

IEEE NorCAS 2020, October 27-28, 2020 – virtual from Oslo, Norway

Preliminary Programme

Times in Central European Time CET (GMT+1)!!!

Tuesday October 27

12:00 **Opening** (*Jari Nurmi*)

12:20 **Keynote 1** (*Chair: Jari Nurmi*)

Compressive sensing (CS) Circuits and Systems for Intelligent Biomedical Signal Processing

An-Yeu (Andy) Wu, National Taiwan University, Taiwan

13:20 **Plenary 1** (*Chair: Dag T. Wisland*)

13:20 HyVE: A Hybrid Voting-based Eviction Policy for Caches

Akshay Srivatsa, Sebastian Nagel, Nael Fafous, Nguyen Anh Vu Doan, Thomas Wild, Andreas Herkersdorf, Technical University of Munich, Germany

13:40 Multi-threshold voltage and dynamic body biasing techniques for energy efficient ultra low voltage subthreshold adders

Somayeh Zadeh, Trond Ytterdal, Snorre Aunet, NTNU, Norway

14:00 Break

14:20 – 16:00 Parallel sessions

14:20 **Data Converters** (*Chair: Atila Alvandpour*)

14:20 A 10b 1GS/s Inverter-Based Pipeline ADC in 65nm CMOS

Timmy Sundström¹, Javad Bagheri Asli², Christer Svensson², Atila Alvandpour²

1) SAAB AB Linköping, Sweden; 2) Linköping University, Sweden

14:40 A 10-bit 3.75-GS/s Binary-Weighted DAC with 58.6-pJ Energy Consumption in 65-nm CMOS, Oscar Morales¹, Jacob Wikner¹, Atila Alvandpour¹, Litter Siek²

1) Linköping University, Sweden; 2) Nanyang Technological University, Singapore

15:00 Digital Timing Error Calibration of Time-Interleaved ADC with Low Sample Rate
Marko Neitola, University of Oulu, Finland

14:20 **Scheduling, Approximation and Error Resilience** (*Chair: Peeter Ellervee*)

14:20 Low Power Scheduling of Periodic Hardware Tasks in Flash-Based FPGAs

Cornelia Wulf, Michael Willig, Diana Göhringer, Technische Universität Dresden, Germany

14:40 Model-Based Design Space Exploration for Approximate Image Processing on FPGA
Manu Manuel¹, Arne Kreddig², Simon Conrady³, Nguyen Anh Vu Doan¹, Walter Stechele¹

1) Technical University of Munich, Germany; 2) SmartRay GmbH, Germany;
3) Arnold & Richter Cine Technik, Germany

15:00 Novel Lockstep-based Approach with Roll-back and Roll-forward Recovery to Mitigate Radiation-Induced Soft Errors

Server Kasap, Eduardo Weber Wächter, Xiaojun Zhai, Shoaib Ehsan, Klaus D. McDonald-Maier, University of Essex, United Kingdom

- 15:20 **Amplifiers** (Chair: Ivan Jørgensen)
- 15:20** Schmitt Trigger Based Single-Ended Voltage Amplifier with Positive Feedback Control for Ultra-Low-Voltage Supplies
Luis Henrique Rodvalho, Federal University of Santa Catarina, Brazil
- 15:40** On the Design of a CMOS-integrated Load Modulated Balanced Amplifier
Ted Johansson, Srivatsa Samji, Linköping University, Sweden
- 15:20 **FPGA Applications** (Chair: Snorre Aunet)
- 15:20** A FPGA-based Hardware Accelerator for Bayesian Confidence Propagation Neural Network
Lizheng Liu^{1,2}, Deyu Wang¹, Yuning Wang¹, Anders Lansner², Ahmed Hemani², Yu Yang², Xiaoming Hu², Zhuo Zou¹, Lirong Zheng¹
1) Fudan University, Shanghai, China;
2) Royal Institute of Technology (KTH), Stockholm, Sweden
- 15:40** A Parallel and Pipelined Implementation of a Pascal-Simplex Based Two Asset Option Pricer on FPGA using OpenCL
Aidan O Mahony¹, Gil Zeidan², Bernard Hanzon¹, Emanuel Popovici¹
1) University College Cork, Ireland; 2) Intel Corporation, Massachusetts, USA
- 16:00 Break
- 16:20 **Keynote 2** (Chair: Jari Nurmi)
- Approximate Computing: Test and Reliability issues and opportunities**
- Alberto Bosio, INL-ECL, France**
- 17:20 End of day 1

Wednesday October 28

- 12:00 **Keynote 3** (Chair: Dag T. Wisland)
- Future Human: Merging Minds and Machines**
- Tim Constandinou, Imperial College, UK**
- 13:00 **Plenary 2** (Chair: Dag T. Wisland)
- 13:00** A Design Method to Minimize the Impact from Bit Conversion Errors in SAR ADCs
Siyu Tan¹, Mattias Palm², Daniele Mastantuono², Roland Strandberg², Lars Sundström², Sven Mattisson^{1,2}, Pietro Andreani¹
1) Department of Electrical and Information Technology, Lund University, Lund, Sweden;
2) Ericsson Research, Lund, Sweden
- 13:20 Break

13:40 – 16:40 Parallel Sessions

13:40 **Biomedical/Bioinspired** (Chair: Kristian G. Kjelgård)

13:40 A Low Power Front-end for Biomedical Fluorescence Sensing Applications

Seyed Ruhallah Qasemi, Maryam Rafati, Atila Alvandpour, Linköping University, Sweden

14:00 A Power Efficient, High Gain and High Input Impedance Capacitively-coupled Neural Amplifier

