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7-10 June 2015**



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13th IEEE International NEW Circuits And
Systems Conference (NEWCAS)
June 7-10, 2015

TECHNICAL PROGRAM

Sunday, June 7th

LOCATION: PHELMA Minatec.

08:30-10:00 Session 1A: Tutorial 1 - Injection Locked Oscillators: Applications, Modeling, and Design - Part I

LOCATION: Amphitheatre 001

Tony Chan Carusone
University of Toronto

08:30-10:00 Session 1B: Tutorial 2 - FDSOI Technology - Part I - Body Biasing techniques in UTBB

LOCATION: Room 002

Philippe Flatresse
ST Microelectronics

10:00-10:30 Coffee Break

10:30-12:00 Session 2A: Tutorial 1 - Injection Locked Oscillators: Applications, Modeling, and Design - Part II

LOCATION: Amphitheatre 001

Tony Chan Carusone
University of Toronto

10:30-12:00 Session 2B: Tutorial 2 - FDSOI Technology - Part II - Millimeter Wave 28nm-CMOS FD SOI Power Amplifier Design

LOCATION: Room 002

Eric Kerhervé, Aurélien Larie, & Baudouin Martineau,
IMS

12:00-13:30 Lunch Break

13:30-15:00 Session 3A: Tutorial 3 - Full Software Radio Circuits and Systems: Design by Mathematics in 28nm FDSOI Technology and Application to 5G Standard - Part I

LOCATION: Amphitheatre 001

Yann Deval

IMS

13:30-15:00 Session 3B: Tutorial 4 - Substrate Integrated Waveguides: from PCB to Microelectronics Technologies - Part I

LOCATION: Room 002

Ke Wu

Polytechnique Montréal

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15:30-17:00 Session 4A: Tutorial 3 - Full Software Radio Circuits and Systems: Design by Mathematics in 28nm FDSOI Technology and Application to 5G Standard - Part II

LOCATION: Amphitheatre 001

François Rivet

IMS

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LOCATION: Room 002

Ke Wu

Polytechnique Montréal

18:00-19:30 Welcome reception – La Bastille

Monday, June 8th

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LOCATION: Auditorium

09:10-10:10 Session 6: Plenary Lecture J. Sifakis

LOCATION: Auditorium

SESSSION CHAIR: M. Belleville – CEA-Leti

Joseph Sifakis

The Internet of Things – The Ultimate ICT Revolution

EPFL

10:10-10:30 Coffee Break

10:30-12:00 Session 7A: Phase Locked Loops and Circuits for Optical Communications

LOCATION: Auditorium

SESSSION CHAIR: R. Lababidi - IM2NP, F. Hameau - CEA-Leti

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IHP

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CEA LETI

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LOCATION: Auditorium

SESSION CHAIR: G. Charvet - CEA

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LOCATION: Room 222

SESSION CHAIR: J.-D. Arnould, IMEP-LAHC

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LOCATION: Auditorium

SESSION CHAIR: D. Morche – CEA-Leti

Christophe Fourtet

The technical challenges of future IoT networks and their consequences on modem's and SoC's design N/A

SigFox

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LOCATION: Petit Salon

SESSION CHAIR: H. Barthélemy – IM2NP

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¹Institut des Nanotechnologies de Lyon, ²Laboratoire d'AstroParticule et Cosmologie, Université Paris-Diderot

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12:00-13:30 Lunch Break

13:30-15:00 Session 14A: Wireless Transmitters and Receivers

LOCATION: Auditorium

SESSION CHAIRS: D. Belot – *STMicroelectronics*; R. Sobot – *University of Western Ontario*

14A1 *Dajana Danilovic¹, Andreia Cathelin¹, Andrei Vladimirescu² and Borivoje Nikolic³*

Design considerations for Low Noise Transconductance Amplifiers in 28nm UTBB-FDSOI 325

