2016 14th IEEE International New Circuits and Systems Conference (NEWCAS 2016)

Vancouver, British Columbia, Canada
26 – 29 June 2016
Tutorials

Sunday Morning, June 26

Point Grey Room
9:00 to 12:00
Tiny Inductively powered Battery Chargers, by Professor Gabriel Rincon-Mora (Georgia Institute of Technology).....N/A

Ambleside I
9:00 to 12:00
Development of Massively-Parallel Multimedia Algorithms and Applications in the Integrated Multi-Core/GPU Platform by Saeid Nooshabadi (Michigan Technological University).....N/A

| 10:15 to 10:30 - Coffee Break |

12:00 to 13:30 – Lunch (Pinnacle Ballroom)

Sunday Afternoon, June 26

Point Grey Room
13:30 to 16:30
Phase-Locked Clock Generation for SoC: Circuit and System Design Aspects by Professor Woogeun Rhee (Tsinghua University).....N/A

Ambleside I
13:30 to 16:30
Optimizing NanoCMOS Circuits by Using Transistor Networks by Professor Ricardo Reis, Universidade Federal do Rio Grande do Sul (UFRGS).....N/A

| 15:15 to 15:30 - Coffee Break |

17:30 to 20:00 - Welcome Reception (Point Grey Room)
# Technical Sessions

## Session 1 - Formal Opening and Plenary Session

**Monday Morning, June 27, Pinnacle Ballrooms II and III**

**8:30** Formal Opening  
**9:00** Keynote

![Professor Behzad Razavi](image)  
**Professor Behzad Razavi**, University of California, Los Angeles  
**Title:** Design for Low Power: The Next Frontier

## 10:00 to 10:30 - Coffee Break (Shaughnessy Salon)

## Session 2 - UWB Radios: Advances and Perspectives

**Monday Morning, June 27, Pinnacle II Ballroom**

Session Chair: Domenico Zito, University College Cork & Tyndall National Institute  
Yann Deval, IMS Laboratory

<table>
<thead>
<tr>
<th>Time</th>
<th>Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>10:30</strong></td>
<td><strong>UWB Radios - the Maturity Age?</strong>, Domenico Zito&lt;sup&gt;1&lt;/sup&gt;, Dominique Morche&lt;sup&gt;2&lt;/sup&gt;, Innovations for High Performance Microelectronics, Ireland; &lt;sup&gt;2&lt;/sup&gt;CEA-Leti, France.....1</td>
</tr>
<tr>
<td><strong>10:48</strong></td>
<td><strong>Low-Power High-Speed Wireless Transceivers and Antennas for Large-Scale Neural Implants</strong>, Masoud Rezaei, Benoit Gosselin, Université Laval, Canada.....5</td>
</tr>
<tr>
<td><strong>11:06</strong></td>
<td><strong>Design of Pulse Synthesizers for the Convergence of IR-UWB Solutions</strong>, Remy Vauché&lt;sup&gt;1&lt;/sup&gt;, Sylvain Bourdel&lt;sup&gt;3&lt;/sup&gt;, Eloi Muhr&lt;sup&gt;1&lt;/sup&gt;, Jean Gaubert&lt;sup&gt;1&lt;/sup&gt;, Nicolas Dehaese&lt;sup&gt;1&lt;/sup&gt;, Frédéric Hameau&lt;sup&gt;2&lt;/sup&gt;, Hervé Barthelemy&lt;sup&gt;1&lt;/sup&gt;, &lt;sup&gt;1&lt;/sup&gt;Aix-Marseille Université / Institut Matériaux Microélectronique Nanosciences de Provence, France; &lt;sup&gt;2&lt;/sup&gt;CEA-Leti, France; &lt;sup&gt;3&lt;/sup&gt;Université Grenoble Alpes, France.....9</td>
</tr>
<tr>
<td><strong>11:24</strong></td>
<td><strong>Remote Monitoring of Vital Signs Using a CMOS UWB Radar Transceiver</strong>, Dag Wisland, Kristian Granhaug, Jan Roar Pleym, Nikolaj Andersen, Stig Støa, Håkon Hjortland, Novelda AS, Norway.....13</td>
</tr>
<tr>
<td><strong>11:42</strong></td>
<td><strong>Low-Latency Asynchronous Networking for the IoT: Routing Analog Pulse Delays Using IR-UWB</strong>, Marco Crepaldi&lt;sup&gt;1&lt;/sup&gt;, Alessandro Sanginario&lt;sup&gt;1&lt;/sup&gt;, Paolo Motto Ros&lt;sup&gt;1&lt;/sup&gt;, Danilo Demarchi&lt;sup&gt;2&lt;/sup&gt;, &lt;sup&gt;1&lt;/sup&gt;Istituto Italiano di Tecnologia, Italy; &lt;sup&gt;2&lt;/sup&gt;Politecnico di Torino, Italy.....17</td>
</tr>
</tbody>
</table>
# Session 3 - Amplifiers

Monday Morning, June 27, Pinnacle III Ballroom

Session Chair: Igor Filanovsky, University of Alberta  
Eric Kerherve, IMS Laboratory

