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June 2018

NEWS

UPCOMING SSCS WEBINAR

This webinar is part of a two-part series on time-based circuits



PART 2

Applications of Time-Based Circuits in Data Conversion, Filtering, and Control
Wednesday, July 11, 2018

11:00 AM ET

**Presenter: Pavan K. Hanumolu,
University of Illinois, Urbana-Champaign**

Abstract: In the 2nd part of this 2 part series on time based circuits, I will present time based signal representation as an alternative to classical voltage or charge based signal representations. I will then show how this representation enables the implementation of fundamental building blocks such as integrators using mostly digital circuits. Finally, I will present case studies of time based analog filters, analog to digital converters, and DC DC converters to highlight the advantages, opportunities, and drawbacks of the time based approach.

[CLICK HERE TO REGISTER](#)

Did you miss part one? Watch it online!

[PART 1 - Archived Online - Watch On](#)



Demand on the SSCS Resource Center

Time-Based Circuits - not just the Single Slope!

Presenter: Matt Straayer, Maxim Integrated Inc.

Abstract: Compared to circuits utilizing voltage or current to convey analog signals, time-based circuits offer unique attributes, ranging from simple, area efficient quantization to more complex techniques for time-based processing

such as integration, interpolation, and noise shaping. Although time-based circuits are not new, the availability of fast, low-power transistors in advanced process nodes, combined with the challenges of traditional analog design techniques, has renewed interest in time as a signal domain both in academia and in industry. This talk will look at some obvious and more subtle differences between voltage and time-based circuits, and discuss tradeoffs in the context of application requirements. A few advanced state-of-the-art time-based circuits will motivate the audience to consider how time-based circuits can be a useful tool for their own designs.

CLICK HERE TO WATCH ONLINE

Please note that moving forward all SSCS webinar registrations will be processed through the SSCS Resource Center. SSCS webinars are a members-only benefit. If you are not an SSCS member and would like to attend an SSCS webinar, a fee will be charged. In addition, PDH's for SSCS webinars will now be processed through the SSCS Resource Center. PDH's will remain free until January 1, 2019.

If you have any questions about this policy, please email sscs-staff@ieee.org.

Laurence W. Nagel Receives 2019 IEEE Donald O. Pederson Award in Solid-State Circuits

The recipient of the 2019 IEEE Donald O. Pederson Award in Solid-State Circuits is Laurence W. Nagel (President, Omega Enterprises Consulting, Kensington, California) for the development and demonstration of SPICE as a tool to design and optimize electronic circuits.

The IEEE Donald O. Pederson Award in Solid-State Circuits is awarded to those who have made outstanding contributions in the field of solid-state circuits. This IEEE Technical Field Award is named after Donald O. Pederson of the University of California, Berkeley.

The IEEE Donald O. Pederson Award in Solid-State Circuits will be presented at the 2019 International Solid-State Circuits Conference (ISSCC).

[Click here](#) for more information about the award.

Introducing - SSCS Chip Chat



SSCS' educational programming has expanded to include a podcast called SSCS Chip Chat. This interview style podcast focuses on the stories of engineers and scientists behind the integrated circuits that power the world.

The podcast can be listened to by searching SSCS Chip Chat in the Apple Podcast App or whatever podcast app you use for your

mobile device.

You can also listen to the podcast online. [Click here to listen!](#)

Episode 1: Dr. Gert Cauwenberghs

Episode 2: Albert Theuwissen

EDUCATION

July 2018 Distinguished Lectures

CHAPTER	TALK DETAILS	DATE	LOCATION
SSCS Vietnam	Topic TBD - Presented by Jan Van der Spiegel	July 18 - 20, 2018	TBD Click here for more information
SSCS San Diego	Energy Efficient Computing in Nanoscale CMOS - Presented by Vivek De	June 19, 2018	Qualcomm, San Diego Click here for more information
SSCS Japan & SSCS Kansai	Design Strategies for wearable sensor interface circuits - from electrodes to signal processing - Presented by Jerald Yoo	July 25, 2018	University of Tokyo Click here for more information
SSCS Kansai	On-Chip Epilepsy Detection: Where Machine Learning Meets Wearable, Patient-Specific Healthcare - Presented by Jerald Yoo	July 26, 2018	Location TBD Click here for more information