¹STMicroelectronics, ²ISEP, ³University of California, Berkeley

- 14A2 *José Ferreira, Jorge Fernandes and Hugo Gonçalves*
A 2.41 GHz ISM Receiver using an IQ VCO-Mixer 329
INESC-ID
- 14A3 *Jeffrey Walling and Wen Yuan*
A Switched-Capacitor Controlled Digital-Current Modulated Class-E EER Transmitter 333
University of Utah
- 14A4 *Zengqi Wang and Zhiqun Li*
A 1V 830 μ W Full-band ZigBee Receiver Front-end with Current-reuse and Gm-boosting Techniques 337
Southeast University Nanjing, China
- 14A5 *Fikre Tsigabu Gebreyohannes, Antoine Frappé and Andreas Kaiser*
Semi-digital FIR DAC for Low Power Single Carrier IEEE 802.11ad 60GHz Transmitter 341
IEMN-ISEN

13:30-15:00 Session 14B: Mixed Signal Circuits

LOCATION: Room 222

SESSION CHAIRS: Erkan Isa - *EMFT*; He Tang - *Univ. of Electron. Science & Technol. of China*

- 14B1 *Mathieu Vallerian¹, Florin Hutu², Benoit Miscopein¹, Guillaume Villemaud² and Tanguy Risset²*
Additive Companding Implementation to Reduce ADC Constraints for Multiple signals Digitization 345
¹*Orange*, ²*INSA Lyon CITI*
- 14B2 *Jaswinder Lota¹ and Andreas Demosthenous²*
Q-enhancement with on-chip inductor optimization for reconfigurable delta-sigma radio-frequency ADC 349
¹*University of East London*, ²*University College London*
- 14B3 *Seok Min Jung and Janet Roveda*
A Low Jitter Digital Phase-Locked Loop With a Hybrid Analog/Digital PI Control 353
University of Arizona
- 14B4 *Amer Samarah and Anthony Chan Carusone*
Cycle-Slipping Pull-In Range of Bang-Bang PLLs 357
University of Toronto
- 14B5 *Claudio De Berti¹, Piero Malcovati¹, Lorenzo Crespi² and Andrea Baschiroto³*
Colored Clock Jitter Model in Audio Continuous-Time $\Sigma\Delta$ Modulators 361
¹*University of Pavia*, ²*Conexant Systems*, ³*Univ Milan Bicocca*

15:00-15:20 Coffee Break

15:20-16:50 Session 15A: Voltage References and Power Converters

LOCATION: Auditorium

SESSION CHAIRS: W. Rahajandraibe – *IM2NP*; Tony Chan Carusone – *University of Toronto*

15A1 *David Cordova*¹, *Pedro Toledo*¹, *Hamilton Klimach*², *Sergio Bampi*² and *Eric Fabris*¹

EMI Resisting MOSFET-Only Voltage Reference Based on the ZTC Condition 365

¹*NSCAD*, ²*Federal University of Rio Grande do Sul*,

15A2 *Omar Abdelfattah*¹, *Ishiang Shih*¹, *Gordon Roberts*¹ and *Yi-Chi Shih*²

A 0.6V-Supply Bandgap Reference in 65 nm CMOS 369

¹*McGill University*, ²*University of California, Los Angeles*

15A3 *Mohanad Ahmed* and *Mohammad Al-Ghamdi*

Rail-to-Rail Multiphase Supply Insensitive Voltage Controlled Oscillator for Low Power Converters 373

King Fahd University of Petroleum and Minerals

15A4 *Esmaeel Maghsoudloo*¹, *Masoud Rezaei*¹, *Mohamad Sawan*² and *Benoit Gosselin*¹

A Power-Efficient Wide-Range Signal Level-Shifter 377

¹*Université Laval*, ²*École Polytechnique de Montréal*

15A5 *Vratislav Michal*, *Denis Cottin*, *Patrik Arno* and *Nicolas Marty*

Dual-phase 18V 280 μ A Charge Pump with Active Switches and Passive Level Shifter for Low-Voltage Capacitors 381

STMicroelectronics

15:20-16:50 Session 15B: Special Session Approximate Computing

LOCATION: Room 222

SESSION CHAIR: A. Amara - *ISEP*

15B1 *Shrikanth Ganapathy*¹, *Adam Teman*¹, *Robert Giterman*², *Andreas Burg*³ and *Georgios Karakonstantis*¹