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
<th>Location</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30</td>
<td>A Compact 90W Broadband Doherty Amplifier</td>
<td>Al Freundorfer, Justin Chan, Carlos Saavedra, Queen's University, Canada</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>10:48</td>
<td>Top-Down Design and Synthesis of Inherently-Stable Integrator-Based High-Order Amplifiers</td>
<td>Aly Shoukry, Gordon Roberts, McGill University, Canada</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>11:06</td>
<td>Analysis and Design of Differential LNAs with on-Chip Transformers in 65-nm CMOS Technology</td>
<td>Takao Kihara, Shigesato Matsuda, Tsutomu Yoshimura, Osaka Institute of Technology, Japan</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>11:24</td>
<td>A Low-Power High-Speed Charge-Steering Comparator for High-Speed Applications</td>
<td>Ali Hassan, Mohamed Aboudina, Mohamed Refky, Cairo University, Egypt</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>11:42</td>
<td>A Digitally Programmable 50-150dB DC Gain Operational Transconductance Amplifier in 130nm CMOS</td>
<td>Ming Yang, Gordon Roberts, McGill University, Canada</td>
<td>37</td>
<td></td>
</tr>
</tbody>
</table>

**12:00 to 13:30 – Lunch Break (Pinnacle Ballroom I)**

# Session 4 - Digital Circuits and Systems I

Monday Afternoon, June 27, Pinnacle II Ballroom

Session Chair: Yvon Savaria - Ecole Polytechnique de Montreal  
Ricardo Reis - UFRGS

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
<th>Location</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:30</td>
<td>Byte-Based Partial-Match Instruction and Data Compression for High-Performance and Low-Power Interconnects</td>
<td>Sujan Kumar Saha, Jiangjiang Liu, Lamar University, United States</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>13:48</td>
<td>A Modified RNS-to-Binary Converter Scheme for {2^{n+1}.1, 2^{2n+1}, 2^{2n}.1} Moduli Set</td>
<td>Edem Bankas, Ohio University, Ghana</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>14:06</td>
<td>Redundant STT-MTJ-Based Nonvolatile Flip-Flops for Low Write-Error-Rate Operations</td>
<td>Naoya Onizawa, Takahiro Hanyu, Tohoku University, Japan</td>
<td>49</td>
<td></td>
</tr>
</tbody>
</table>
**Session 5 - Energy Harvesting Circuits I**

Monday Afternoon, June 27, Pinnacle Ballroom III

Session Chair: Thierry Taris - IMS Laboratory
    Dominique Morche - CEA LETI

13:30  **An ULP and Very Efficient Adaptively Biased LDO Regulator for Harvesting Application**, Nicola Verrascina¹, Jean-Baptiste Begueret¹, Mattia Borgarino², ¹University of Bordeaux, France, ²Università degli Studi di Modena e Reggio Emilia, Italy.....53

13:48  **Optimally Pre-Damped Switched-Inductor Piezoelectric Energy-Harvesting Charger**, Siyu Yang, Gabriel Rincon-Mora, Georgia Institute of Technology, United States.....57

14:06  **Multiple Energy-Shot Load Interface for Electrostatic Vibrational Energy Harvesters**, Mohammed Bedier¹, Dimitri Galayko², ¹Université Pierre-et-Marie-Curie / Université Paris-Sorbonne, France, ²Université Pierre-et-Marie-Curie / Sorbonne University, France.....61

14:24  **Efficient Power Management Circuit for RF Energy Harvesting with 74.27% Efficiency at 623 nW Available Power**, Gaurav Saini, Soumik Sarkar, Mahima Arrawatia, Maryam Shojaei Baghini, Indian Institute of Technology Bombay, India.....65

14:42  **Analysis, Design, and Characterization of Wireless Power Transfer Systems Using Conical Coils**, Parinaz Hadadtehrani¹, Soroush Dehghani¹, Reza Molavi¹, Vasudevan Janarthanan², Thomas Johnson¹, Shahriar Mirabbasi¹, ¹University of British Columbia, Canada, ²Fairleigh Dickinson University, Canada.....69

**15:00 to 15:30 - Coffee Break (Shaughnessy Salon)**

**Session 6 - CAD, EDA & Design Tools**

Monday Morning, June 27, Pinnacle Ballroom II

Session Chair: Luc Hebrard - University of Strasbourg
    Ljiljana Trajkovic - Simon Fraser University

15:30  **An Efficient Algorithm for 3D-IC TSV Assignment**, Cong Hao, Nan Ding, Takeshi Yoshimura, Waseda University, Japan.....73
Sizing and Layout Integrated Optimizer for 28nm Analog Circuits Using Digital PnR Tools, François Stas, Guerric de Streef, David Bol, Université catholique de Louvain, Belgium.....77

Discrete-Time Modelling and Experimental Validation of an All-Digital PLL for Clock-Generating Networks, Eugene Koskin1, Elena Blokhina1, Chuan Shan2, Eldar Zianbetov3, Orla Feely1, Dimitri Galayko2, 1University College Dublin, Ireland, 2Université Pierre-et-Marie-Curie/Sorbonne University, France, 3Spintronique et Technologie des Composants - Inac - CEA, France.....81

Improving Placement Algorithms by Using Visualization Tools, Mateus Fogaça, Guilherme Flach, Marcelo Johann, Ricardo Reis, Universidade Federal do Rio Grande do Sul, Brazil.....85

