



**IEEE SOLID-STATE
CIRCUITS SOCIETY**
Where ICs are in IEEE

May 2017

EDUCATION



Upcoming Webinar

**Adaptive sensing and computing
towards always-on context-
awareness**

Presented by Marian Verhelst

Wednesday, June 28th @ 11:00 AM (ET)

***Professional Development Hours
can be requested for this webinar***

[CLICK HERE TO REGISTER!](#)

This webinar was prerecorded. Marian Verhelst will be available during the presentation to answer questions regarding content, formulas, or theories. Please follow the link to register for the webinar which is free and open to all SSCS members.

Abstract: Future mobile electronic devices will be equipped with more and more sensors that require always-on operation, to bring continuous context-awareness to the mobile device. Enabling this at near-zero power budgets, is only feasible if the device can continuously tune its own performance and hardware configuration in function of the

sensory context. This requires combining research on adaptive sensor interfaces, embedded machine learning, and reconfigurable computing.

We propose two important self-adaptivity techniques which can be exploited both in the sensor interfaces, as well as in the subsequent machine learning processing layer: 1.) hierarchical activation, and 2.) precision scalability. Both techniques will be illustrated with practical silicon implementations to assess their benefits, and this for always-on acoustic sensing and always-on image recognition applications. The resulting hardware context-awareness will be crucial in achieving the necessary 10x energy improvement for further miniaturization of mobiles, wearables and the IoT.

Bio: Marian Verhelst is an assistant professor at the MICAS laboratories (MICro-electronics And Sensors) of the EE Department of KU Leuven, Belgium, as of 2012. Her research focuses on self-adaptive circuits and systems, and low-power sensing and processing for the internet-of-things. From 2008 till 2011, she worked in the Radio Integration Research Lab of Intel Labs, Hillsboro OR, doing research on digital assistance of configurable wireless radio front-ends. Marian received a PhD from KU Leuven cum ultima laude in 2008, and was a visiting scholar at the Berkeley Wireless Research Center (BWRC) of UC Berkeley in the summer of 2005.

Marian has a passion for inter-disciplinary collaborations and science communication, is a member of the Young Academy of Belgium, and has published over 60 papers in conferences and journals. She is a member of the ISSCC and DATE TPC, as well as a member of the executive committees of DATE and ISSCC. Marian is an SSCS Distinguished Lecturer, and an associate editor of JSSC.

Upcoming Distinguished Lecturer Events in June

| | SPEAKER | CHAPTER | TOPIC |
|--------|----------------|-------------------|--|
| June 1 | Jerald Yoo | SSCS/EDS New York | Topic 1: Sensor Interface Circuit Design |

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|---------|-------------------|--------------------------|---|
| | | | <p>Topic 2: Machine Learning Meets Patient-Specific Wearable Healthcare</p> <p>For more details, please click here.</p> |
| June 6 | Pietro Andreani | SSCS/EDS Hawaii | <p>Topic: RF Integrated Harmonic Oscillators in Silicon Technologies</p> <p>For more details, please click here.</p> |
| June 9 | Pietro Andreani | SSCS Toronto | <p>Topic: RF Integrated Harmonic Oscillators in Silicon Technologies</p> <p>For more details, please click here.</p> |
| June 15 | Hiroataka Tamura | SSCS Kansai & SSCS Japan | <p>Topic: TBD</p> <p>For more details, please click here.</p> |
| June 21 | Antonio Liscidini | SSCS Zurich | <p>Topic: Emerging Analog Filtering Techniques</p> <p>For more details, please click here.</p> |
| June 22 | Antonio Liscidini | SSCS Lund | <p>Topic: Emerging Analog Filtering Techniques</p> <p>For more details, please click here.</p> |
| June 22 | Antonio Liscidini | SSCS Pavia | <p>Topic: Emerging Analog Filtering Techniques</p> <p>For more details, please click here.</p> |
| June 28 | Antonio Liscidini | SSCS Twente | <p>Topic: Emerging Analog Filtering Techniques</p> <p>For more details, please click here.</p> |

For more information on upcoming Distinguished Lecturer Tours, [CLICK HERE.](#)