Erwin Habibzadeh Tonekabony Shad¹, Tania Moeinfard², Marta Molinas¹, Trond Ytterdal¹

1) NTNU, Norway; 2) York, Canada

14:20 Design of a Current Mode Multiplexed Circuit for Integrate & Fire Neuromorphic Systems

Fausto Sargeni, Vincenzo Bonaiuto, University of Rome Tor Vergata, Italy

13:40 **Digital Circuits and Systems** (Chair: Peeter Ellervee)

13:40 Comparative Study of Single, Regular and Flip well Subthreshold SRAMs in 22 nm FDSOI Technology

Somayeh Hossein Zadeh, Trond Ytterdal, Snorre Aunet, NTNU, Norway

14:00 A 90nm PVT Tolerant Current Mode Frequency Divider with Wide Locking Range

Madhusudan Maiti¹, Shubhro Chakrabartty², AlaaDdin Al-Shidaifat², Hanjung Song², Bidyut Kumar Bhattacharyya³, Alak Majumder¹

1) Integrated Circuit & System Lab, Department of ECE, National Institute of Technology Arunachal Pradesh, Yupia 791112, India;

2) Department of Nanoscience and Engineering, Centre for Nano Manufacturing, Inje University, Gimhae 50834, Korea;

3) Packaging Research Center, Georgia Institute of Technology, Atlanta, GA 30332, USA

14:20 Electro-Optic Reversible Toffoli Gate with Optimal Count of LiNbO₃ Mach-Zehnder Interferometers

Shashank Awasthi¹, Saurav Sharma², Sanjeev Kumar Metya¹, Alak Majumder¹

1) National Institute of Technology Arunachal Pradesh;

2) Galgotias College of Engineering & Technology Greater Noida

14:40 **Analog Circuits** (Chair: Atila Alvandpour)

14:40 Low Power Class-AB Line Driver with Adaptive Digital Impedance Control for Fast Ethernet

Simon Buhr, Martin Kreißig, Christian David Matthus, Florian Protze, Frank Ellinger

Technische Universität Dresden, Germany

15:00 Origins of Intermodulation Distortion in A Pseudo-differential CMOS Beamforming Receiver

Negar Shabanzadeh¹, Mahmoud Shehab², Rehman Akbar¹, Aarno Pärssinen¹, Timo Rahkonen¹

1) University of Oulu, Finland; 2) Nokia Oyj

14:40 **Digital Applications** (Chair: Snorre Aunet)

14:40 Matrix Decomposition for Massive MIMO Detection

Shahriar Shahabuddin¹, Muhammad Hasibul Islam¹, Mohammad Shahanewaz Shahabuddin²,

Mahmoud A. Albreem^{1,3}, Markku Juntti¹

1) Centre for Wireless Communications, University of Oulu; 2) Vaasa University of Applied Science, Finland; 3) A'Sharqiyah University, Oman

15:00 Digital Architecture for MUAPs Propagation Speed Estimator triggered by Foot Plant Switch

Giovanni Mezzina, Daniela De Venuto, Politecnico di Bari, Italy

15:20 Break

15:40 **Microwave Circuits** (Chair: Kristian G. Kjelgård)

15:40 A 500 mV, 4.5 mW, 16 GHz VCO with 33.3% FTR, designed for the 5G application
Piyush Kumar¹, Dario Stajic¹, Enno Boehme², Erkan Nevzat Isa², Linus Maurer¹

1) University Bundeswehr; 2) Fraunhofer Research Institution for Microsystems and Solid State Technologies EMFT, Munich, Germany

16:00 A Voltage Controlled Oscillator with Inductive Divider Design and Analysis at Frequencies Above 100 GHz

Yasir Shafiullah, Rehman Akbar, Mikko Hietanen, Aarno Pärssinen, University of Oulu, Finland

16:20 Software-Defined Radio Assessment for Microwave Imaging Breast Cancer Detection
Dionisio Carvalho¹, Alexandre J. Aragão^{1,2}, André Ferrari¹, Bruno Sanches¹, Wilhelmus Noije¹

1) Department of Electronic Systems Engineering of the School of Engineering (USP), São Paulo, Brazil;

2) Federal Institute of Education, Science and Technology (IFSP), São Paulo, Brazil

15:40 **Network-on-Chip** (Chair: Peeter Ellervee)

15:40 Exploring Task and Channel Mapping Strategies in Fail-Operational and Hard Real-Time NoCs

Max Koenen, Nguyen Anh Vu Doan, Thomas Wild, Andreas Herkersdorf
Technical University of Munich, Germany

16:00 A Study of the Impact of Formulation of Cost Function in Task Mapping Problem on NoCs

Jesse Barreto de Barros¹, Nidhi Anantharajaiah², Mauricio Ayala-Rincon³, Carlos Humberto Llanos⁴, Jürgen Becker⁵

1) Universidade de Brasilia, Brazil; 2) Karlsruhe Institute of Technology (KIT); 3) Universidade de Brasilia, Brazil; 4) Universidade de Brasilia, Brazil; 5) Karlsruhe Institute of Technology (KIT)

16:20 Synthesizable Synchronization FIFOs Utilizing the Asynchronous Pulse-Based Handshake Protocol

Ameer M.S. Abdelhadi, University of Toronto, Canada

16:40 **Keynote 4** (Chair: Jari Nurmi)

Software-Defined Radio Education and the Next Generation of Wireless Communications Innovators

Alexander Wyglinsky, Worcester Polytechnic Institute, MA, USA

17:40 **Awards and Closing** (Chair: Jari Nurmi)