High-Level Simulation of a PID Controller Based on Memristor, Carlos Sánchez-López, Francisco Epimenio Morales-López, Miguel Angel Carrasco-Agüilar, Autonomous University of Tlaxcala, Mexico.....89

Session 7 - CMOS and BiCMOS Circuits for High Data Rate Communication

Monday Afternoon, June 27, Pinnacle Ballroom III
Session Chair: Thierry Taris - IMS Laboratory
Yann Deval - IMS Laboratory

10 Gbps, 560 fJ/B TIA and Modulator Driver for Optical Networks-on-Chip in CMOS 65nm, José-Luis González-Jiménez1, Robert Polster2, Guillaume Waltener1, Yvain Thonnart1, Eric Cassan3, 1Université Grenoble Alpes, France, 2Columbia University, United States, 3Université Paris-Sud, France.....93

0.3-42.5 GHz Wideband Common Emitter Amplifier Driver Unit in 55 nm SiGe BiCMOS for 60 Gb/s Silicon Photonic Mach-Zehnder Modulator, Jérémie Prades1, Eric Kerhervé1, Anthony Ghiotto1, Denis Pache2, 1University of Bordeaux, France, 2STMicroelectronics, France.....97

0.18-μm CMOS Driver Optimization for Maximum Data Rate Under Power and Area Constraints, Audrey Michard1, Pietro Maris Ferreira1, Jean-François Carpentier2, 1CentraleSupélec/Université Paris-Saclay, France, 2STMicroelectronics, France.....101

A Digitally Tunable Stabilization Technique for Transimpedance Amplifiers in Optical Wireless and Visible Light Communication
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>16:42 PM</td>
<td><strong>A 180 GHz Frequency Multiplier in a 130nm SiGe BiCMOS Technology</strong>, Thomas Girg¹, Christopher Beck¹, Marco Dietz¹, Amelie Hagelauer¹, Dietmar Kissinger², Robert Weigel¹, ¹Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; ²Technische Universität Berlin / Innovations for High Performance Microelectronics, Germany</td>
</tr>
<tr>
<td></td>
<td><strong>Panel Discussion</strong></td>
</tr>
<tr>
<td></td>
<td>Monday Afternoon, June 27, (15:30 – 17:00)</td>
</tr>
<tr>
<td></td>
<td>Organized by IEEE Women in Circuits and Systems (WiCAS) and Young Professionals (YP)</td>
</tr>
<tr>
<td></td>
<td>Panelists: Dr. Magdy Bayoumi, University of Louisiana, Dr. Neda Parnian, Intel, Dr. Mohamad Sawan, Polytechnique Montréal, Dr. Shahram Tafazoli, Motion Metrics, Dr. Rabab Ward, University of British Columbia,</td>
</tr>
<tr>
<td>18:00 to 20:00</td>
<td><strong>Social Event (Cruise)</strong></td>
</tr>
</tbody>
</table>
Tuesday, JUNE 28, 2016

Session 8 – Plenary Session
Tuesday Morning, June 28, Pinnacle Ballrooms II and III
9:00  Keynote

Professor Massimo Alioto, National University of Singapore
Title: Designing (Relatively) Reliable Systems with (Highly) Unreliable Components

10:00 to 10:30 - Coffee Break (Shaughnessy Salon)

Session 9 - Sensors and Circuits for Health and Environmental Monitoring
Tuesday Morning, June 28, Pinnacle Ballroom II

Session Chair: Amine Miled - Université Laval
Benoit Gosselin - Université Laval

10:30  A Current-Controlled Transceiver IC for Structural Health Monitoring,
9-1  Hossein Zamani, Cheng Chen, Xinyao Tang, Pedram Mohseni, Soumyajit Mandal, Case Western Reserve University, United States.....113

10:48  Microfluidic Platform with Integrated Thin-Film Optical Oxygen Sensors for Transient Hypoxia,
9-2  Samantha Grist, Jonathan Schmok, Andrea Díaz Gaxiola, Karen Cheung, University of British Columbia, Canada.....117

11:06  Low-Power and Low-Noise Fully Differential Difference Amplifier for Sub-Nanoampere on-Chip Potentiostat,
9-3  Elnaz Ghodsevali1, Mounir Boukadoum2, Benoit Gosselin3, Amine Miled1, 1Laval University, Canada; 2Université du Québec à Montréal, Canada; 3Université Laval, Canada.....121

11:24  Hybrid Wiener and Partial Differential Equations Filter for Biomedical Image Denoising,
9-4  Salim Lahmiri1, Mounir Boukadoum2, 1École de Technologie Supérieure, Canada; 2Université du Québec à Montréal, Canada.....125

11:42  A Palmtop Platform for Miniaturized Dielectric Spectroscopy from MHz to GHz,
9-5  Mehran Bakhshiani, Michael Suster, Pedram Mohseni, Case Western Reserve University, United States.....129
Tuesday Morning, June 28, Pinnacle Ballroom III

Session Chair: Michael Green - University of California Irvine
Yvon Savaria - Ecole Polytechnique de Montreal

10:30  Digital Direct-Driven Speaker Architecture Using Segmented Pulse Shaping Technique, Go Harumi, Satoshi Saikatsu, Michitaka Yoshino, Akira Yasuda, Hosei University, Japan.....133