Approximate Computing with Unreliable Dynamic Memories 385

¹*Ecole Polytechnique Federale de Lausanne*, ²*Bar Ilan University*, ³*ETH Zurich*

15B2 *Vincent Camus*, *Jeremy Schlachter* and *Christian Enz*

Energy-Efficient Digital Design through Inexact and Approximate Arithmetic Circuits 389

EPFL

15B3 *Xun Jiao*¹, *Abbas Rahimi*¹, *Balakrishnan Narayanaswamy*¹, *Hamed Fatemi*², *Jose Pineda de Gyvez*² and *Rajesh Gupta*¹

A Scalable Model for Timing Error Prediction under Hardware and Workload Variations 393

¹*University of California at San Diego*, ²*NXP*

15B4 *Leonardo Bandeira Soares¹, Sergio Bampi¹, André Luis Rodeghiero Rosa¹ and Eduardo Antônio Cesar Da Costa²*

Near-Threshold Computing for Very Wide Frequency Scaling: Approximate Adders to Rescue Performance 397

¹Federal University of Rio Grande do Sul, ²Catholic University of Pelotas - UCPel

15B5 *Lirida Naviner¹, Hao Cai¹, You Wang¹, Zhao Weisheng² and Arwa Ben Dhia¹*

Stochastic Computation With Spin Torque Transfer Magnetic Tunnel Junction 401

¹Telecom ParisTech, ²Univ. Paris-Sud

16:50-18:10 **Panel Session**

IoT Revolution: What is the key enabler? Technology, Software or Application?

LOCATION: Auditorium

18:30 Gala Dinner Château de Sassenage

Wednesday, June 10th

09:00-10:30 Session 17A: Microwave and mm-wave Circuits

LOCATION: Auditorium

SESSION CHAIRS: J. M. Fournier – IMEP-LAHC; F. Nabki - UQAM

17A1 *Domenico Pepe*¹ and *Domenico Zito*²

A Compact 67 GHz Oscillator in 65nm CMOS 405

¹*Tyndall National Institute*, ²*University College Cork*

17A3 *Ekta Sharma*, *Alfredo Bautista*, *Emmanuel Pistono*, *Philippe Ferrari* and *Sylvain Bourdel*

81-86 GHz VCO for Backhaul application with S-CPS based differential Inductor in BiCMOS 55nm Technology 409

IMEP-LAHC

17A4 *Imen Ghorbel* and *Fayrouz Haddad*

Ultra Low Power RF Cross-Coupled VCO Design in the Subthreshold Regime with High Immunity to PVT Variations in 130nm CMOS technology 413

IM2NP

17A5 *Florent Torres*^{1,2}, *Jean-Baptiste Bégueret*¹, *Nicolas Martin*^{1,2}, *Didier Belot*² and *Thierry Taris*¹

A Novel Tunable Impedance Transmission Line for mm-Waves Applications 417

¹*IMS Bordeaux*, ²*STMicroelectronics*

09:00-10:30 Session 17B: Building Blocks for Biomedical Applications

LOCATION: Room 222

SESSION CHAIR: Mohamad Sawan – *Ecole Polytechnique de Montréal*

17B1 *Mohammad Usaid Abbas*¹, *Georgios Raikos*², *Ruchir Saraswat*² and *Esther Rodriguez-Villegas*²

A high PSRR, ultra-low power 1.2V curvature corrected Bandgap Reference for Wearable EEG application 421

¹*University of Southampton*, ²*Imperial College London*

17B2 *Francois Rummens*, *Sylvie Renaud* and *Noelle Lewis*

CMOS Differential Neural Amplifier with High Input Impedance 425

IMS - Bordeaux University

17B3 *Pere Llimós Muntal¹, Dennis Øland Larsen¹, Kjartan Færch², Ivan Harald¹
Holger Jørgensen¹ and Erik Bruun¹*