CONFERENCES

Upcoming Conferences

| | |
|---|-------------------------|
| <p>IEEE Radio Frequency Integrated Circuits Symposium (RFIC) Honolulu</p> | <p>June 4 - 6, 2017</p> |
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| | |
|---|-----------------------|
| <u>2017 Symposia on VLSI Technology and Circuits</u> Kyoto | June 5 - 8, 2017 |
| <u>2017 IEEE/ACM International Symposium on Low Power Electronics and Design (ISLPED)</u> Taiwan | July 24 - 26, 2017 |
| <u>2017 European Solid-State Circuits Conference (ESSCIRC)</u> Belgium | Sept 11 - 14, 2017 |
| <u>2017 IEEE Biomedical Circuits and Systems Conference (BioCAS)</u> Italy | October 19 - 21, 2017 |
| <u>2017 IEEE Bipolar/BiCMOS Circuits and Technology Meeting - BCTM</u> Florida | October 19 - 21, 2017 |
| <u>2017 IEEE Asian Solid-State Circuits Conference (A-SSCC)</u> Korea (South) | November 6 - 8, 2017 |

CALL FOR PAPERS

BioCAS 2017 - Call for Papers

The [13th IEEE BioCAS](#) welcomes the submission of papers. The conference will be held October 19 - 21 in Turin, Italy. BioCAS serves as a premier international forum for presenting the interdisciplinary research and development activities at the crossroads of medicine, life sciences, physical sciences and engineering that will shape tomorrow's medical devices and healthcare systems.

Paper topics can be on (but are not limited to) the following topics:

- Assistive, Rehabilitation, and Quality of Life Technologies
- Bio-inspired and Neuromorphic Circuits and Systems
- Biofeedback, Electrical Stimulation, and Closed-Loop Systems
- Biomedical Imaging Technologies & Image Processing
- Biosensor Devices
- Biosensor Interfacing Circuits
- Biosignal Recording & Processing
- Body Area/Sensor Network
- Brain Machine Interfaces
- Brain Machine Interfaces
- Electronics for Brain Science
- Genomics and Systems Biology
- Implantable Electronics
- Innovative Circuits for Medical Applications
- Lab-on-Chip & BioMEMS
- Medical Information Systems and Bioinformatics
- Wireless and Energy Harvesting/Scavenging Technology

[Download the call for papers here](#)

Important Deadlines: June 16 - Paper Submission Deadline, July 14 - Demonstration Proposal Submission Deadline

IEEE Asian Solid-State Circuits Conference (A-SSCC) 2017 - Call for Papers

The Asian Solid-State Circuits Conference (A-SSCC) 2017 welcomes the submission of papers. The conference will be held November 6 - 8, 2017 in Seoul, Korea. A-SSCC is an international forum for presenting the most updated and advanced chips and circuit designs in solid-state and semiconductor fields. Paper submission guidelines are available on the [A-SSCC website](#).

Perspective authors are invited to submit full-length, four-page manuscripts (including figures, tables, and references). Authors submitting papers to Special Session - Industry Program may use a two-page or four-page format.

Papers are solicited in the following categories:

- **Analog Circuits & Systems:** Amplifiers, comparators, switch capacitor circuits, continuous-time & discrete-time filters, voltage/current references; DC-DC converters, power-control circuits; IF/baseband analog circuits, AGC/VGA; non-linear analog circuits.
- **Data Converters:** Nyquist-rate and oversampling A/D, D/A converters, time-to-digital converters, and capacitance-to-digital converters; sub-circuits for data converters including sample-and-hold circuits, calibration circuits, etc.
- **Digital Circuits & Systems:** Design, fabrication, and test of digital VLSI systems; high-speed low-power digital circuits, power-reduction and management methods for digital VLSI, ultra-low-voltage and sub-threshold logic design; leakage reduction techniques; clock distribution, I/O circuits, reconfigurable logic-array circuits; supply/substrate noise measurement and cancellation for digital VLSI, variation and fault-tolerant circuits.
- **SoC & Signal Processing Systems:** System-on-chip(including 3D integration), microprocessors, network processors, baseband communication processing system & architectures, energy efficient signal-processing systems; multimedia and recognition processing systems; cryptographic and security-processing circuits and systems; bio-medical/neural-network processors and sensor network systems.
- **RF:** Receivers/transmitters/transceivers for wireless systems; narrowband RF, ultra-wideband and millimeter-wave circuits; circuits and building-blocks including RF front-end, LNA, mixer, power amplifiers, VCOs, frequency synthesizers, RF filters, RF switches, power detectors, active antennas.
- **Wireline:** Receivers/transmitters/transceivers for wireline systems; optical/electrical data links and backplane transceivers; power-line communication; clock generation circuits, PLL, DLL, spread-spectrum clock generation; building blocks for high-speed wireline communication; analog-digital mixed-mode circuits.
- **Emerging Technologies and Applications:** Advanced system designs and circuit solutions for technologies and applications including state-of-the-art devices and packaging technologies; flexible and printable electronics; smart sensors and transducers; MEMS for analog, RF, and sensor applications; image sensors and displays; energy harvesting systems; transceiver systems; medical/bio-electronics/bio-inspired chip design and silicon systems.
- **Memory:** Volatile and Non-volatile memory; new memory designs for 3D/2D architectures, emerging devices such as resistive-/phase change-/magnetic-/ferro-electric- memory devices; data storage and multi-bit-cell memory design; cache-memory system, multi-port memory, and CAM design; yield-enhancing and ECC techniques; memory testing and built-in self-test.

Papers related to integrated circuits for intelligent systems are highly solicited. Papers on low-power and/or low-voltage approaches, signal integrity, noise, test, and manufacturability for all the above categories are welcomed. Measurement results are highly recommended, especially for analog, and RF categories. Design methodologies for SiP, and SoC are included in the scope of the conference; the papers only describing CAD tools and CAD algorithms are not considered.

Deadlines: Papers must be submitted by June 5, 2017, 20:00 (GMT). [Click here to submit](#).

PUBLICATIONS

The latest in SSCS Flagship Publications...

**IEEE Journal of Solid-State
Circuits**

| |
|--|
| Patent Abstracts |
| A 1.2-GS/s 8-bit Two-Step SAR ADC in 65-nm CMOS With Passive Residue Transfer Hai Huang; Ling Du; Yun Chiu |
| A 5.8-Gb/s Adaptive Integrating Duobinary DFE Receiver for Multi-Drop Memory Interface Hyun-Wook Lim; Sung-Won Choi; Jeong-Keun Ahn; Woong-Ki Min; Sang-Kyu Lee; Chang-Hoon Baek; Jae-Youl Lee; Gyo-Cheol Hwang; Young-Hyun Jun; Bai-Sun Kong |
| Hybrid CMOS/GaN 40-MHz Maximum 20-V Input DC-DC Multiphase Buck Converter Eyal Aklimi; Daniel Piedra; Kevin Tien; Tomás Palacios; Kenneth L. Shepard |
| A 0.42-mW 1-Mb/s 3- to 4-GHz Transceiver in 0.18 - CMOS With Flexible Efficiency, Bandwidth, and Distance Control for IoT Applications Dang Liu; Xuwen Ni; Ranran Zhou; Woogeun Rhee; Zhihua Wang |
| A Compact Broadband Mixed-Signal Power Amplifier in Bulk CMOS With Hybrid Class-G and Dynamic Load Trajectory Manipulation Song Hu; Shouhei Kousai; Hua Wang |
| A Low-Power Digitizer for Back-Illuminated 3-D-Stacked CMOS Image Sensor Readout With Passing Window and Double Auto-Zeroing Techniques Qiyuan Liu; Alexander Edward; Martin Kinyua; Eric G. Soenen; Jose Silva-Martinez |
| A 23-mW Face Recognition Processor with Mostly-Read 5T Memory in 40-nm CMOS Dongsuk Jeon; Qing Dong; Yejong Kim; Xiaolong Wang; Shuai Chen; Hao Yu; David Blaauw; Dennis Sylvester |
| A 3T1R Nonvolatile TCAM Using MLC ReRAM for Frequent-Off Instant-On Filters in IoT and Big-Data Processing Meng-Fan Chang; Chien-Chen Lin; Albert Lee; Yen-Ning Chiang; Chia-Chen Kuo; Geng-Hau Yang; Hsiang-Jen Tsai; Tien-Fu Chen; Shyh-Shyuan Sheu |
| Power Integrity Analysis of a 28 nm Dual-Core ARM Cortex-A57 Cluster Using an All-Digital Power Delivery Monitor Paul N. Whatmough; Shidhartha Das; Zacharias Hadjilambrou; David M. Bull |
| In Vitro Multi-Functional Microelectrode Array Featuring 59 760 Electrodes, 2048 Electrophysiology Channels, Stimulation, Impedance Measurement, and Neurotransmitter Detection Channels <i>Jelena Dragas; Vijay Viswam; Amir Shadmani; Yihui Chen; Raziyeh Bounik; Alexander Stettler; Milos Radivojevic; Sydney Geissler; Marie Engelene J. Obien; Jan Müller; Andreas Hierlemann</i> |
| Design and Self-Calibration Techniques for Inductor-Less Millimeter-Wave Frequency Dividers Ahmed I. Hussein; Jeyanandh Paramesh |
| A 28-GHz SiGe BiCMOS PA With 32% Efficiency and 23-dBm Output Power Anirban Sarkar; Farshid Aryanfar; Brian A. Floyd |
| A 1.9-mm-Precision 20-GHz Direct-Sampling Receiver Using Time-Extension Method for Indoor Localization Hong Gul Han; Byung Gyu Yu; Tae Wook Kim |
| A 2.4-GHz ZigBee Transmitter Using a Function-Reuse Class-F DCO-PA and an ADPLL Achieving 22.6% (14.5%) System Efficiency at 6-dBm (0-dBm) Xingqiang Peng; Jun Yin; Pui-In Mak; Wei-Han Yu; Rui P. Martins |