10:48  Improved Alias Rejection Using Interleaved CIC Decimation Filter, Karthikeyan Saravanan, Dinesh Ganesan, Binsu Kailath, Indian Institute of Information Technology Design and Manufacturing Kancheepuram, India.....137

11:06  Performance Characterization of an SCMA Decoder, Roya Alizadeh, Normand Bélanger, Yvon Savaria, François-Raymond Boyer, Polytechnique Montréal, Canada.....141

11:24  Using Adder Compressors for Power-Efficient 2-D Approximate Discrete Tchebichef Transform, Guilherme Paim\textsuperscript{2}, Eduardo Costa\textsuperscript{1}, \textsuperscript{1}Universidade Católica de Pelotas, Brazil; \textsuperscript{2}Universidade Federal de Pelotas, Brazil.....145

11:42  Adjusting Video Tiling to Available Resources in a Per-Frame Basis in High Efficiency Video Coding, Giovani Malossi\textsuperscript{2}, Daniel Palomino\textsuperscript{2}, Claudio Diniz\textsuperscript{1}, Altamiro Susin\textsuperscript{2}, Sergio Bampi\textsuperscript{2}, \textsuperscript{1}Universidade Católica de Pelotas, Brazil; \textsuperscript{2}Universidade Federal do Rio Grande do Sul, Brazil.....149

12:00 to 13:30 – Lunch Break (Pinnacle Ballroom I)

Poster Session - Analog and Mixed Circuit Building Blocks

Tuesday Afternoon, June 28, Shaughnessy Room, (13:00 - 15:00)

Session Chair: Luc Hebrard - University of Strasbourg
Yvon Savaria - Ecole Polytechnique de Montreal

A-1  Data Transient Insensitive Phase-Locked Loops, Durand Jarrett-Amor, Fei Yuan, Ryerson University, Canada.....153

A-2  A Start-Up Free 200nW Bandgap Voltage Reference, Chundong Wu\textsuperscript{2}, Wang Ling Goh\textsuperscript{2}, Yongkui Yang\textsuperscript{2}, Alan Chang\textsuperscript{3}, Xi Zhu\textsuperscript{1}, Lei Wang\textsuperscript{3}, \textsuperscript{1}Macquarie University, Australia, \textsuperscript{2}Nanyang Technological University, Singapore, \textsuperscript{3}Nanyang Technological University / NXP Semiconductors Singapore Pte Ltd, Singapore.....157
A-3  A 28-Gb/s Transmitter with 3-Tap FFE and T-Coil Enhanced Terminal in 65-nm CMOS Technology, Naiwen Zhou, Linghan Wu, Ziqiang Wang, Xuqiang Zheng, Weidong Cao, Chun Zhang, Fule Li, Zhihua Wang, Tsinghua University, China.....161

A-4  A Programmable CMOS Feedback IC for Reconfigurable MEMS-Referenced Oscillators, Hesam Khanmohammadi, Peng Wang, Christopher Babecki, Philip Feng, Soumyajit Mandal, Case Western Reserve University, United States.....165

A-5  A Comparative Study of Body Biased Time-to-Digital Converters Based on Stochastic Arbiters and Stochastic Comparators, James Tandon\(^2\), Satoshi Komatsu\(^3\), Takahiro Yamaguchi\(^1\), Kunihiro Asada\(^3\), \(^1\)Advantest Corporation, Japan, \(^2\)California State University, East Bay, United States, \(^3\)University of Tokyo, Japan.....169

A-6  Aperture Error Reduction Technique for Subrange SAR ADC, Ying Ju, Fule Li, Xiuju He, Chun Zhang, Zhihua Wang, Tsinghua University, China.....173

A-7  Digital Compensation of DC-DC Converter Voltage Ripple for Switched-Capacitor Power Amplifiers, Stefan Trampitsch\(^3\), Daniel Gruber\(^1\), Michael Lungenmayr\(^2\), Edwin Thaller\(^1\), Mario Hoerner\(^2\), \(^1\)Intel Austria GmbH, Austria, \(^2\)Johannes Kepler University Linz, Austria, \(^3\)Johannes Kepler University Linz / Intel Austria GmbH, Austria.....177


A-9  A Fixed Window Level Crossing ADC with Activity Dependent Power Dissipation, Austin Ogweno, Patrick Degenaar, Victor Khomenko, Alex Yakovlev, Newcastle University, United Kingdom.....185

A-10 Adaptive UHF RFID Analog Front End for Communication Range Improvement, Damien Jaussen\(^2\), Emmanuel Bergeret\(^1\), Jean Gaubert\(^1\), Christophe Moreaux\(^3\), Gary Seigneur\(^5\), \(^1\)Aix-Marseille Université / Institut Matériaux Microélectronique Nanosciences de Provence, France, \(^2\)Institut Matériaux Microélectronique Nanosciences de Provence, France, \(^3\)INVIA, France.....189
Tuesday Afternoon, June 28, Shaughnessy Room, (13:00 - 15:00)

Session Chair: Yvon Savaria - Ecole Polytechnique de Montreal
Luc Hebrard - University of Strasbourg

**B-1** A Correction Code for Multiple Cells Upsets in Memory Devices for Space Applications, Helano Castro, Jarbas da Silveira, Alexandre Coelho, Felipe e Silva, Philippe Magalhães, Otávio de Lima Jr., Universidade Federal do Ceará, Brazil......193

