

Programme 30 October 2018

09.00 Opening and welcome

Jari Nurmi, Tampere University of Technology, FI
Peeter Ellervee, Tallinn University of Technology, EE

1. Plenary session

Chair: Tor S. Lande, University of Oslo, NO

09.15 Invited talk: UWB Radar Sensor

Dag T. Wisland, Novelda AS, NO

10.00 A RF Pulse-Width and Pulse-Position Modulator IC in 28 nm FDSOI CMOS

Markus Grözing¹, Johannes Digell¹, Thomas Veigell¹, Robert Bieg¹, Jianxiong Zhang¹, Simon Brandl¹, Martin Schmidt¹, Christoph Haslach², Daniel Markert², Wolfgang Templ²
¹University of Stuttgart, DE; ²Nokia Bell Labs, DE

10.20 A 0.0186 mm², 0.65 V Supply, 9.53 ps RMS Jitter All-Digital PLL for Medical Implants

Arjun Ramaswami Palaniappan^{1,2}, LITER Siek¹, ¹School of Electrical and Electronic Engineering, VIRTUS, Nanyang Technological University, SG; ²NXP Semiconductors, SG

10.40 Unleashing the full power of feed-forward opamps: a 200MHz, fully differential, conditionally stable, 36dB gain PGA, using a four-stage multi-path 2.5V amplifier with double feed-forward compensation.

Vahur Kampus¹, Martin Trojer¹, Robert Teschner², ¹Intel Austria GmbH; ²IMST GmbH, AT

11.00 Coffee break

2.1 Power/Amplifiers

Chair:

11.30 A 24 GHz, 18 dBm, Broadband, Three Stacked Power Amplifier in 28nm FDSOI

Imad ud Din¹, Stefan Andersson¹, Therese Forsberg², Henrik Sjöland^{1,2}, ¹Ericsson AB, SE; ²Lunds Tekniska Högskola, SE

11.50 A Design Approach for SiGe Low-Noise Amplifiers Using Wideband Input Matching

Zhe Chen, Hao Gao, Peter Baltus, Eindhoven University of Technology, NL

12.10 Design of Stacked-MOS Transistor mm-Wave Class C Amplifiers for Doherty Power Amplifiers

Mohammad Hassan Montaseri, University of Oulu, FI

2.2 Network-on-Chip

Chair:

Multi-Swarm based NoC Configuration and Synthesis

Muhammad Obaidullah, Gul Nawaz Khan, Fei Yuan, Ryerson University, CA

Fault-Tolerant and Energy-Efficient Communication in Mixed-Criticality Networks-on-Chips

Adele Maleki, Hamidreza Ahmadian, Roman Obermaisser, University of Siegen, Germany

A Distributed DoS Detection Scheme for NoC-based MPSoCs

Cesar G. Chaves¹, Siavoosh Payandeh Azad², Thomas Hollstein^{1,2}, Johanna Sepúlveda³, ¹Frankfurt University of Applied Sciences, DE; ²Tallinn University of Technology, EE; ³Technical University of Munich, DE

12.30 Lunch

3.1 Data Converters

Chair:

- 13.40 Flying-Capacitor Bottom-Plate Sampling Scheme for Low-Power High-Resolution SAR ADCs
Dmitry Osipov, Steffen Paul, ITEM, DE
- 14.00 A Configurable Hysteresis Comparator for Asynchronous Sigma-Delta Modulators
Olaitan Olabode, Vishnu Unnikrishnan, Ilija Kempf, Andreas Hammer, Marko Kosunen, Jussi Ryyanen, Aalto University, FI
- 14.20 A Row-Column Accessed Dynamic Element Matching DAC Architecture for SAR ADCs
Mustafa Kilic, Selman Ergunay, Yusuf Leblebici, EPFL, CH

3.2 Test and Fault Tolerance

Chair:

- Mitigating Multi-bit Soft Errors in ASIC Registers Using ECC-aware Register Clustering
Keisuke Inoue, International College of Technology, Kanazawa, JP
- On Designing PUF-Based TRNGs with Known Answer Tests
Yang Yu, Elena Dubrova, Mats Näslund, Sha Tao, KTH Royal Institute of Technology, SE
- Semiconductor Component Fault Assessment and Probability Impact Estimation on Application Level
Jonas Stricker¹, Clemens Kain², Jerome Kirscher², Andi Buzo², Linus Maurer¹, Georg Pelz², ¹Bundeswehr Universität München, DE; ²Infineon Technologies AG, DE

4. Poster session I

Coffee break

- 14.40 A Comparison of Polar and Quadrature RF-PWM
Muhammad Fahim Ul Haque¹, Muhammad Touqir Pasha², Tahir Malik¹, Ted Johansson², INED University of Engineering and Technology, PK; ²Linköping University, SE
- A Radiation Hardened 16 GS/s Arbitrary Waveform Generator IC for a Submillimeter Wave Chirp-Transform Spectrometer
Philip Ostrovskyy¹, Oliver Schrape¹, Klaus Tittelbach-Helmrich¹, Frank Herzell¹, Gunter Fischer¹, Peter Boerner³, Alexander Loose³, David Hellmann³, Paul Hartogh³, Dietmar Kissinger^{1,2}, ¹IHP, DE; ²TU Berlin, DE; ³Max Planck Institut for Solar System Research, DE
- Insertion-Loss Optimization of Transformer-based Matching Networks for mm-Wave Applications
David Bierbüsse, Renato Negra, RWTH Aachen, DE
- FPGA Based Hybrid Computing Platform for ESS Linac Simulator
Arun Jeevaraj¹, Emmanuel Laface², Maurizio Donna², Fredrik Edman¹, Liang Liu¹, ¹Lund University, SE; ²ESS, SE
- Analysis of Synchronous-Asynchronous NoC for the Dark Silicon Era
Reem Walid Etman¹, Salma Hesham¹, Diana Goehringer², Mohamed AbdelGhany¹, Klaus Hofmann³, ¹IGUC, EG; ²TU-Dresden, DE; ³IES TU-Darmstadt, DE
- Master-Clone Placement with Individual Clock Tree Implementation – a Case on Physical Chip Design
Oliver Schrape¹, Alexey Balashov¹, Aleksandar Simevski¹, Carlos Benito², Milos Krstic^{1,3}, ¹IHP, DE; ²Arquimea Deutschland GmbH, DE; ³University of Potsdam, DE

- 15.30 **Invited talk: Modular Arithmetic based Circuits and Systems for Emerging Technologies and Applications: Deep Neural Networks and Cryptography**
Leonel Sousa, Instituto Superior Técnico, PT

5.1 High Frequency

Chair:

- 16.15 A 15-50GHz Multiplexer Circuit in 130nm SiGe BiCMOS Technology for Ultra-Wide Frequency Ramps in FMCW Radar
Frank Herzel¹, Arzu Ergintav¹, Johannes Borngräber¹, Dietmar Kissinger^{1,2}, IHHP, DE;²Technische Universität Berlin, DE
- 16.35 Building lumped models for measured passive mm-wave components
Eero Sankila, Veeti Kiuru, Janne P. Aikio, Timo Rahkonen, University of Oulu, FI
- 16.55 A 4.3-mW mm-Wave Divide-by-Two Circuit with 30% Locking Range in 28-nm FD-SOI CMOS
Therese Forsberg, Johan Wernehag, Henrik Sjöland, Markus Törmänen, Lund University, SE

5.2 SoC Applications

Chair:

- Three-Dimensional Dynamic Programming Accelerator for Multiple Sequence Alignment
Ruei-Ting Chien¹, Yi-Lun Liao¹, Chien-An Wang², Yu-Cheng Li², Yi-Chang Lu^{1,2}, ¹National Taiwan University, TW;²Graduate Institute of Electronics Engineering, National Taiwan University, TW
- Design and Implementation of 2D IDCT/IDST-Specific Accelerator on Heterogeneous Multicore Architecture
Mohammad Ali Pourabed, Sajjad Nouri, Jari Nurmi, Tampere University of Technology, FI