[A Wide Linear Dynamic Range Image Sensor Based on Asynchronous Self-Reset and Tagging of Saturation Events](#)

Juan Antonio Leñero-Bardallo; Ricardo Carmona-Galán; Ángel Rodríguez-Vázquez

[Characterizing the Impact of RTN on Logic and SRAM Operation Using a Dual Ring Oscillator Array Circuit](#)

Qianying Tang; Chris H. Kim

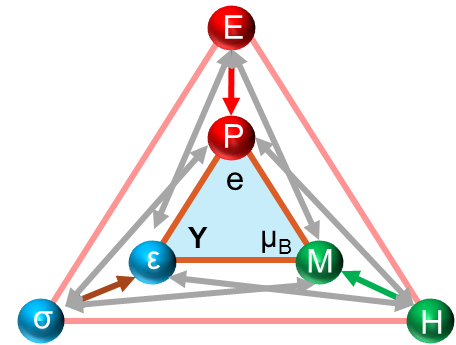
[A Dynamic Zoom ADC With 109-dB DR for Audio Applications](#)

Burak Gönen; Fabio Sebastiano; Rui Quan; Robert van Veldhoven; Kofi A. A. Makinwa

IEEE Journal on Exploratory Solid-State Computational Devices and Circuits

Volume 3: 2017

[An Energy-Efficient Digital ReRAM-Crossbar-Based CNN With Bitwise Parallelism](#)



[An Energy-Efficient Digital ReRAM-Crossbar-Based CNN With Bitwise Parallelism](#)

Leibin Ni ; Zichuan Liu ; Hao Yu ; Rajiv V. Joshi

[CoMET: Composite-Input Magnetolectric- Based Logic Technology](#)

Meghna G. Mankalale ; Zhaoxin Liang ; Zhengyang Zhao ; Chris H. Kim ; Jian-Ping Wang ; Sachin S. Sapatnekar

[Compact Modeling of Distributed Effects in 2-D Vertical Tunnel FETs and Their Impact on DC and RF Performances](#)

Jie Min ; Peter M. Asbeck

[Nonvolatile Spintronic Memory Array Performance Benchmarking Based on Three-Terminal Memory Cell](#)