**B-2** A Study of a Top-Down Error Correction Technique Using Recurrent-Neural-Network-Based Learning, Masanori Natsui, Naoto Sugaya, Takahiro Hanyu, Tohoku University, Japan......197

**B-3** A Versatile Quaternion Multiplier Based on Sparse-Iteration 4D CORDIC, Marek Parfiieniuk, Sang Yoon Park, Bialystok University of Technology, Poland; Myongji University, Korea, South......201

**B-4** Design of an Area-Efficient Partial-Sum Architecture for Polar Decoders Based on New Matrix Generator, Yun-Nan Chang, National Sun Yat-sen, Taiwan......205

---

**Poster Session - Energy Harvesting Circuits II**

Tuesday Afternoon, June 28, Shaughnessy Room, (13:00 - 15:00)

Session Chair: Yvon Savaria - Ecole Polytechnique de Montreal
Luc Hebrard - University of Strasbourg

**C-1** A Battery-Less, Self-Sustaining RF Energy Harvesting Circuit with TFETs for μW Power Applications, David Cavalheiro, Francesc Moll, Stanimir Valtchev, Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa, Portugal; Universitat Politècnica de Catalunya, Spain......209

**C-2** A Fully-Synthesizable 0.6V Digital LDO with Dual-Loop Control Using Digital Standard Cells, Jun Liu, Nima Maghari, University of Florida, United States......213

**C-3** Loss Analysis of Flyback in Discontinuous Conduction Mode for Sub-mW Harvesting Systems, Armande Capitaine, Gaël Pillonnet, Thibaut Chailloux, Firas Khaled, Olivier Ondel, Bruno Allard, Université Grenoble Alpes, France; Université de Lyon / Institut National des Sciences Appliquées de Lyon, France......217
Poster Session - Technology Trends

Tuesday Afternoon, June 28, Shaughnessy Room, (13:00 - 15:00)

Session Chair: Yvon Savaria - Ecole Polytechnique de Montreal
               Luc Hebrard - University of Strasbourg

D-1  Innovative Device Source/Drain and Channel Implantation for MOS Transistors in Ultra Low Power Subthreshold Circuit Applications, Munem Hossain, Masud Chowdhury, University of Missouri-Kansas City, United States.....221

D-2  Novel Ising Model Using Dimension-Control for High-Speed Solver for Ising Machines, Kenta Someya, Ryoto Ono, Takayuki Kawahara, Tokyo University of science, Japan.....225

Session 11 - Biomedical Circuits and Systems 1

Tuesday Afternoon, June 28, Pinnacle Ballroom II

Session Chair: Benoit Gosselin - Université Laval
               Amine Miled - Université Laval

13:30  Design of High-Voltage-Tolerant Level Shifter in Low Voltage CMOS Process for Neuro Stimulator, Zhicong Luo, Ming-Dou Ker, National Chiao-Tung University, Taiwan.....229

13:48  A Small-Footprint Body Channel Communication Transceiver Using Only One Phase-Locked Loop as Modulator and Demodulator, Bo Wang, Haibin Shao, Chaoxun Wang, Peking University Shenzhen Graduate School, China.....233

14:06  SAW Resonator Oscillator Based Injection LockedOOK Transmitter for MedRadio Spectrum, Abhishek Srivastava, Devarshi Das, Dinesh Kumar Sharma, Maryam Shojaei Baghini, Indian Institute of Technology Bombay, India.....237

14:24  A Precise 360°-Range Phase Detector Based on an N-Path Filter, Siavash Yazdi, Michael Green, University of California, Irvine, United States.....241

14:42  Low Emission, Open Loop MAC Protocol Compliant Implantable FSK Modulator, Ruchir Saraswat, Esther Rodriguez-Villegas, Zhou Jiang, Imperial College London, United Kingdom.....245
Panel Session - From RFID to IoT, Dreams and Reality

Tuesday Afternoon, June 28, Pinnacle Ballroom III (13:30 – 15:00)
Organized by: Magdy Bayoumi, University of Luisana

Panelists: Massimo Alioto, National University of Singapore
Mounir Boukadoum, Université du Québec à Montréal
Yann Deval, IMS Lab, Université de Bordeaux
Wolfgang Richter, EPIC Semiconductors
Zhuhua Wang, Tsinghua University

15:00 to 15:30 - Coffee Break (Shaughnessy Salon)

Session 12 - High Performances ADC

Tuesday Afternoon, June 28, Pinnacle Ballroom II

Session Chair: Nima Maghari - University of Florida
Patricia Desgreys - Télécom ParisTech

15:30 12-1 A 77.1dB/108.9dB SNDR Dual-Mode Delta-Sigma Modulator, Ning Yan,
Dongmei Li, Guolin Li, Zhihua Wang, Tsinghua University, China.....249

15:48 12-2 A 96.4 dB High-Pass Delta-Sigma Modulator with Dynamic Biasing
and Tree-Structured DEM, Nikola Ivanisevic, Saul Rodriguez, Ana Rusu,
KTH Royal Institute of Technology, Sweden.....253

16:06 12-3 An 11-Bit 200MS/s Subrange SAR ADC with Charge-Compensation-
Based Reference Buffer, Shushu Wei, Ying Ju, Fule Li, Zhihua Wang,
Tsinghua University, China.....257