CONFERENCES

Upcoming Conferences

<u>2018 IEEE/ACM International Symposium on Low Power Electronics and Design (ISLPED)</u> Seattle, WA	July 23 - 25, 2018
<u>ESSCIRC/ESSDERC 2018 - 44th European Solid-State Circuits Conference/44th European Solid-State Device Research Conference</u> Dresden, Germany	September 3 - 6, 2018
<u>2018 IEEE BiCMOS and Compound Semiconductor Integrated Circuits and Technology Symposium (BCICTS)</u> San Diego, CA	October 14 - 17, 2018
<u>2018 IEEE Biomedical Circuits and Systems Conference (BioCAS)</u> Cleveland, OH	October 17 - 19, 2018
<u>2018 IEEE Asian Solid-State Circuits Conference (A-SSCC)</u> Tainan, Taiwan	November 5 - 7, 2018

Call for Participation

International Symposium on Low Power Electronics and Design (ISLPED'18)

Bellevue, Washington July 23-25, 2018

ISLPED is the world's premier event on low power design. It is sponsored by the IEEE Circuits and Systems Society and the ACM Special Interest Group on Design Automation.

The technical program highlights the following areas:

- * Machine Learning - Inference
- * Hardware Security
- * Approximate Computing
- * SRAM and 3D Integration
- * Energy-efficient Training of NNs
- * Non-Volatile Memory - Technology to System
- * Architectural Techniques for Energy-Efficiency
- * Mobile Applications
- * Special Session on SRC JUMP Centers

A preliminary list of the accepted papers is available on the conference website. As with prior years, the program will also include several keynote presentations, special sessions, the annual design contest, as well as a rich social program.

For more information and registration, visit: <http://www.islped.org/>

CALL FOR PAPERS

ISSCC 2019 - Call for Papers

Theme: Envisioning the Future

ISSCC 2019 is seeking innovations that will inspire the future of solid-state circuits and systems. Innovative and original papers are solicited in subject areas including (but not limited to) the following:

ANALOG: Amplifiers, comparators, oscillators, filters, references; nonlinear analog circuits; digitally-assisted analog circuits; MEMS/sensor interface circuits.

DATA CONVERTERS: Nyquist-rate and oversampling A/D and D/A converters; embedded and application-specific A/D and D/A converters; analog to information conversion; time-to-digital converters.

DIGITAL ARCHITECTURES & SYSTEMS: Microprocessors, micro-controllers, application processors, graphics processors; digital systems for communications, video and multimedia, machine-learning, deep-learning, neuromorphism, cryptography, security and trusted computing, special-function acceleration, processing-in-memory; reconfigurable systems, near- and sub-threshold systems, digital architectures and systems for emerging applications (e.g. virtual reality - AR/VR and autonomous vehicles).

DIGITAL CIRCUITS: Building blocks for 2D/3D SoC such as intra-chip communication circuits, clock distribution techniques, soft-error and variation-tolerant circuits. Circuits for power management in digital applications: including voltage regulators, adaptive digital circuits, digital sensors; Near- and sub-threshold circuits; PLLs for digital clocking applications. Circuits for neuro-computing; Hardware security circuits including PUFs, TRNG, and attack-detection sensors.

IMAGERS, MEMS, MEDICAL, & DISPLAY: Image sensors and SoCs; automotive, LIDAR, and ultrasonic sensors; MEMS sensor systems; wearable, implantable, ingestible electronics, biomedical SoCs, neural interfaces and closed-loop systems; biosensors, microarrays, and lab-on-a-chip; display electronics, displays with sensing functionality; sensing for AR/VR.

MEMORY: Static, dynamic, and non-volatile memories for stand-alone and embedded applications; memory/SSD controllers; high-bandwidth I/O interfaces; memories based on phase-change, magnetic, spin-transfer-torque, ferroelectric, and resistive materials; array architectures and circuits to improve low-voltage operation, power reduction, reliability, and fault tolerance; memory-subsystem enhancements, including in-memory logic functions, machine learning, artificial intelligence, and AR/VR.

POWER MANAGEMENT: Power control and management circuits, regulators; switched-mode power converter ICs using inductive, capacitive, and hybrid techniques; energy-harvesting circuits and systems; wide-bandgap topologies and gate-drivers; power and signal isolators; circuits for lighting, wireless power.