Chenyun Pan ; Azad Naeemi

[Nonboolean Pattern Recognition Using Chains of Coupled CMOS Oscillators as Discriminant Circuits](#)

Vahnood Pourahmad ; Sasikanth Manipatruni ; Dmitri Nikonov ; Ian Young ; Ehsan Afshari

NEWS

Upcoming - SSCS & EDS Joint Young Professionals & Graduate Students Mentoring and Career Coaching Session

In conjunction with [VLSI Symposium](#), the Solid-State Circuits Society (SSCS) and Electron Devices Society (EDS) will be holding a Joint Young Professionals & Graduate Students Mentoring and Career Coaching Session.

The event will be held on Tuesday, June 6th at 6:15 p.m. in the Shunju I Room at the RIHGA Royal Hotel in Kyoto, Japan.

This complimentary event is open to all graduate students, early career engineers, and faculty within 15 years of their degree. Leading experts from industry, academia, SSCS executive officers & distinguished lecturers will be available at the mentoring session to talk about career coaching, entrepreneurship, publications, and answer all your questions - both in a town-hall style and one-on-one. There will be complimentary snacks and beverages available for all participants. Student participants will get 1 year free SSCS membership. [Please RSVP](#) and let us know if you can attend. Walk-in's are welcome!



Do you Qualify for IEEE Senior Member Grade?

Senior Member is the highest grade for which IEEE members can apply. IEEE members can self-nominate or be nominated for Senior Member grade.

Benefits include professional recognition, a senior member plaque, leadership eligibility to hold executive IEEE volunteer positions, and more.

For more information on IEEE Senior Member Grade, please [click here](#). If you have any questions or concerns, or need assistance obtaining references, email sscs-membership@ieee.org.

The next Senior Member review panel is in June. Become a Senior Member now!

[BEGIN SENIOR MEMBER APPLICATION](#)

New offering for SSCS members



In an effort to increase member benefits, SSCS has created the SSCS Resource Center. This informational hub will house technical information such as past webinar videos and slides, ISSCC tutorials and short courses, and more.

Top 5 Downloaded Products on the SSCS Resource Center:

- 1). [ISSCC 2015 Tutorial: High Speed Current Steering DACs](#), Presented by Jan Mulder
- 2). [Webinar: Trends in Broadband Converters](#), Presented by David H. Robertson
- 3). [ISSCC 2006 Short Course: Pipelined A/D Converters](#), Presented by Bang-Sup Song
- 4). [Webinar: Enabling and Exploiting Machine Learning in Ultra-low-power Devices](#), Presented by Naveen Verma
- 5). [Webinar: The X Files, Sheerluck Ohms and the 33dB Solution](#), Presented by Paul Brokaw

[Click here to visit the SSCS Resource Center.](#)

SSCS Members Can Join Sister Societies for Just \$5 Use Code SSCXCAS2017 or SSCXEDS2017

If you have not renewed your SSCS membership for 2017, you can enter the promotion code SSCXCAS2017 at checkout to join the Circuits and Systems Society (CAS) for \$5 or SSCXEDS2017 to join the Electron Devices Society (EDS) for \$5.

If you have already renewed for 2017, [click here](#) for more details about the discounted CAS membership and [click here](#) for more details about the discounted EDS membership.

Earn Continuing Education Hours

Have you attended an SSCS webinar? Attendees of upcoming and past webinars have the opportunity to earn professional development hours. Certificates of completion are offered to participants who view a webinar. A certificate of completion confirms one hour of professional development. After you attend the webinar, you may request a certificate of completion by completing the form [HERE](#).

Seeking News

Please send any chapter news or happenings (Distinguished Lecturer visits, events hosted by your SSCS chapter, awards received by members, etc) to Abira Sengupta, SSCS Magazine News Editor, for inclusion in an upcoming issue of the magazine. Please email - Abira.Sengupta@ieee.org. We look forward to receiving your news articles!

For more chapter news, [check out](#) the Winter 2017 issue of the Solid-State Circuits Magazine.

FEEDBACK

Let us know what you think! Please [email us](#) to send us your comments about the newsletter, what you would like to see included each month, or any other comments.

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