyogo, Japan

11:39
C2aL-01.4 **A Mismatch Compensation Scheme for Cyclic-Pipelined ADC via Dynamic Element Matching Technique** 3229
Yihao Yang, Yanjin Lyu, Yuanqi Hu
Beihang University, China

11:57
C2aL-01.5 **Mixed-Signal Integrated Circuit for Direct Raised-Cosine Filter Waveform Synthesis of Digital Signals Up to 24 GS/s in 22 nm FD-SOI CMOS Technology** 3234
Daniel Widmann, Raphael Nägele, Markus Grözing, Manfred Berroth
Universität Stuttgart, Germany

C2aL-02 Electronic Design Automation and Physical Design (Virtual Asia)

Time: Wednesday, June 1 (10:45-12:15)
Place: Room 2
Chair(s): Youngjoo Lee, *POSTECH*
Yeong-Kang Lai, *National Chung Hsing University*

10:45
C2aL-02.1 **Scalable Synthetic Circuit Generation Using Geometry Embedding for CAD Tool Assessment** 3239
Bing-Yu Li, Rung-Bin Lin
Yuan Ze University, Taiwan

C2aL-03 Multimedia Systems and Applications V (Virtual Asia)

Time: Wednesday, June 1 (10:45-12:15)
Place: Room 3
Chair(s): Hyun Kim, *Seoul National University of Science and Technology, South Korea*

C2aL-04 Memristive and CNT Circuits and Systems III (Virtual Asia)

Time: Wednesday, June 1 (10:45-12:15)
Place: Room 4
Chair(s): Adnan Harb, *Lebanese International University*
Koji Inone, *Kyushu University*

C2aL-05 Deep Learning for Visual Signal Representation and Processing (Virtual Asia)

Time: Wednesday, June 1 (10:45-12:15)
Place: Room 5
Chair(s): Hsu-Feng Hsiao, *National Yang Ming Chiao Tung University, Taiwan*

C2aL-06 Mixed-Signal Circuits for Machine Learning, Hardware Security and Edge Intelligence I (Virtual Asia)

Time: Wednesday, June 1 (10:45-12:15)
Place: Room 6
Chair(s): Vishal Saxena, *University of Delaware*

10:45
C2aL-06.1 **Analog-Memory-Based 14nm Hardware Accelerator for Dense Deep Neural Networks including Transformers** 3319
Atsuya Okazaki[1], Pritish Narayanan[2], Stefano Ambrogio[2], Kohji Hosokawa[1], Hsinyu Tsai[2], Akiyo Nomura[1], Takeo Yasuda[1], Charles Mackin[2], Alexander Friz[2], Masatoshi Ishii[1], Yasuteru Kohda[1], Katie Spoon[2], An Chen[2], Andrea Fasoli[2], Malte J. Rasch[3], Geoffrey W. Burr[2]
[1]IBM Research - Tokyo, Japan; [2]IBM Research - Almaden, United States; [3]IBM T. J. Watson Research Center, United States

11:03
C2aL-06.2 **High-Precision Nano-Amp Current Sensor and Obfuscation Based Analog Trojan Detection Circuit** 3324
Mostafa Abedi, Tiancheng Yang, Yunsi Fei, Aatmesh Shrivastava
Northeastern University, United States

11:21
C2aL-06.3 **Ali266: An Optimized VVC Software Encoder Implementation Towards Real-Time Applications** 3329
Jianhua Chen, Yan Ye, Liangwei Yu, Xinchao Dong, Shuqing Fang, Shengyang Xu, Zhiwei Huang, Ru-Ling Liao, Jie Liu, Rongbing Yang
Alibaba Group, China

11:39
C2aL-06.4 **An Efficient FPGA-Based Accelerator for Deep Forest** 3334
Mingyu Zhu, Jiapeng Luo, Wendong Mao, Zhongfeng Wang
Nanjing University, China