RF CIRCUITS and WIRELESS SYSTEMS: Building blocks and complete solutions at RF, mm-Wave and THz frequencies for receivers, transmitters, frequency synthesizers, transceivers, SoCs, and SiPs. Innovative circuit-level and system-architecture solutions for established wireless standards and future systems or applications such as radar, sensing, and imaging.

TECHNOLOGY DIRECTIONS: Emerging IC and system solutions for: biomedical, sensor interfaces, analog signal processing, power management, computation, data storage, and communication; analog/mixed-signal techniques for security and machine learning; non-silicon-, carbon-, organic-, metal-oxide-, compound-semiconductor- and new-device-based circuits; nano, flexible, large-area, stretchable, printable, quantum, optical, and 3D-integrated electronics; spintronics.

WIRELINE: Receivers/transmitters/transceivers for wireline systems, including backplane transceivers, optical links, chip-to-chip communications, 2.5/3D interconnect, copper-cable links, and equalizing on-chip links; exploratory I/O circuits for advancing data rates, power efficiency, and equalization; wireline transceiver building blocks (such as AGCs, front ends, equalizers, clock-generation and distribution circuits including PLLs, clock-and-data recovery, line drivers, and hybrids).

INDUSTRY SHOWCASE

SSCC 2019 will host an Industry Showcase Evening Session. The goal of this event is to highlight the role of solid-state circuits and systems-on-chip (SoCs) in the creation of novel products. It will feature short presentations, as well as interactive demonstrations where attendees can have a hands-on experience with each featured innovation. The outstanding demonstration(s) will be recognized at next-year's Conference. To be considered for participation in the Industry Showcase, proposals consisting of a one-page description of the potential demonstration, including a maximum of two illustrative figures, must be uploaded to the ISSCC submission website (<https://submissions.miramsmart.com/ISSCC2019>). Firm deadline for electronic submission is Monday, September 10, 2018, 3:00PM Eastern Daylight Time (19:00 GMT). Only proposals with an industrial affiliation will be considered. Feedback on the proposals will be given by October 31, 2018. Refer to the ISSCC Website for further information (<http://isscc.org>).

The submission website will be available starting July 1, 2018.

Please [click here](#) for details on submission guidelines and requirements.

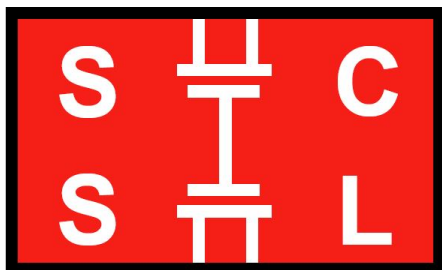
DEADLINES

Paper Submissions: September 10, 2018, 3:00 PM ET

Electronic Submission Proposals for Industry Showcase: September 10, 2018, 3:00 PM ET

PUBLICATIONS

The latest in SSCS Flagship Publications...



IEEE Solid-State Circuits Letters

Volume 1, Issue 3, March 2018

[A Neuromodulator Frontend With Reconfigurable Class-B Current and Voltage Controlled Stimulator](#)

Michael Haas ; Patrick Vogelmann ; Maurits Ortmanns

[A 183 GHz Desensitized Unbalanced Cascode Amplifier With 9.5-dB Power Gain and 10-GHz Band Width and -2 dBm Saturation Power](#)

Hamid Khatibi ; Somayeh Khiyabani ; Ehsan Afshari

[Fast Cascoded Quenching Circuit for Decreasing Afterpulsing Effects in 0.35- \$\mu\$ m CMOS](#)

R. Enne ; B. Steindl ; M. Hofbauer ; H. Zimmermann

[A 5.8-GHz Bidirectional and Reconfigurable RF Energy Harvesting Circuit With Rectifier and Oscillator Modes](#)

Soroush Dehghani ; Shahriar Mirabbasi ; Thomas Johnson

[A 174 pW-488.3 nW 1 S/s-100 kS/s All-Dynamic Resistive Temperature Sensor With Speed/Resolution/Resistance Adaptability](#)

Haoming Xin ; Martin Andraud ; Peter Baltus ; Eugenio Cantatore ; Pieter Harpe

[A 0.009 mm² Wide-Tuning Range Automatically Placed-and-Routed ADPLL in 14-nm FinFET CMOS](#)

