Tampere, Finland
27-28 October 2014

Norchip
THE NORDIC MICROELECTRONICS EVENT

Technically co-sponsored by:

IEEE CAS

CONFERENCE SECRETARIAT

Technoconsult ApS
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MONDAY 27 OCTOBER 2014

09.00 Opening and welcome
Jari Nurmi, Tampere University of Technology (FI)

09.15 Invited talk: Brain-implanted wireless chips to control paralyzed limbs
Leena Ukkonen, Tampere University of Technology (FI)

10.00 Energy-Efficient Message Authentication for IEEE 802.15.4-Based Wireless Sensor Networks
Dubrova, Elena (1); Näslund, Mats (2); Selander, Göran (2); Tsiatsis, Vlasios (2), 1: Royal Institute of Technology (SE); 2: Ericsson AB (SE)

10.20 A 10bit 16MS/s redundant SAR ADC with flexible window function for a digitally controlled DC-DC converter in 28nm CMOS
Haenzsche, Stefan; Höppner, Sebastian; Schüffny, Rene, Technische Universität Dresden (DE)

10.40 Coffee break

1.1 RF Circuits

CHAIR: Tor S. Lande, University of Oslo (NO)

11.10 A 28 GHz SiGe QVCO and divider for an 81-86 GHz E-band beam steering transmitter PLL
Tired, Tobias (1); Sjöland, Henrik (1,2); Sandrup, Per (3); Wernehag, Johan (1); ud Din, Imad (2); Törmänen, Markus (1,3), 1 : Lund University; 2: Ericsson Research; 3: Ericsson Modems (SE)

11.30 A 97-106-GHz Differential I-Q Phase Shifter in 28-nm CMOS
Vahdati, Ali; Varonen, Mikko; Kärkkäinen, Mikko; Parveg, Dristy; Halonen, Kari, Aalto University (FI)

11.50 A 5.3 pJ/Pulse Impulse-Radio Ultra-Wideband Pulse-Generator for Band Group # 6
Lee, Kin Keung; Lande, Tor Sverre, University of Oslo (NO)

1.2 Systems Design

CHAIR: Peeter Ellervee, Tallinn University of Technology (EE)

11.10 Modular Layout-friendly Cell Library Design Applied for Subthreshold CMOS
Bjerkedok, Jonathan Edvard (1); Vatanjou, Ali Asghar (2); Ytterdal, Trond (2); Aunet, Snorre (2), 1: BITVIS; 2: Norwegian University of Science and Technology (NO)

11.30 Design Solutions for a Low-Power SoC Platform Using Near-Threshold Voltages
Kutila, Mika; Eriksson, Jonas; Ylitolva, Marko, University of Turku (FI)

11.50 Open Core Protocol (OCP) Clock Domain Crossing Interfaces
Herlev, Mathias; Poulsen, Christian Keis; Sparsø, Jens, Technical University of Denmark (DK)

12.10 Lunch

13.30 Invited talk: Constructive noise
Tor S. Lande, University of Oslo (N)

2.1 AD Converters

CHAIR: Jens Sparsø, Technical University of Denmark (DK)

14.00 A Low-Power 2nd-order CT Delta Sigma Modulator with an Asynchronous SAR Quantizer
Radjen, Dejan (1); Anderson, Martin (2); Sundström, Lars (2); Andreani, Pietro (1), 1: Lund University, 2: Ericsson Research (SE)

14.20 A 9-bit 1-MS/s 7-uW SAR ADC for Ultra Low Power Radio
Wang, Ji; Carmona, Manuel Bejarano; Hall, Helgi; Radjen, Dejan; Lu, Ping, Lund University (SE)

14.40 A 5.43-µW 0.8-V Subthreshold Current-Sensing Sigma-Delta Modulator for Low-Noise Sensor Interfaces
Katic, Nikola (1); Kazi, Ibrahim (2); Tajalli, Armin (3); Schmid, Alexandre (1); Leblebici, Yusuf (1), 1: Swiss Federal Institute of Technology (EPFL) (CH); 2: KU Leuven (BE), 3: Kandou Bus Technologies (CH)

2.2 Digital Systems

CHAIR: Mohammad Fattah, University of Turku (FI)

14.00 Analyzing Worst-case Delay-Buffer-Equation for Wormhole Networks on Chip
Qian, Yue (1); Wang, Junhui (1); Lu, Zhonghai (2), 1: National University of Defense Technology, Chang'sha (CN); 2: Royal Institute of Technology (SE)