16:24 12-4 A Multi-Channel Sigma-Delta Modulator for Subband Digital
Predistortion with LTE Signals, Kelly Tchambake, Dang-Kiên Germain
Pham, Chadi Jabbour, Patricia Desgreys, Patrick Loumeau, Télécom
ParisTech, France.....261

16:42 12-5 SMASH-MASH Delta-Sigma Modulator Using Noise-Shaping
Quantizers, Changsok Han, Taewook Kim, Nima Maghari, University of
Florida, United States.....265
Tuesday Afternoon, June 28, Pinnacle Ballroom III

Session Chair: Ming-Dou Ker - National Chiao-Tung University
Frédéric Nabki - Université du Québec à Montréal

15:30  **A Low-Power Continuous-Reset CMOS Charge-Sensitive Amplifier for the Readout of Solid-State Radiation Detectors**, Mohammad Beikahmadi\(^1\), Krzysztof Iniewski\(^1\), Shahriar Mirabasii\(^2\), \(^1\)Redlen Technologies Inc., Canada; \(^2\)University of British Columbia, Canada.....269

15:48  **Sub-Nanosecond Gated Photon Counting for High Spatial Resolution CMOS Imagers**, Octavian Maciu, Wilfried Uhring, Jean-Baptiste Kammerer, Jean-Pierre Le Normand, Norbert Dumas, Foudil Dadouche, Luc Hebrard, Université de Strasbourg / ICube, France.....273

16:06  **Line Buffer Reduction for LUT-Based Real-Time Image Inverse Warping**, Yufeng Lu\(^2\), Xiaohua Luo\(^2\), Yimu Wang\(^1\), Luc Claesen\(^1\), \(^1\)Hasselt University, Belgium; \(^2\)Zhejiang University, China.....277

16:24  **A 100MHz, 1.2V, ±1V Peak-to-Peak Output, Double-Bus Single Ended-to-Differential Switched-Capacitor Amplifier for Multi-Column CMOS Image Sensors**, Ali Zadeh, University of Southern California, United States.....281

16:42  **Parallel Hybrid Bispectrum-Multiframe Blind Deconvolution Algorithm for Horizontal Imaging**, Solmaz Hajmohammadi, Saeid Nooshabadi, Michigan Technological University, United States.....285

18:00 to 20:00
Social Event at the University of British Columbia (UBC)
Sponsored by
Department of Electrical and Computer Engineering (UBC)
Wednesday, JUNE 29, 2016

Session 14 – Plenary Session
Tuesday Morning, June 28, Pinnacle Ballrooms II and III
9:00 Keynote

Professor Ali Niknejad, University of California, Berkeley
Title: mm-Wave CMOS to the Rescue: 5G and Beyond (xG) Communication and Enhanced BioSensing

10:00 to 10:30 - Coffee Break (Shaughnessy Salon)

Session 15 - Signal Conditioning and MEMS Control
Wednesday Morning, June 29, Pinnacle Ballroom II

Session Chair: Luc Hebrard - University of Strasbourg
Mohamad Sawan - Polytechnique Montréal

10:30 Wideband LNA with 1.9 dB Noise Figure in 0.18 µm CMOS for High Frequency Ultrasound Imaging Application, Yuxuan Tang¹, Yulong Feng², Zhiheng Zuo², Qingjun Fan², Cheng Fang¹, Jun Zou¹, Jinghong Chen²,¹Texas A&M University, United States, ²University of Houston, United States.....289

10:48 Ultra-High Sensitivity, Low-Power Dual Chopper Signal Conditioning Circuit for Integrated Sensors, Parisa Vejdani¹, Karim Allidina², Frederic Nabki¹, ¹Université du Québec à Montréal, Canada, ²MEMS Vision International Inc, Canada.....293

11:06 Mixed-Mode Self-Calibrated Amplitude Control Scheme for MEMS Vibratory Gyroscopes, Ahmed Sawaby, Amr Ahmed, Mohamed Abozeid, Hassan Ali, Mohamed Aboudina, Cairo University, Egypt.....297

11:24 3-Axis High Q MEMS Accelerometer with Simultaneous Damping Control, Lavinia Elena Ciotirca¹, Olivier Bernal², Hélène Tap², Jérôme Enjalbert³, Thierry Cassagnes³, ¹NXP Semiconductors, ²Ecole Nationale Supérieure d'Electrotechnique, d'Electronique, d'Informatique, d'Hydraulique et des, France, ³NXP Semiconductors, France.....301

11:42 Tracking BTI and HCI Effects at Circuit-Level in Adaptive Systems, Mauricio Altieri¹, Suzanne Leseq¹, Edith Beigne¹, Olivier Heron², Diego Puschini¹, ¹CEA-Leti, France; ²CEA-LIST, France.....305
Session 16 - Silicon-Based RF Front-End Circuits

Wednesday Morning, June 29, Pinnacle Ballroom III

Session Chair: Frederic Nabki – UQAM
Jose-Luiz Gonzales - CEA-LETI

10:30  A Broad-Band 55-nm BiCMOS T/R Switch for mmW 5G Small Cell Access Point, Vincent Puyal1, Alexandre Silgaris1, José-Luis González-Jiménez2, Cédric Dehos1, Frédéric Hameau1, Aurélien Larie1, Laurent Dussopt1, Eric Mercier1, 1CEA-Leti, France, 2Université Grenoble Alpes, France.....309