David M. Moore ; Thucydides Xanthopoulos ; Scott Meninger ; David D. Wentzloff



IEEE Journal of Solid-State Circuits

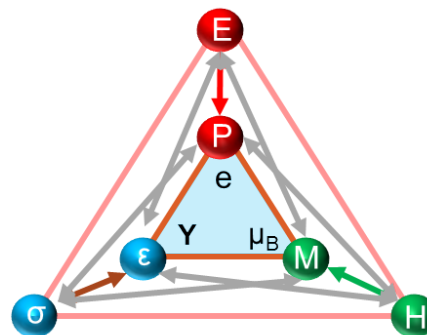
**Vol. 53, Issue 7, July 2018
(Special Issue on the 47th
European Solid-State Circuits
Conference - ESSCIRC)**

<p>A 13-mW 64-dB SNDR 280-MS/s Pipelined ADC Using Linearized Integrating Amplifiers Rohan Sehgal ; Frank Van Der Goes ; Klaas Bult</p>
<p>A 1.25-GS/s 7-b SAR ADC With 36.4-dB SNDR at 5 GHz Using Switch-Bootstrapping, USPC DAC and Triple-Tail Comparator in 28-nm CMOS Athanasios T. Ramkaj ; Maarten Strackx ; Michiel S. J. Steyaert ; Filip Tavernier</p>
<p>A 1.2-V Dynamic Bias Latch-Type Comparator in 65-nm CMOS With 0.4-mV Input Noise Harijot Singh Bindra ; Christiaan E. Lokin ; Daniel Schinkel ; Anne-Johan Annema ; Bram Nauta</p>
<p>A 0.1% THD, 1-MHz to 1-GHz Tunable, Temperature-Compensated Transimpedance Amplifier Using a Multi-Element Pseudo-Resistor Denis Djekic ; Georg Fantner ; Klaus Lips ; Maurits Ortmanns ; Jens Anders</p>
<p>A 93.3% Peak-Efficiency Self-Resonant Hybrid-Switched-Capacitor LED Driver in 0.18-µm CMOS Technology Juan C. Castellanos ; Mert Turhan ; Eugenio Cantatore</p>
<p>A 48-V Wide-Vin 9-25-MHz Resonant DC-DC Converter Juergen Wittmann ; Tobias Funk ; Thoralf Rosahl ; Bernhard Wicht</p>
<p>An FDD Wireless Diversity Receiver With Transmitter Leakage Cancellation in Transmit and Receive Bands Daniele Montanari ; Gerardo Castellano ; Ehsan Kargaran ; Giacomo Pini ; Saheed Tijani ; Davide De Caro ; Antonio Giuseppe Maria Strollo ; Danilo Manstretta ; Rinaldo Castello</p>
<p>A 65-nm CMOS 2x2-MIMO Multi-Band LTE RF Transceiver for Small Cell Base Stations Kyoohyun Lim ; Sanghoon Lee ; Yongha Lee ; Byeongmoo Moon ; Hwahyeong Shin ; Kisub Kang ; Seungbeom Kim ; Jinhyeok Lee ; Hyungsuk Lee ; Hyunchul Shim ; Chulhoon Sung ; Kumyoung Park ; Garam Lee ; Minjung Kim ; Seokyeong Park ; Hyosun Jung ; Younhyun Lim ; Changhun Song ; Jaehyeon Seong ; Heechang Cho ; Jaehyok Choi ; Jongryul Lee ; Sangwoo Han</p>
<p>A Low-Flicker-Noise 30-GHz Class-F23 Oscillator in 28-nm CMOS Using Implicit Resonance and Explicit Common-Mode Return Path Yizhe Hu ; Teerachot Siriburanon ; Robert Bogdan Staszewski</p>
<p>A 28-nm FD-SOI 115-fs Jitter PLL-Based LO System for 24-30-GHz Sliding-IF 5G Transceivers Staffan Ek ; Tony Pahlsson ; Christian Elgaard ; Anders Carlsson ; Andreas Axholt ; Anna-Karin Stenman ; Lars Sundström ; Henrik Sjöland</p>
<p>A 60-GHz 8-Way Phased-Array Front-End With T/R Switching and Calibration-Free Beamsteering in 28-nm CMOS Khaled Khalaf ; Kristof Vaesen ; Steven Brebels ; Giovanni Mangraviti ; Michael Libois ; Charlotte Soens ; Wim Van Thillo ; Piet Wambacq</p>
<p>AD-Band Digital Transmitter with 64-QAM and OFDM Free-Space Constellation</p>