- Embedded Programmable Processor for Compressive Sensing Applications
Mehdi Safarpour, Ilkka Hautala, Olli Silven, University of Oulu, FI

17.15 Break

19.00 **Dinner**

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09.00 **Invited talk: Transprecision Computing Circuits for Energy Efficiency**
Christoph Hagleitner, IBM Research, CH

6. Poster session II

Coffee break

09.45 Time-gated CMOS SPAD and a Quantum Well Laser Diode with a CMOS driver for Time-Resolved Diffuse Optics Imaging
Jan Nissinen, Ilkka Nissinen, Sahba Jahromi, Tuomo Talala, Juha Kostamovaara, University of Oulu, FI

Analysis and Design of ESD Protection for Robust Low-Power Pierce Crystal Oscillator Startup
Kim B. Östman¹, Erlend Strandvik², Phil Corbishley², Tor Ø. Vedal², Mika Salmi¹, 1Nordic Semiconductor Finland Oy, FI; 2Nordic Semiconductor ASA, NO

An 87% Peak Efficiency, 37W, Class H Audio Amplifier with GaN Output Stage
Nardi Utomo¹, Liter Siek¹, Heng Goh Yap¹, Don Disney², Lawrence Selvaraj², Lulu Peng², 1Nanyang Technological University, SG; 2GlobalFoundries Inc

Comparison of Ultra Low Power Full Adder Cells in 22 nm FDSOI Technology
Somayeh Hossein Zadeh, Trond Ytterdal, Snorre Aunet, NTNU, NO

Dynamically Reconfigurable Gearbox Switched-Capacitor DC-DC Converter
Dennis Øland Larsen^{1,2}, Martin Vinter², Ivan Jørgensen¹, 1Technical University of Denmark, DK; 2GN Hearing A/S, DK

Characterization and Considerations for Upset in FPGA
Christian Johansson, Torbjörn Månefjord, Saab AB, SE

Methods for controlling sub system inputs in a SoC for ATPG Testing
Sunjiv Sachan, Sreenath AK, Anand S, Intel Technology India PVT ltd, IN

6. Plenary session

Chair:

10.30 Design and Implementation of Multi-Purpose DCT/DST-Specific Accelerator on Heterogeneous Multicore Architecture
Sajjad Nouri¹, Ramin Ghaznavi-Youvalari², Jari Nurmi¹, 1Tampere University of Technology, FI; 2Nokia Technologies, FI

10.50 VELs: VHDL E-Learning System for Automatic Generation and Evaluation of Per-Student Randomized Assignments
Martin Mosbeck, Daniel Hauer, Axel Jantsch, TU Wien, AT

7.1 Data Converters

Chair:

11.10 A 10b SAR ADC with Widely Scalable Sampling Rate and AGC Amplifier Front-End

7.2 Extra Functional Design Aspects

Chair: Maksim Jenihhin, Tallinn University of Technology, EE

Energy-Delay Trade-offs in Instruction Register File Design

*Ayca Akkaya*¹, *Firat Celik*¹, *Armin Tajalli*²,
*Yusuf Leblebici*¹, ¹*EPFL, CH*; ²*The University*
of Utah, US

Joonas Iisakki Multanen, *Heikki Olavi Kultala*,
Pekka Olavi Jääskeläinen, *Tampere University*
of Technology, FI