C3aL-01 Millimeter Wave Circuits (Virtual Asia)

Time: Wednesday, June 1 (14:00-15:30)
Place: Room 1
Chair(s): Raafat Lababidi, *ENSTA Bretagne*
Zhiyong Zhang, *Texas A&M University*

14:00
C3aL-01.1 **A 120-160 GHz 28 mW LNA in 70-nm GaAs mHEMT Technology** 3339
Che Hao Li[1], Chien-Nan Kuo[2]
[1]Industrial Technology Research Institute, Taiwan; [2]National Yang Ming Chiao Tung University, Taiwan

14:18
C3aL-01.2 **Design of a dB-Linear 21.5-to-36 GHz 6-Bit RF-VGA with Accurate Gain Control in 0.13-µm SiGe BiCMOS Technology** 3343
Yu Wang[1], Fanyi Meng[1], Kaixue Ma[1], Min Lu[2]
[1]Tianjin University, China; [2]ZTE Corporation, China

14:36
C3aL-01.3 **A 71-86 GHz Cascaded Harmonic Enhanced Tripler with -69 dBc Fundamental and -66 dBc Second Harmonic Suppression** 3347
Zhaoqi Chen[1], Chunqi Shi[1], Yuri Lu[1], Runxi Zhang[1], Hao Deng[2], Jinghong Chen[2]
[1]East China Normal University, China; [2]University of Houston, United States

C3aL-02 Low-Power Logic, Circuits and Architectures II (Virtual Asia)

Time: Wednesday, June 1 (14:00-15:30)
Place: Room 2
Chair(s): Weiwei Shan, *Souteast University*
Chung-An Shen, *Taiwan University of Science*

C3aL-03 High Energy-Efficient Hardware Acceleration (Virtual Asia)

Time: Wednesday, June 1 (14:00-15:30)
Place: Room 3
Chair(s): Vishal Saxena, *University of Delaware*

C3aL-04 Emerging Devices, Circuits and Systems (Virtual Asia)

Time: Wednesday, June 1 (14:00-15:30)
Place: Room 4
Chair(s): Alex James, *Clootrack Pvt Ltd.*
Xunzhao Yin, *Zheijiang University*

C3aL-05 Algorithm Optimization and Hardware Solutions for Low-Complexity Biomedical Signal Processing (Virtual Asia)

Time: Wednesday, June 1 (14:00-15:30)
Place: Room 5
Chair(s): Bruno Zatt, *Federal University of Pelotas, Brazil*

14:00
C3aL-05.1 **On the Design of Rationalised Bi-Orthogonal Wavelet Using Reversible Logic** **3428**
Sithara Raveendran, Pranose J. Edavoor, Nithin Kumar Y.B., Vasantha M.H.
National Institute of Technology Goa, India

14:18
C3aL-05.2 **Interleaved Hybrid Domain Learning for Super-Resolution MRI** **3433**
Vazim Ibrahim[1,2], Sumit Datta[1,2], Alex P. James[1,2], Joseph Suresh Paul[1,2]
[1]Kerala University of Digital Sciences, Innovation and Technology, India;
[2]Indian Institute of Information Technology and Management-Kerala, India

14:36
C3aL-05.3 **Speed Imagery EEG Classification with Spatial-Temporal Feature Attention Deep Neural Networks** **3438**
Xiaoqian Hao, Biao Sun
Tianjin University, China

14:54
C3aL-05.4 **A CMOS Axon-Sharing Neuron Array with Background Calibration** **3443**
Xiangao Qi[1], Jian Zhao[1], Guoxing Wang[1], Kea-Tiong Tang[2], Yongfu Li[1]
[1]Shanghai Jiao Tong University, China; [2]National Tsing Hua University, Taiwan

15:12
C3aL-05.5 **Toward Ultra-Large Scale Neural Spike Sorting with Distributed Sorting Channels and Unsupervised Training** **3448**
Junhong Sun, Tianhao Li, Tongtong Guo, Yongfu Li, Changyun Fu, Yan Liu
Shanghai Jiao Tong University, China