Formation Stefan Shopov ; Ozan D. Gurbuz ; Gabriel M. Rebeiz ; Sorin P. Voinigescu
Bidirectional Communication Circuits for a 120-GHz PMF Data Link in 40-nm CMOS Niels Van Thienen ; Yang Zhang ; Patrick Reynaert
Isolator-Less Near-Field RFID Reader for Sub-Cranial Powering/Data Link of Millimeter-Sized Implants Christopher Sutardja ; Jan M. Rabaey
A Battery-Powered Wireless Ion Sensing System Consuming 5.5 nW of Average Power Hui Wang ; Xiaoyang Wang ; Abbas Barfidokht ; Jiwoong Park ; Joseph Wang ; Patrick P. Mercier
A Reconfigurable Ultrasound Transceiver ASIC With 24\times40 Elements for 3-D Carotid Artery Imaging Eunchul Kang ; Qing Ding ; Maysam Shabanimotlagh ; Pieter Kruizinga ; Zu-Yao Chang ; Emile Noothout ; Hendrik J. Vos ; Johan G. Bosch ; Martin D. Verweij ; Nico de Jong ; Michiel A. P. Pertjjs
A Multi-Sensor and Parallel Processing SoC for Miniaturized Medical Instrumentation Philipp Schönle ; Florian Glaser ; Thomas Burger ; Giovanni Rovere ; Luca Benini ; Qiuting Huang
A 2.7 pJ/cycle 16 MHz, 0.7μW Deep Sleep Power ARM Cortex-M0+ Core SoC in 28 nm FD-SOI Guérolé Lallement ; Fady Abouzeid ; Martin Cochet ; Jean-Marc Daveau ; Philippe Roche ; Jean-Luc Autran
Margin Elimination Through Timing Error Detection in a Near-Threshold Enabled 32-bit Microcontroller in 40-nm CMOS Hans Reyserhove ; Wim Dehaene
A 32-KB ePCM for Real-Time Data Processing in Automotive and Smart Power Applications Marco Pasotti ; Riccardo Zurla ; Marcella Carissimi ; Chantal Auricchio ; Donatella Brambilla ; Emanuela Calvetti ; Laura Capecechi ; Luigi Croce ; Daniele Gallinari ; Cristina Mazzaglia ; Vikas Rana ; Alessandro Cabrini ; Guido Torelli
A 19.4-nJ/Decision, 364-K Decisions/s, In-Memory Random Forest Multi-Class Inference Accelerator Mingu Kang ; Sujan K. Gonugondla ; Sungmin Lim ; Naresh R. Shanbhag
An 800-MHz Mixed-VT4T IFGC Embedded DRAM in 28-nm CMOS Bulk Process for Approximate Storage Applications Robert Giterman ; Alexander Fish ; Narkis Geuli ; Elad Mentovich ; Andreas Burg ; Adam Teman

IEEE Journal on Exploratory Solid-State Computational Devices and Circuits

Volume 4



[Towards a Strong Spin-Orbit Coupling Magnetoelectric Transistor](#)

Peter A. Dowben ; Christian Binek ; Kai Zhang ; Lu Wang ; Wai-Ning Mei ; Jonathan P. Bird ; Uttam Singisetti ; Xia Hong ; Kang L. Wang ; Dmitri Nikonov

[Using Programmable Graphene Channels as Weights in Spin-Diffusive Neuromorphic Computing](#)

Jiayi Hu ; Gordon Stecklein ; Yoska Anugrah ; Paul A. Crowell ; Steven J. Koester

[BCB Evaluation of High-Performance and Low-Leakage Three-Independent-Gate Field Effect Transistors](#)

Jorge Romero-Gonzalez ; Pierre-Emmanuel Gaillardon

[Tunnel FET Analog Benchmarking and Circuit Design](#)

Hao Lu ; Paolo Paletti ; Wenjun Li ; Patrick Fay ; Trond Ytterdal ; Alan Seabaugh

[Improving Energy Efficiency of Low Voltage Logic by Technology-Driven Design](#)

Kaushik Vaidyanathan ; Daniel H. Morris ; Uygur E. Avci ; Huichu Liu ; Tanay Karnik ; Hong Wang ; Ian A. Young

JxCDC papers listed in order of popularity can be found online [HERE](#).

For paper submission details, click [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 **Spring 2018 issue of the Solid-State Circuits Magazine**.

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