14.20 Silicon synapse designs for VLSI neuromorphic platform
Duc, Nguyen (1); Daneshtalab, Masoud (1,2); Dytckov, Sergei (1); Plosila, Juha (1); Tenhunen, Hannu (1,2), 1: University of Turku (FI); 2: Royal Institute of Technology (SE)

14.40 A Novel Speculative Pseudo-Parallel Delta Sigma Modulator
Johansson, Jesper E.; Svensson, Lars S., Chalmers University of Techology (SE)

3. Poster Session I

15.00 Coffee / Poster Session

Circuit Design for Broad band EMI reduction in LCD Driver IC
Kim, Soowoo; An, Sehyuk; Kim, Namsoo; Jeong, Hyeim; Choi, Hoyoung, Chungbuk National University (KR)

Micromechanical accelerometers based on surface acoustic waves
Kukaev, Alexander; Lukyanov, Dmitry; Shevchenko, Sergey; Elena, Filippova; Daniil, Safronov, Saint-Petersburg Electrotechnical University (RU)

Micro Rate Gyroscopes Based on Surface Acoustic Waves
Kukaev, Alexander; Lukyanov, Dmitry; Shevchenko, Sergey; Roman, Telichkin; Aleksey, Ivanov, Saint-Petersburg Electrotechnical University (RU)

Design of a Sampling Switch for a 0.4-V SAR ADC Using a Multi-Stage Charge Pump
Harikumar, Prakash; Wikner, J Jacob, Linköping University (SE)

An Efficient Maximum Power Point Tracking Algorithm for Solar PV Panels
Radwan, Abdelrahman Hesham (1); Marzouk, Ahmad Mahfouz (1); Abd El Ghany, Mohamed Ahmed (1,2); Hofmann, Klaus (2), 1: German University in Cairo (EG); 2: TU Darmstadt (DE)

Polynomial Modelling: Accuracy vs. Shape
Aikio, Janne P.; Rahkonen, Timo, University of Oulu (FI)

Evaluation of Alternative LBIST Flows: A Case Study
Li, Nan (1); Dubrova, Elena (1); Carlsson, Gunnar (2), 1: Royal Institute of Technology, 2: Ericsson AB (SE)

Fault Tolerant Routing Implementation Mechanism for irregular 2D Mesh NoCs
Bishnoi, Rimpy (1); Laxmi, Vijay (1); Gaur, Manoj Singh (1); Bin Ramlee, Radi Husin (2); Zwolinski, Mark (2), 1: MNIT (IN); 2: University of Southampton (UK)

Analysis of Dead Time Losses in Energy Harvesting Boost Converters for Implantable Biosensors
Katic, Janko; Rodriguez, Saul; Rusu, Ana, Royal Institute of Technology (SE)

Evaluation of digital predistortion using the USRP N200 Software Defined Radio transceiver
Marsalek, Roman; Pospisil, Martin, Brno University of Technology (CZ)

Customizing 6LoWPAN Networks towards Internetof- Things Based Ubiquitous Healthcare Systems
Nguyen Gia, Tuan; Thanigaivelan, Nanda Kumar; Rahmani, Amir-Mohammad; Westerlund, Tomi; Liljeberg, Pasi; Tenhunen, Hannu, University of Turku (FI)

4.1 Circuitry

CHAIR: Timo Rahkonen, University of Oulu (FI)

15.50 High-voltage Pulse-triggered SR Latch Level-Shifter Design Considerations

Larsen, Dennis Øland; Llimós Muntal, Pere; Jørgensen, Ivan H. H.; Bruun, Erik, Technical University of Denmark (DK)

16.10 Integrated Reconfigurable High-Voltage Transmitting Circuit for CMUTs
Llimos Muntal, Pere; Larsen, Dennis Øland; Jørgensen, Ivan H.H.; Bruun, Erik, Technical University of Denmark (DK)

16.30 Cross talk measurements of a time-gated 4x128 SPAD array for pulsed Raman spectroscopy
Nissinen, Ilkka; Nissinen, Jan; Holma, Jouni; Kostamovaara, Juha, University of Oulu (FI)

16.50 Performance comparison of 5 Subthreshold CMOS flip-flops under process-, voltage-, and temperature variations, based on netlists from layout
Værnes, Magne; Ytterdal, Trond; Aunet, Snorre, Norwegian University of Science and Technology (NO)

4.2 Reconfigurable Systems

CHAIR: Jari Nurmi, Tampere University of Technology (FI)