C3aL-06 Recent Progress in Theory and Applications of Memristive Technologies Toward a New Era in Electronic II (Virtual Asia)

Time: Wednesday, June 1 (14:00-15:30)
Place: Room 6
Chair(s): Alon Ascoli, *TU Dresden, Germany*

14:00
C3aL-06.1 **Analog Image Denoising with an Adaptive Memristive Crossbar Network** **3453**
O. Krestinskaya[1], K. Salama[1], A.P. James[2]
[1]King Abdullah University of Science and Technology, Saudi Arabia; [2]Digital University Kerala, India

14:18
C3aL-06.2 **Experimentally-Validated Crossbar Model for Defect-Aware Training of Neural Networks**
Ruibin Mao[1], Bo Wen[1], Mingrui Jiang[1], Jiezhi Chen[2], Can Li[1]
[1]University of Hong Kong, China; [2]Shandong University, China

14:36
C3aL-06.3 **Unstructured Weight Pruning in Variability-Aware Memristive Crossbar Neural Networks** **3458**
Aswani A.R[1], Chitra R.[2], A.P. James[1]
[1]Digital University Kerala, India; [2]IIITMK, India

14:54
C3aL-06.4 **Wave Cellular Automata for Computing Applications** **3463**
Theodoros Panagiotis Chatzinikolaou[1], Iosif-Angelos Fyrigos[1], Vasileios Ntinas[1,3], Stavros Kitsios[2], Panagiotis Bousoulas[2], Michail-Antisthenis Tsompanas[1], Dimitris Tsoukalas[2], Andrew Adamatzky[4], Georgios Ch. Sirakoulis[1]
[1]Democritus University of Thrace, Greece; [2]National Technical University of Athens, Greece; [3]Universitat Politecnica de Catalunya, Spain; [4]University of the West of England, United Kingdom

15:12
C3aL-06.5 **An Event-Driven Spiking Neural Network Accelerator with On-Chip Sparse Weight** **3468**
Yisong Kuang, Xiaoxin Cui, Chenglong Zou, Yi Zhong, Zhenhui Dai, Zilin Wang, Kefei Liu, Dunshan Yu, Yuan Wang
Peking University, China

C4aL-01 Analog Circuits with Adjustability (Virtual Asia)

Time: Wednesday, June 1 (15:45-17:15)
Place: Room 1
Chair(s): Jusung Kim, *Hanbat National University*
Roberto Gomez-Garcia, *Universidad de Alcala*

15:45
C4aL-01.1 **A True Time Delay Element Using Cascaded Variable Bandwidth All Pass Filters** **3473**
Mayur S. Marinaik, Ganga K. Maheshwarappa, Naveen Kadayinti
Indian Institute of Technology Dharwad, India

16:03
C4aL-01.2 **OTA Based Fractional-Order Oscillator with Controlled Phase Difference** **3478**
Garima Varshney, Neeta Pandey, Rajeshwari Pandey
Delhi Technological University, India

16:21
C4aL-01.3 **A PVT-Invariant Front-End Ring Amplifier Using Self-Stabilization Technique for SAR ADC** **3483**
Chi-Wei Chen, Chien-Yu Su, Hsin-Shu Chen
National Taiwan University, Taiwan

16:39
C4aL-01.4 **A Novel Low-Leakage ESD Power Clamp Circuit with Adjustable Transient Response Time** **3488**
Zilong Shen[1], Yize Wang[2], Xing Zhang[1], Yuan Wang[1]
[1]Peking University, China; [2]Beijing Microelectronics Technology Institute, China