Integrated Differential High-Voltage Transmitting Circuit for CMUTs 429

¹Technical University of Denmark, ²Analogic Ultrasound, BK Medical Design Center

17B4 *Yuwadee Sundarasaradula and Apinunt Thanachayanont*

A 1-V, 6-nW Programmable 4th-order Bandpass Filter for Biomedical Applications 433

King Mongkut's Institute of Technology Ladkrabang

17B5 *Robert Gallichan¹, Daniel McCormick², Rezaul Hasan³, Patrick Hu¹ and David Budgett²*

Analysis of Peak Currents in Integrated Synchronous Rectifiers 437

¹University of Auckland, ²Auckland Bioengineering Institute, ³Massey University Albany

09:00-10:30 Session 17C: Analog-to-Digital Converters

LOCATION: Room 224-225

SESSION CHAIRS: M. de Matteis – *Unimib*; P. Loumeau – *Télécom ParisTech*

17C1 *Chithira Ravi, Vineeth Sarma and Bibhudatta Sahoo*

At Speed Digital Gain Error Calibration of Pipelined ADCs 441

Amrita Vishwa Vidyapeetham

17C2 *Weitao Li, Fule Li, Ya Wang, Chun Zhang and Zhihua Wang*

A Power-Efficient 14-bit 250MS/s Pipelined ADC 445

Tsinghua university

17C3 *Li Shengjing, Li Weitao and Li Fule*

A Digital Blind Background Calibration Algorithm for Pipelined ADC 449

Tsinghua University

17C4 *Luca Giuffredi¹, Giorgio Pietrini¹, Marco Ronchi², Alessandro Magnanini³ and Andrea Boni*

Low-Power 3rd order Sigma Delta Modulator in CMOS 90-nm for sensors interface applications 453

¹Universtà degli studi di Parma, ²STMicroelectronics, ³Silis s.r.l.

17C5 *Ahmed Hamza¹, Sameh Ibrahim¹, Mohamed El-Nozahi¹ and Mohamed Dessouky²*

A Low-Power, 9-Bit, 1.2 ps Resolution Two-Step Time-to-Digital Converter in 65 nm CMOS 457

¹Ain Shams University, ²Mentor Graphics Egypt

10:30-10:50 Coffee Break

10:50-11:50 Session 18: Plenary Lecture B. Nauta

LOCATION: Auditorium

SESSION CHAIR: P. Desgreys – *Telecom Paristech*

Bram Nauta

Circuit Techniques for next Generation Wireless Communication

University of Twente

11:50-13:30 Lunch Break

13:30-15:00 Session 19A: Circuits for Wireless Communications

LOCATION: Auditorium

SESSION CHAIR: J. L. Gonzalez Jiménez – *CEA Leti*

19A1 *Marcelo De Souza*¹, *André Mariano*² and *Thierry Taris*³

Inductorless Low Power Wideband LNA in 130 nm CMOS 461

¹*UTFPR*, ²*DELTA - GICS – UFPR*, ³*Université de Bordeaux I*

19A2 *Parvaneh Saffari*¹, *Mohammad Taherzadeh Sani*¹, *Ali Basaligheh*², *Frederic Nabki*³ and *Mohamad Sawan*⁴

Low-Energy CMOS Common-Drain Power Amplifier for Short-Range Applications 465

¹*Ferdowsi University of Mashhad*, ²*ETS Montreal*, ³*Université du Québec à Montréal*, ⁴*Ecole Polytechnique de Montréal*

19A3 *Remy Vauche*¹, *Eloi Muhr*¹, *Ndiogou Tall*¹, *Abderrahmane Haloua*¹, *Sylvain Bourdel*², *Jean Gaubert*¹, *Nicolas Dehaese*¹ and *Herve Barthelemy*¹

Ultra-WideBand Voltage Controlled Oscillator with Commutable Phases for BPSK Implementation 469

¹*Aix-Marseille University - IM2NP*, ²*IMEP-LAHC*

19A4 *Răzvan Cristian Marin*¹, *Antoine Frappé*¹, *Andreas Kaiser*¹ and *Andreia Cathelin*²