15.50 Validation of pipelined Double-precision Floating Point operations in a Multi-core environment Implemented on FPGA using the ForSyDe/NoC System Generator Tool Suite
Ezzeddine, Hussein; Öberg, Johnny; Robino, Francesco, Royal Institute of Technology (SE)

16.10 Cost effective FPGA probabilistic fault emulation
Boncalo, Oana (1); Amaricai, Alexandru (1); Spagnol, Christian (2); Popovici, Emanuel (2), 1: University Politehnica Timisoara (RO); 2: University College Cork (IE)

16.30 Energy Efficient FPGA based Hardware Accelerators for Financial Applications
Toft, Jakob Kenn; Nannarelli, Alberto, Technical University of Denmark (DK)

16.50 Customization Methodology of a Coarse Grained Reconfigurable Architecture
Payandeh Azad, Siavoosh (2); Farahini, Nasim (1); Hemani, Ahmed (1), 1: Tallinn University of Technology (EE); 2: Royal Institute of Technology (SE)

17.10 Break

19.00 Dinner
Restaurant Finlaysonin Palatsi, Kuninkaankatu 1, Tampere

TUESDAY 28 OCTOBER 2014

09.00 Opening of SoC Symposium
Jari Nurmi, Tampere University of Technology (FI)

09.15 Invited talk: Trends on Micro and nanoelectronics
Ricardo Reis, Universidade Federal do Rio Grande do Sul (BR)

5. Time-to-Digital Converters

CHAIR: Ilkka Nissinen, University of Oulu (FI)

10.00 A Modified Switching Scheme for Multiplexer Based Thermometer-to-Binary Encoders
Pasha, Muhammad; Vesterbacka, Mark, Linköping University (SE)

10.20 Time-to-Digital Converter (TDC) Based on Startable Ring Oscillators and Successive Approximation
Mäntyniemi, Antti Samuli; Kostamovaara, Juha Tapio, University of Oulu (FI)

6. Poster Session II

10.40 Coffee / Poster Session

Optimization of Modulator and Circuits for Low Power Continuous-Time Delta-Sigma ADC
Marker-Villumsen, Niels (1,2); Bruun, Erik (2), 1: EPCOS AG (DK) 2: Technical University of Denmark (DK)

Implementation of a dynamic word length SIMD multiplier
Liu, Yangxurui (1,2); Liu, Liang (1); Öwall, Viktor (1); Chen, Shuming (2), 1: Lund University (SE); 2: National University of Defense Technology (CN)

An New Approach to Reliable FSRs Design
Liu, Ming; Dubrova, Elena, Royal Institute of Technology (SE)

Design of Wideband Mixer and VGA for Software Defined Radio in RFID Application
Wang, Lebo (1); Hu, Youde (1); Shen, Jue (2); Zou, Zhuo (2); Zheng, Lirong (1,2), 1: Fudan University (CN); 2: Royal Institute of Technology (SE)

Phase Noise Improvement and Noise Modeling of Type-I ADPLL with Non-Linear Quantization Effects
Shen, Jue (1); Jonsson, Fredrik (1); Chen, Jian (1); Tenhunen, Hannu (1); Zheng, Li-Rong (1,2), Royal Institute of Technology (SE); 2: Fudan University (CN)

Tandem Lange 3-dB 90° Hybrid Implemented on FR4 Substrate
Hayashi, Hitoshi, Sophia University (JP)

Hardware Implementation of the Exponential Function Using Taylor Series
Nilsson, Peter (1); Gangarajaiah, Rakesh (1); Hertz, Erik (2); Ur Rahman Shaik, Ateeq (1,)1: Lund University; 2: Halmstad University (SE)

Synthesis and Layout of an Asynchronous Network-on-Chip using Standard EDA Tools
Müller, Christoph Thomas; Kasapaki, Evangelia; Sørensen, Rasmus Bo; Sparsø, Jens, Technical University of Denmark (DK)

Design of Low Phase Noise K-band Voltage-Controlled Oscillator using 180 nm CMOS and Integrated Passive Device Technologies
Wei, Muh-Dey (1); Chang, Sheng-Fuh (2); Negra, Renato (1), 1: RWTH Aachen University (DE); 2: National Chung Cheng University (TW)

Stimuli generator for testing processes in VHDL
Neverdauskas, Tomas; Jusas, Vacius, Kaunas University of Technology (LT)

7. Analog Circuits
CHAIR: Markku Åberg, VTT (FI)

11.25 Subthreshold Nano-Watt Front-End Amplifier for Wireless ECG Applications
Nevalainen, Tapani Antero, University of Turku (FI)