16:57
C4aL-01.5 **An Integrated 200MHz 4A Pulsed Laser Driver with DLL-Based Time Interpolator for Indirect Time-of-Flight Applications** **3493**
Shenglong Zhuo[1], Yuwei Wang[2], Tao Xia[1], Yifan Wu[2], Lichun Xie[2], Wei Zheng[2], Zhihong Lin[1], Miao Sun[1], Lei Zhao[1], Yajie Qin[1], Rui Bai[2], Patrick Yin Chiang[1]
[1]Fudan University, China; [2]PhotonIC Technologies, China

C4aL-02 Digital Circuits and Systems (Virtual Asia)

Time: Wednesday, June 1 (15:45-17:15)
Place: Room 2
Chair(s): Taigon Song, *Kyungbook National University, South Korea*

15:45
C4aL-02.1 **Quantified Satisfiability-Based Simultaneous Selection of Multiple Local Approximate Changes under Maximum Error Bound** 3498
Chenfei Lou[1], Weihua Xiao[1], Weikang Qian[1,2]
[1]University of Michigan-Shanghai Jiao Tong University Joint Institute, Shanghai Jiao Tong University, China; [2]Shanghai Jiao Tong University, China

16:03
C4aL-02.2 **Adversarial Sample Generation for Lithography Hotspot Detection** 3503
Shuyuan Sun, Yiyang Jiang, Fan Yang, Xuan Zeng
Fudan University, China

16:21
C4aL-02.3 **Systems on a Chip with 8bits and 32bits Processors in 0.18µm Technology for IoT Applications**
Marco Sarmiento, Khai-Duy Nguyen, Ckristian Duran, Ronaldo Serrano, Trong-Thuc Hoang, Koichiro Ishibashi, Cong-Kha Pham
University of Electro-Communications, Japan

16:39
C4aL-02.4 **Low Error-Rate Approximate Multiplier Design for DNNs with Hardware-Driven Co-Optimization** 3507
Yao Lu, Jide Zhang, Su Zheng, Zhen Li, Lingli Wang
Fudan University, China

16:57
C4aL-02.5 **TDPRO: Ultra-Low Power ECG Processor with High-Precision Time-Domain Computing Engine** 3512
Liang Chang, Siqi Yang, Huinan Wang, Jianbiao Xiao, Xin Zhao, Shuisheng Lin, Jun Zhou
University of Electronic Science and Technology of China, China

C4aL-03 Intelligent Analysis and Decision-Making of Large-Scale Nonlinear Complex Systems II (Virtual Asia)

Time: Wednesday, June 1 (15:45-17:15)
Place: Room 3
Chair(s): Hassan Najafi, *University of Louisiana*

15:45
C4aL-03.1 **Temporal Analysis of Transaction Ego Networks with Different Labels on Ethereum** 3517
Baoying Huang[1], Jieli Liu[1], Jiajing Wu[1], Quanzhong Li[1], Hao Lin[2]
[1]Sun Yat-sen University, China; [2]Merchants Union Consumer Finance Company Limited, China

16:03
C4aL-03.2 **Predicting Onset Time of Cascading Failure in Power Systems Using a Neural Network-Based Classifier** 3522
Junyuan Fang, Dong Liu, Chi K. Tse
City University of Hong Kong, China

16:21
C4aL-03.3 **Analysis of Q-Learning Like Algorithms through Evolutionary Game Dynamics**
Yiming Shi, Zhihai Rong
University of Electronic Science and Technology of China, China

16:39
C4aL-03.4 **Phishing Detection on Ethereum via Attributed Ego-Graph Embedding**
Yijun Xia, Jieli Liu, Tao Huang, Jiajing Wu
Sun Yat-sen University, China

16:57
C4aL-03.5 **Evolution of Locality on Ethereum Transaction Network** **3527**
Dingyuan Lu[1], Jieli Liu[1], Shanhe Zhao[2], Jiajing Wu[1]
[1]Sun Yat-sen University, China; [2]Merchants Union Consumer Finance Co.,Ltd., China

C4aL-04 New Emerging Principles and Applications (Virtual Asia)