Considerations for High-Speed Configurable-bandwidth Time-interleaved Digital Delta-Sigma Modulators and Synthesis in 28 nm UTBB FDSOI 473

¹*IEMN-ISEN*, ²*STMicroelectronics*

19A5 *Ayssar Serhan*, *Estelle Lauga-Larroze* and *Jean-Michel Fournier*

Efficiency Enhancement Using Adaptive Bias Control for 60GHz Power Amplifier 477

IMEP-LAHC

13:30-15:00 Session 19B: Systems for Biomedical Applications

LOCATION: Room 222

SESSION CHAIR: S. Mirabbasi - *University of British Columbia*19B1 *Wout Swinkels¹, Yi Sun², Bart Stukken¹, Constantinus Politis¹ and Luc Claesen¹***Cloud-based Orthognathic Surgical Planning Platform 481***¹University Hasselt, ²KU Leuven*19B2 *Xusheng Wang¹, Ming Zhang¹, Xiaojiao Ren¹, Francis Rodes² and Romain Deniéport²***Auto Tuning System for a Half Bridge Resonant Converter Using a Synchronous Switched Capacitor 485***¹University of South Paris 11, ²ENSEIRB-MATMECA*19B3 *Masoud Rezaei¹, Esmaeel Maghsoudloo², Mohamad Sawan³ and Benoit Gosselin¹***A Novel Multichannel Analog-to-Time Converter Based on a Multiplexed Sigma Delta Converter 489***¹Université Laval, ²LRTS, ³École Polytechnique de Montréal*19B4 *Pankaj Kumar Jha¹, Pravanjan Patra², Jairaj Naik¹, Ashudeb Dutta¹, Amit Acharya¹, Shiv Govind Singh¹ and P. Rajalakshmi¹***A 2 μ W Biomedical Frontend with ADC for Self-powered u-Healthcare Devices in 0.18 μ m CMOS 493***¹IIT Hyderabad, ²National Institute of Technology,*19B5 *Muriel Muller and Ghalid Abib***Ultra WideBand RADAR System for Human Chest Displacement 497***Telecom Sud Paris***13:30-15:00 Session 19C: Special Session Control Techniques for Adaptive Computing Systems**

LOCATION: Room 224-225

SESSION CHAIR: S. Lesecq – *CEA-Leti*19C1 *Yeter Akgul¹, Diego Puschini¹, Lionel Vincent², Pascal Benoit³ and Mauricio Altieri¹***Energy-efficient control through power mode placement with discrete DVFS and Body Bias 501***¹CEA LETI, MINATEC Campus, ²PERSYVAL-Lab, ³LIRMM, University of Montpellier 2*19C2 *Benedikt Janßen, Fynn Schwiegelshohn and Michael Hübner***Adaptive Computing in Real-Time Applications 505***Ruhr-University Bochum*

19C3 *Mykhailo Zarudniev¹, Arnaud Tonda¹, Laurent Alacoque¹, Sebastien Bolis², Fabrice Jacquet¹ and Arnaud Pouydebasque²*

Autofocus performance realization using automatic control approach 509

¹CEA-LETI, ²Wavelens

19C4 *Chuan Shan¹, Eldar Zianbetov², François Anceau¹, Olivier Billoint and Dimitri Galayko¹*

A distributed synchronization of all-digital PLLs network for clock generation in synchronous SOCs 513

¹UPMC, ²CEA INAC-SPINTEC

19C5 *Olesia Mokrenko¹, Maria Isabel Vergara-Gallego¹, Warody Lombardi¹, Suzanne Lesecq¹ and Carolina Albea²*

WSN Power Management with Battery Capacity Estimation 517

¹CEA-LETI, ²Univ. de Toulouse LAAS-CNRS

15:00-15:20 Coffee Break

15:20-16:50 Session 20A: Digital Design and Modeling

LOCATION: Auditorium

SESSION CHAIR: M. Belleville – CEA-Leti

20A1 *Gaspard Hiblot¹, Quentin Raffay², Frédéric Boeuf¹ and Gérard Ghibaudo²*

Impact of short-channel effects on velocity overshoot with hydrodynamic transport 521