- 11.30 Design Considerations and Evaluation of a High-Speed SAR ADC
Victor Åberg, *Christian Fager*, *Lars Svensson*,
Chalmers University of Technology, SE
- 11.50 On the Noise Considerations of the Pulse-Shaping Based TIA Channel Designed for a Pulsed TOF Laser Radar Receiver
Aram Baharmast, *Juha Kostamovaara*,
University of Oulu, Oulu, FI
- 12.10 **Lunch**
- 13.15 **Invited talk: Solutions for cooler, smaller, lighter and better sounding audio products**
Mikkel Høyerby, *Merus Audio, DK*
- 14.00 NorCAS 2019 announcement and Best Paper Award

8.1 Power Amplifiers

Chair:

- 14.15 Low-Power Regulator for Micro Energy Harvesting Applications
*Tapani Antero Nevalainen*¹, *Esteban Ferro*²,
*Víctor Manuel Brea*², *Paula López*², *Ari*
*Paasio*¹, ¹*University of Turku, FI*,
²*Universidade de Santiago de Compostela, ES*
- 14.35 Application Specific Integrated Gate-Drive Circuit for Driving Self-Oscillating Gallium Nitride & Logic-Level Power Transistors
Jacob Elias Fæster Overgaard, *Jens Christian Hertel*, *Jens Pejtersen*, *Arnold Knott*,
Technical University of Denmark, DE
- 14.55 Design of Multi-Stacked CMOS mm-Wave Power Amplifiers for Phased Array Applications Using Triple-Well Process
Mohammad Hassan Montaseri, *University of*
Oulu, FI

8.2 Application-Specific Design Optimizations

Chair: *Peeter Ellervee*, *Tallinn University of*
Technology, EE

- GPU-enhanced Multimodal Dense Matching
Nicolai Behmann, *Max Mehlretter*, *Sebastian P.*
Kleinschmidt, *Bernardo Wagner*, *Christian*
Heipke, *Holger Blume*, *Leibniz University*
Hannover, DE
- A Low-Power Hardware Stack for Continuous Data Streaming from Telemetry Implants
Ilia Kempfi, *Nouman Ahmed*, *Andreas Hammer*,
Olaitan Olabode, *Vishnu Unnikrishnan*, *Marko*
Kosunen, *Jussi Ryyanen*, *Aalto University, FI*
- Implementation of an Area Efficient Crypto Processor for a NB-IoT SoC Platform
Luis Cavo, *Sebastien Fuhrmann*, *Liang Liu*,
Lund University, SE

- 15.15 **Coffee**

Biomedical Systems

Chair:

- 15.40 Current Readout Circuit for Point-of-Care Infectious Disease Diagnostics in Animal Health
Kathy Hanley¹, Aidan Murphy¹, Niamh Creedon², Alan O' Riordan², Daniel O' Hare¹, Ivan O' Connell¹, ¹ (MCCI), Tyndall National Institute, IE;² (NTG), Tyndall National Institute, IE
- 16.00 High-speed Sampling System in CMOS
 E. Ulvestad, K. G. Kjølgaard, T. Moradi Khanshan, D. T. Wisland, T. S. Lande.
University of Oslo, NO
- 16.20 CMOS LIDAR for Biosensing
Tohid Moradi Khanshan, Kristian Gjertsen Kjølgaard, Emil Ulvestad, Dag T Wisland, Tor Sverre Lande, University of Oslo, NO
- 16.40 **Finish**

Data Processing Systems

Chair:

- Low-latency Packet Parsing in Software Defined Networks
Hesam Zolfaghari¹, Davide Rossi², Jari Nurmi¹, ¹Tampere University of Technology, FI;²University of Bologna, IT
- Time-predictable Distributed Shared Memory for Multi-core Processors
Simon Thye Andersen, Morten Borup Petersen, Anthon Vincent Riber, Martin Schoeberl, DTU, Denmark
- Goal Formulation: Abstracting Dynamic Objectives for Efficient On-chip Resource Allocation
Elham Shamsa¹, Anil Kanduri¹, Amir M. Rahmani^{2,3}, Pasi Liljeberg¹, Axel Jantsch³, Nikil Dutt², ¹ University of Turku, Turku, FI;²University of California, Irvine, US;³TU Wien, AT

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