Time: Wednesday, June 1 (15:45-17:15)
Place: Room 4
Chair(s): Sudeb Dasgupta, *Indian Instutue of Researh of Rookea*
Xueqing Li, *Tsinghua University*

15:45
C4aL-04.1 **STATE: A Test Structure for Rapid Prediction of Resistive RAM Electrical Parameter Variability** **3532**
Hassan Aziza[1], Jérémy Postel-Pellerin[1], Hussein Bazzi[1,2], Mathieu Moreau[1], Adnan Harb[2]
[1]IM2NP, Aix-Marseille Université, France; [2]Lebanese International University, Lebanon

16:03
C4aL-04.2 **A High-Voltage Characterisation Platform for Emerging Resistive Switching Technologies** **3537**
Jiawei Shen, Andrea Mifsud, Lijie Xie, Abdulaziz Alshaya, Christos Papavassiliou
Imperial College London, United Kingdom

16:21
C4aL-04.3 **Temperature Sensing System with Flexible Electronics Using Oxide TFTs** **3542**
Suyash Shrivastava, Pydi Ganga Bahubalindruni
Indian Institute of Science Education and Research, Bhopal, India

16:39
C4aL-04.4 **Design of Variable Bit-Width Arithmetic Unit Using Single Flux Quantum Device** **3547**
Iori Ishikawa[1], Ikki Nagaoka[2], Ryota Kashima[2], Koki Ishida[1], Kosuke Fukumitsu[1], Keitaro Oka[1], Masamitsu Tanaka[2], Satoshi Kawakami[1], Teruo Tanimoto[1], Takatsugu Ono[1], Akira Fujimaki[2], Koji Inoue[1]
[1]Kyushu University, Japan; [2]Nagoya University, Japan

16:57
C4aL-04.5 **Bionic Robust Memristor-Based Artificial Nociception System for Robotics** **3552**
Guangyu Feng, Bokyung Kim, Hai Li
Duke University, United States

C4aL-05 References and Regulators (Virtual Asia)

Time: Wednesday, June 1 (15:45-17:15)
Place: Room 5
Chair(s): Joseph Chang, *Nanyang Technological University*
Mohamad Sawan, *Westlake University*

15:45
C4aL-05.1 **A Nanopower 95.6% Efficiency Voltage Regulator with Adaptive Supply-Switching for Energy Harvesting Applications** 3557
Yiwei Zou, Xinling Yue, Sijun Du
Delft University of Technology, The Netherlands

16:03
C4aL-05.2 **Optimization of CMOS Voltage Reference with Prediction Based on Multi-Group Hierarchical Collaborative Evolution and GBDT** 3562
Yanhan Zeng, Peidong Lin, Mingrui Lv, Shangzuo Xie, Mingjiang Hou, Jingci Yang, Weijian Chen
Guangzhou University, China

16:21
C4aL-05.3 **An Input-Output Regulated Adaptive Ramp for Fast Load Transition of PWM Buck Convertor** 3566
Bingbing He[1], Haoran Li[2], Mingyi Chen[1], Yongfu Li[1], Yan Liu[1], Yang Zhao[1]
[1]Shanghai Jiao Tong University, China; [2]Alibaba DAMO Academy, China

16:39
C4aL-05.4 **LDO Regulator Optimized on Power Efficiency and Load Transient Response with Voltage Damper and Body Loop Feedback** 3571
Heebae Kim, Seung Soo Kwak, Yong Sin Kim
Korea University, Korea

16:57
C4aL-05.5 **A Single-Inductor Triple-Output Buck-Boost Converter with Output Ripple Control for Wearable Devices** 3575
Zhi-Yun Hsu[1], Chi-Wei Liu[1], Jun-Wan Wu[1], Wei-Jen Chang[2], Tsung-Ling Li[2], Po-Hung Chen[1]
[1]National Yang Ming Chiao Tung University, Taiwan; [2]Gear Radio Electronics Corp., Taiwan