¹STMicroelectronics, ²IMEP-LAHC

20A3 *Khaled Helal, Sameh Attia, Tawfik Ismail and Hassan Mostafa*

Priority-Select Arbiter: An Efficient Round-Robin Arbiter 525

Cairo University

20A4 *Mickaël Fiorentino¹, Yvon Savaria¹, Omar Al-Terkawi¹ and Claude Thibeault²*

Self-Timed Circuits FPGA Implementation Flow 529

¹École Polytechnique de Montréal, ²Ecole des Technologies Supérieures Montréal

20A5 *Florent Berthier¹, Edith Beigne¹, Pascal Vivet¹ and Olivier Sentieys²*

Power Gain Estimation of an Event-driven Wake-Up Controller dedicated to WSN's Microcontroller 533

¹CEA leti, ²IRISA/INRIA

15:20-16:50 Session 20B: Filters and Transconductors

LOCATION: Room 222

SESSION CHAIR: T. Taris - IMS

20B1 *Astria Nur Irfansyah¹, Andrew Nicholson¹, Julian Jenkins², Tara Julia Hamilton³ and Torsten Lehmann¹*

Subthreshold Operation of Nauta's Operational Transconductance Amplifier 537

¹School of Electrical Engineering and Telecommunications UNSW, ²Perceptia Ltd, ³University of Western Sydney

20B2 *Federica Resta¹, Marcello De Matteis¹, Alessandro Pezzotta¹, Stefano D'Amico² and Andrea Baschiroto¹*

A 30MHz 28dBm-IIP3 3.2mW Fully-Differential Sallen-Key 4th-Order Filter with Out-of-Band Zeros Cancellation 541

¹University of Milano-Bicocca, ²University of Salento

20B3 *Hervé Barthelemy¹, Rémy Vauche² and Sylvain Bourdel³*

Digitally Controlled Transconductor Based on a Quantum Transconductance 545

¹University of Toulon (UTLN), ²Aix-Marseille University, ³IMEP-LAHC

20B4 *Lucie Chandernagor¹, Patrick Jean¹, Bernard Jarry² and Julien Lintignat²*

Self calibrating High sensitivity Ultra-low power Envelope detector 549

¹NXP Semiconductors, ²XLIM

20B5 *Salvatore Pennisi¹, Alfio Dario Grasso¹ and Elena Cabrera-Bernal²*

0.7-V Bulk-Driven Three-Stage Class-AB OTA 553

¹University of Catania, ²University of Sevilla

15:20-16:50 Session 20C: Sensing Systems Integration

LOCATION: Room 224-225

SESSION CHAIR: W. Uhring - University of Strasbourg

20C1 *Luca Aluigi¹ and Domenico Zito²*

Analysis and Design of Ka-Band SoC Radiometer for Space Detection of Solar Flares 557

¹Tyndall National Institute, ²University College Cork

20C2 *Evgenia Voulgari¹, Matthew Noy², Francis Anghinolfi², Francois Krummenacher¹ and Maher Kayal¹*

Sub-picoampere, 7-decade current to frequency converter for current sensing 561

¹EPFL, ²CERN

20C3 *Simon Paulus¹, Jean-Baptiste Kammerer¹, Joris Pascal² and Luc Hebrard¹*

Continuous calibration of Rogowski coil current transducer 565

¹ICube, ²ABB Corporate Research

20C4 *Imane Malass, Wilfried Uhring and Jean Pierre Le Normand*

Efficiency improvement of high rate integrated Time Correlated Single Photon Counting systems by incorporating an embedded FIFO 569

ICUBE University of Strasbourg and CNRS

20C5 *Shigenori Yamauchi and Takamoto Watanabe*

All-digital MEMS tuning-fork self-excited vibration control by phase-relation using TAD-based ADPLL 573

DENSO CORPORATION

16:50-17:20 **Closing Ceremony**

LOCATION: Auditorium