10:48  A 0.3 nJ/Bit Super-Regenerative Pulse UWB Receiver with Track and Detection, Joshua Kim1, Michael Green2, 1Boeing Company, United States, 2University of California, Irvine, United States.....313

11:06  A Concurrent Transmitter in CMOS 28nm FDSOI Technology Based on Walsh Sequences Generator, Nassim Bouassida1, François Rivet1, Yann Deval1, David Duperray2, Andrea Cathelin2, 1Laboratoire de l’Intégration du Matériau au Système/Université de Bordeaux, France, 2STMicroelectronics, France.....317

11:24  A Transformer Combined Quadrature Switched Capacitor Power Amplifier in 65nm CMOS, Vladimir Aparin1, Jeremy Dunworth1, Lee Seward1, Wen Yuan2, Jeffrey Walling2, 1Qualcomm Inc., United States; 2University of Utah, United States.....321

11:42  EPC Gen-2 UHF RFID Tags with Low-Power CMOS Temperature Sensor Suitable for Gas Applications, Mohamed Zgaren1, Saqib Mohamad2, Abbes Amira3, Mohamad Sawan1, 1Polytechnique Montréal, Canada, 2Hong Kong University of Science and Technology, Hong Kong, 3Qatar University, Qatar.....325

12:00 to 13:30 – Lunch Break (Pinnacle Ballroom I)

Poster Session - Analog and Mixed Circuit Building Blocks

Wednesday Afternoon, June 29, Shaughnessy Salon, (13:00 - 15:00)

Session Chair: Eric Kerherve – IMS

E-1  A Dual Gm-Mode LC-Tank VCO with Programmable-in-Size-and-Current Active Core and Pseudo-Exponential Tank Capacitance, Mehran Bakhshiani, Pedram Mohseni, Case Western Reserve University, United States.....329
E-2 Channel Aware Receiver Front End for Low Power 2.4 GHz Wireless Sensor Network - a System Level Analysis, Jennifer Zaini¹, Frédéric Hameau¹, Thierry Taris², Dominique Morche³, Le Quang Vinh Tran², Patrick Audebert¹, ¹CEA-Leti, France; ²ERCOM TELECOM, France; ³University of Bordeaux, France.....333

E-3 A Half-Rate 100 Gb/s Injection-Locked Clock/Data Recovery Circuit, Behzad Samavatv, Michael Green, University of California, Irvine, United States.....337

E-4 PLL Based BFSK Subcarrier Generator for FM-UWB Transmitter, Mohamed Ali¹, Mohamad Sawan¹, Heba Shawkey², Abdelhalim Zekry³, ¹Polytechnique Montréal, Canada, ²Electronics Research Institute, Egypt, ³Polytechnique Montréal, Canada.....341

---

Poster Session - Biomedical Circuits and Systems 2

Wednesday Afternoon, June 29, Shaughnessy Salon, (13:00 - 15:00)

Session Chair: Benoit Gosselin - Laval University

F-1 A Charge-Pump Based Multi-Mode Stimuli Generator for Cardiac Pacemaking, Ali Esmailiy, Ali Shaker, Iman Ghotbi, Omid Shoaei, University of Tehran, Iran.....345

F-2 Toward Sub-pJ Per Classification in Body Area Sensor Networks, Paul Chollet, Kevin Colombier, Cyril Lahuec, Matthieu Arzel, Fabrice Seguin, Telecom Bretagne, France.....349

F-3 A Low-Cost Camera-Based Transducer Tracking System for Freehand Three-Dimensional Ultrasound, Mohammad Baba¹, Otmane Ait Mohamed¹, Falah Awwad², Mohammad Daoud³, ¹Concordia University, Canada, ²United Arab Emirates University, U.A.E ³German Jordanian University, Jordan.....353

---

Poster Session - Communication Circuits and Systems

Wednesday Afternoon, June 29, Shaughnessy Salon, (13:00 - 15:00)

Session Chair: Jeffrey Walling - University of Utah

G-1 A Fast Systolic Priority Queue Architecture for a Flow-Based Traffic Manager, Imad Benacer, François-Raymond Boyer, Normand Bélanger, Yvon Savaria, Polytechnique Montréal, Canada.....357
G-2 High Speed Serial Interface Transceiver Controller Based on JESD204B, Zhaoming Wu, Chun Zhang, Fule Li, Zhihua Wang, Tsinghua University, China.....361

G-3 Quad-Level Carrier Width Modulation Demodulator for Micro-Implants, Aref Trigui1, Mohamed Ali1, Ahmed Chiheb Ammari2, Yvon Savaria1, Mohamad Sawan1, 1Polytechnique Montréal, Canada, 2King Abdulaziz University, Saudi Arabia.....365

G-4 Towards LTE Physical Layer Virtualization on a COTS Multicore Platform with Efficient Scheduling, Michel Gémieux, Yvon Savaria, Guochuan Zhu, Jean-François Frigon, Polytechnique Montréal, Canada.....369

### Poster Session - Design Tools

Wednesday Afternoon, June 29, Shaughnessy Salon, (13:00 - 15:00)