11.45 Integrated Circuit for Neural Recording and Stimulation
Kursu, Olli; Rahkonen, Timo, University of Oulu (FI)

12.05 An improved Source-Follower Based Sallen-Key Continuous-Time Biquadratic Cell with Auxiliary Path
Resta, Federica (1,2); D'Amico, Stefano (1); De Matteis, Marcello (2); Baschirotto, Andrea (2), 1: University of Salento, 2: University of Milano-Bicocca (IT)

12.25 Lunch

13.30 Invited talk: New approach for design and implementation of future communications systems
Geza Kolumban, Pázmány Péter Catholic University (HU)

14.15 NORCHIP 2015

8. Energy Harvesting
CHAIR: Snorre Aunet, NTNU (NO)

14.20 Voltage Multiplier Circuit for UHF RF to DC Conversion for RFID Applications
Chouhan, Shailesh Singh; Halonen, Kari, Aalto University (FI)

14.40 Design Considerations for Interface Circuits to Low-Voltage Piezoelectric Energy Harvesters
Nielsen-Lönn, Martin; Wikner, J Jacob; Alvandpour, Atila, Linköping University (SE)

15.00 Electronics for Characterizing and Using Photovoltaics
Rahkonen, Timo; Schuss, Christian; Hietanen, Mikko; Kotikumpu, Toni; Mustaniemi, Janne; Myllymäki, Aleksi, University of Oulu (FI)

15.20 Coffee / End of NORCHIP sessions

A. SoC Symposium (optional)

15.50 Limits of gate-level power estimation considering real delay effects and glitches
Meixner, Michael; Noll, Tobias G., RWTH Aachen University (DE)

16.10 Unbalanced Buffer Tree Synthesis to Suppress Ground Bounce for Fine-grain Power Gating
Usami, Kimiyoshi (1); Miyauchi, Makoto (1); Kudo, Masaru (1); Takagi, Kazumitsu (1); Amano, Hideharu (2); Namiki, Mitaro (3); Kondo, Masaaki (4); Nakamura, Hiroshi (4), 1: Shibaura Institute of Technology, 2: Keio University, 3: Tokyo University of Agriculture and Technology; 4: The University of Tokyo (JP)

16.30 Keyed Logic BIST for Trojan Detection in SoC
Dubrova, Elena (1); Näslund, Mats (2); Carlsson, Gunnar (2); Smeets, Ben (2), 1: Royal Institute of Technology; 2: Ericsson AB (SE)

16.50 Break

17.30 Bus to Ice Hockey (game 18.30-21.00)

21.00 Supper at Brewery Restaurant Plevna

General scope of the conference
The NORCHIP conference is the main microelectronics event of the Nordic countries. The annual IEEE CAS sponsored conference covers all areas of microelectronics, spanning from large digital systems to simple analog circuits. The wide scope of NORCHIP is intentional promoting cross-field collaboration. NORCHIP is a well established conference with representation from both academia and industry. Papers of the highest scientific and

technical quality are presented together with selected invited speakers and pre-conference tutorial sessions.

Session organisation

Both oral and poster presentations have been carefully selected through a regular review process and they will all appear in the proceedings. Equal quality measures have been applied to posters and lectures. Papers for oral presentation are selected based on thematic composition of sessions.

Proceedings

USB stick proceedings of the conference contributions will be distributed upon registration. Each participant will receive a copy of the proceedings. Proceedings and all presentations will be in English.

Best analog papers

The Management Committee has since 1992 made special issues of the Springer International *Journal on Analog Integrated Circuits and Signal Processing*. Also this year we will publish a number of the best analog papers in the journal. http://www.springer.com/engineering/circuits+%26+systems/journal/10470

Best digital papers

The best digital papers will be invited to publish in the international Elsevier journal *Embedded Hardware Design (MICPRO)*. http://www.elsevier.com/wps/find/journaldescription.cws_home/525449/description#description

Management committee

- Chairman: Tor S. Lande, University of Oslo (NO)
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- Atila Alvandpour, Linköping University (SE)
- Jari Nurmi, Tampere University of Technology (FI)
- Peeter Ellervee, Tallinn Univ. of Technology (EE)

Review Committee

All submitted contributions have been reviewed by the following Committee:

- Chair: Timo Rahkonen, University of Oulu (FI)
- Vice chair: Pasi Liljeberg, University of Turku (FI)
- Aikio, Janne P., University of Oulu (FI)
- Al Faruque, Mohammad Abdullah, University of California Irvine (US)
- Andreani, Pietro, Lund University (SE)
- Annus, Paul, Tallinn University of Technology (EE)
- Aunet, Snorre, NTNU (NO)
- Bekeris, Elmars, Riga Technical University (LT)
- Bertels, Koen, Delft University of Technology (NL)
- Brunelli, Claudio, Microsoft (FI)
- Casu, Mario, Politecnico di Torino (IT)
- Derler, Patricia, UC Berkeley (US)
- Fattah, Mohammad, University of Turku (FI)
- Goehringer, Diana, Ruhr-University Bochum (DE)
- Gogniat, Guy, Université de Bretagne-Sud (FR)
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- Hollstein, Thomas, Tallinn University of Technology (EE)
- Hurskainen, Heikki, Microteam (FI)
- Hussain, M. Waqar, Tampere University of Technology (FI)
- Jafri, Syed Mohammad Asad Hassan, Univerity of Turku (FI)
- Jamil, Tariq, Sultan Qaboos University Oman, Oman
- Jervan, Gert, Tallinn Univ. of Technology (EE)
- Jutman, Artur, Tallinn University of Technology (EE)
- Karimi, Elmira, Sharif University of Technology (IR)
- Kharchenko, Vyacheslav, KhAI, Ukraine
- Kjeldsberg, Per Gunnar, NTNU (NO)
- Koskinen, Lauri, University of Turku (FI)
- Kostamovaara, Juha, University of Oulu (FI)
- Kursu, Olli-Erkki, University of Oulu (FI)
- Kuusilinna, Kimmo, Nosteco (FI)
- Lahtinen, Vesa, Nokia Networks (FI)
- Liu, Dr. Liang, Lund University (SE)
- Mankodiya, Kunal, University of Rhode Island (US)
- Mikkelsen, Jan Hvolgaard, Aalborg University (DK)
- Mäkipää, Jani, VTT (FI)
- Mäntyniemi, Antti Samuli, University of Oulu (FI)
- Nannarelli, Alberto, Technical University of Denmark (DK)
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- Nissinen, Ilkka, University of Oulu (FI)
- Ost, Luciano, LIRMM (FR)
- Perez, Ernesto, Acorde (ES)
- Quadri, Imran, Softeam (CA)
- Rahmani, Amir-Mohammad, University of Turku (FI)
- Rang, Toomas, Tallinn University of Technology (EE)
- Rissa, Tero, Nokia (FI)
- Sheinauskas, Rimantas, Kaunas University of Technology (LT)
- Shen, Ming, Aalborg University (DK)
- Sjöland, Henrik, Lund University (SE)
- Smit, Gerard, University Twente (NL)
- Tammemäe, Kalle, Tallinn University of Technology (EE)
- Thombre, Sarang, Finnish Geodetic Institute (FI)
- Vesterbacka, Mark, Linköping University (SE)
- Virtanen, Seppo, University of Turku (FI)
- Ytterdal, Trond, NTNU (NO)
- Öberg, Johnny, Royal Institute of Technology (SE)
- Åberg, Markku, VTT (FI)

Organising committee

- Chair: Ivan Ring Nielsen, Technoconsult (DK)
- Jari Nurmi, Tampere University of Technology (FI)

Conference venue / accommodation

The conference location is in the heart of Tampere at:

Tampere Hall
Yliopistonkatu 55

FI-33101 Tampere
www.tamperehall.com

REGISTRATION

The registration must be completed at www.norchip.org. Conference fees are:

- Early registration on September 22 or before (450 euros)
- Late registration from September 23 onwards (550 euros)
- IEEE member discount 50 euros
- Student discount 50 euros
- SoC participant discount 50 euros
- Tutorial registration (50 euros)
- On-site registration is strongly discouraged

Registrations are acknowledged upon reception.

CONFERENCE TUTORIALS

There are two half-day tutorials this year, in cooperation with SoC 2014 and the IEEE CAS/SP Chapter in Finland.

Sunday, October 26, 2014

Tite: Physical Design Automation of Transistor Networks

Instructor: Prof. Ricardio Reis, IEEE CASS Distinguished Lecturer

Location: Tampere Hall, room t.b.d.

Preliminary Schedule:
13:30 - 15:00 lectures
15:00 - 15:30 coffee break
15:30 - 17:00 lectures

Monday, October 27, 2014

Tite: Software-Defined Electronics: a new research field for CAS Society

Instructor: Prof. Geza Kolumban, IEEE CASS Distinguished Lecturer

Location: Tampere Hall, room t.b.d.

Preliminary Schedule:
13:30 - 15:00 lectures
15:00 - 15:30 coffee break
15:30 - 17:00 lectures