Session Chair: Jeffrey Walling - University of Utah

K-1 PEVaS: Power and Execution-Time Variation-Aware Scheduling for MPSoC, Komei Nomura1, Yasuhiro Takashima1, Yuichi Nakamura2, 1University of Kitakyushu, Japan, 2NEC Corporation, Japan.....373

### Poster Session - Digital Signal Processing and Embedded Systems

Wednesday Afternoon, June 29, Shaughnessy Salon, (13:00 - 15:00)

Session Chair: Jeffrey Walling - University of Utah

M-1 ORVD-Trellis Based MIMO Detection, Dominik Auras, Rainer Leupers, Gerd Ascheid, Rheinisch-Westfälische Technische Hochschule Aachen, Germany.....377

M-2 Image Super-Resolution with Multi-Channel Convolutional Neural Networks, Yu Kato, Shinya Ohtani, Nobutaka Kuroki, Tetsuya Hirose, Masahiro Numa, Kobe University, Japan.....381

M-3 An Evaluation Framework of OS-Level Power Managements for the big.LITTLE Architecture, Hideki Takase1, Kazumi Aono1, Yutaka Matsubara2, Kazuyoshi Takagi1, Naofumi Takagi1, 1Kyoto University, Japan; 2Nagoya University, Japan.....385
**Poster Session - Microsystems and Sensory Circuits & Systems**

**Wednesday Afternoon, June 29, Shaughnessy Salon, (13:00 - 15:00)***

Session Chair: Benoit Gosselin - Laval University

**T-1**  
**Optimization of in-Plane SiC Capacitive Accelerometers Design Parameters**, Ahmad Alfaifi	extsuperscript{1}, Ibrahim Alhomoudi	extsuperscript{2}, Mourad El-Gamal	extsuperscript{1},  
	extsuperscript{1}McGill University, Canada,  
	extsuperscript{2}King Abdulaziz City for Science and Technology, Saudi Arabia.....389

**T-2**  
**An Integrated Full-Bridge Class-DE Ultrasound Transducer Driver for HIFU Applications**, Ruiqi Song, Carlos Christoffersen, Samuel Pichardo, Laura Curiel, Lakehead University, Canada.....393

**T-3**  
**Design of a DCO Based on Worst-Case Delay of a Self-Timed Counter and a Digitally Controllable Delay Path**, Oyinkuro Benafa, Austin Ogweno, Delong Shang, Alex Yakovlev, Newcastle University, United Kingdom.....397

**T-4**  
**Monitoring SRAM BTI Degradation by Current-Based Tracking Technique**, Peyman Pouyan, Esteve Amat, Antonio Rubio, Universitat Politècnica de Catalunya, Spain.....401

**15:00 to 15:30 – Coffee Break (Shaughnessy Salon)**

---

**Session 17 - Analog Building Blocks**

**Wednesday Afternoon, June 29, Pinnacle Ballroom II**

Session Chair: Danilo Demarchi - Politecnico di Torino  
Jean-Baptiste Begueret - IMS Laboratory

**15:30**  
**Differential Integrator Pixel Architecture for Dark Current Compensation in CMOS Image Sensors**, Marzieh Mehri Dehnavi, Yves Audet, Elham Khamsehashari, Polytechnique Montréal, Canada.....405

**15:48**  
**CMOS Implementation of a Low Power Absolute Value Comparator Circuit**, Saam Iranmanesh, George Raikos, Zhou Jiang, Esther Rodriguez-Villegas, Imperial College London, United Kingdom.....409

**16:06**  
**On Design of Memory Retention LDO Regulator**, Igor Filanovsky	extsuperscript{1}, Luis Bica Oliveira	extsuperscript{2}, Vadim Ivanov	extsuperscript{3},  
	extsuperscript{1}University of Alberta, Canada,  
	extsuperscript{2}University of Nova, Portugal,  
	extsuperscript{3}Texas Instruments, United States.....413
16:24  On Lossy Memristive Behavior of Metal Conductors, Todd Wey, Chris Nadovich, Lafayette College, United States.....417

Session 18 - Frequency Generation

Wednesday Morning, June 29, Pinnacle Ballroom III

Session Chair: Reza Molavi - University of British Columbia

15:30  A Phasor-Domain Study of Injection-Locking of Harmonic Oscillators with Multiple Injections, Fei Yuan, Ryerson University, Canada.....421

15:48  A 2.6GHz Subharmonically Injection-Locked PLL with Low-Spur and Wide-Lock-Range Injection, Naohiro Fujii, Shuei Morishita, Takao Kihara, Tsutomu Yoshimura, Osaka Institute of Technology, Japan.....425

16:06  A Wideband MDLL with Jitter Reduction Scheme for Forwarded Clock Serial Links in 40 nm CMOS, Kiarash Gharibdoust¹, Armin Tajalli², Yusuf Leblebici¹, ¹École Polytechnique Fédérale de Lausanne, Switzerland; ²Kandou Bus, Switzerland.....429

16:24  A Fully Integrated, 1-µs Start-Up Time, 32-MHz Relaxation Oscillator for Low-Power Intermittent Systems, Hiroki Asano, Tetsuya Hirose, Taro Miyoshi, Keishi Tsubaki, Toshihiro Ozaki, Nobutaka Kuroki, Masahiro Numa, Kobe University, Japan.....433

17:00 to 17:30 - Closing Remarks and Best Student Paper Awards
Pinnacle Ballroom II