



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

April 2017

EDUCATION



Upcoming Webinar

**High-EVM, High Bandwidth
Efficient CMOS RF Transmitters**

Presented by Osama Shanaa

**Tuesday, May 23rd @ 12:00 PM
(ET)**

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

[CLICK HERE TO REGISTER!](#)

This webinar will be presented live. Osama Shanaa will be available after 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: In order to support the increasing demand for data-rich wireless streaming over the airwaves, complex modulation schemes with high peak-to-average ratio and wide channel bandwidth are often used. Such schemes have casted its shadow on the complexity of RF radios, particularly transmitters, in their ability handle such complex modulations

while maintaining the required high signal integrity (in the form of stringent EVM and emission mask requirements) and still be power efficient. This talk walks the audience through the various challenges facing today's modern RF transmitters to deliver such stringent requirements. Several digital and analog CMOS RF transmitter schemes with Digital Pre-Distortion (DPD) are discussed for their potential to address the challenge that lies ahead.

Bio: Osama Shanaa (IEEE S'94, M'01, SM'03) has been with Mediatek as a Senior RFIC Design Director since 2008, where he is responsible for various CMOS RF SoC developments for both cellular and connectivity. He received his BSc. degree in electrical engineering with high honor from University of Jordan in 1992, the M.S.EE degree from Portland State University in 1996 and the Ph.D. degree in electrical engineering from Stanford University in 2001. Between 1995-2008 he held various IC design positions at Radio Comm. Corp., National Semiconductor, and Maxim Integrated Products, where he lead many successful RF wireless designs for PCS, CDMA, WCDMA, WLAN and WiMax. In 2005 he was a visiting professor at the University of California Berkeley where he taught an advanced circuit design class for wireless communications. Dr. Shanaa is a Fulbright scholar, a member of the Eta Kappa Nu honor society and is a senior IEEE member. He currently serves on the Technical Program Committee and the Steering Committee of the IEEE RFIC Symposium. Dr. Shanaa is a former Associate Editor for the IEEE Transactions on Microwave Theory and Techniques and a Distinguished Lecturer for the IEEE Solid State Circuits Society

Upcoming Distinguished Lecturer Events in May

	SPEAKER	CHAPTER	TOPIC
May 4	Woogeun Rhee	SSCS Central Texas	Topic: Phase-Locked Frequency Synthesis and Modulation for Modern Wireless Transceivers For more details, please click here.

May 4	Kofi Makinwa	SSCS Central Texas	Topic: Micropower ADCs For more details, please click here.
May 4	Hua Wang	SSCS Central Texas	Topic: Pushing the Envelope of RF/mm-Wave Power Generation by Relearning Ohm's Law For more details, please click here.
May 4	Neel Narasimman	SSCS Central Texas	Topic: Ultra-low Voltage/Power VCO-based ADC; "The Road Less Traveled" For more details, please click here.
May 5	Nagendra Krishnapura	SSCS Central Texas	Topic: Memoryless Analog-to-Digital Conversion Using Delta-Sigma Modulators Without Reset For more details, please click here.
May 18	Jerald Yoo	SSCS Beijing	Topic: Design Strategies for wearable sensor interface circuits from electrodes to signal processing For more details, please click here.
May 24	Jerald Yoo	SSCS Singapore	Topic: TBD For more details, please click here.
May 26	Edith Beigne	SSCS Montreal	Topic: Asynchronous Design: A design and system solution for ultra-low power Internet of Everything For more details, please click here.
May 26	Dennis Sylvester	SSCS Montreal	Topic: Ultra-low Power IC Design 101 For more details, please click here.

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

CONFERENCES

Upcoming Conferences

<u>2017 IEEE Custom Integrated Circuits Conference (CICC)</u> Texas	April 30 - May 3, 2017
<u>IEEE 2017 Wireless Power Transfer Conference (WPTC)</u> Taipei	May 10 - 12, 2017
<u>IEEE Radio Frequency Integrated Circuits Symposium (RFIC)</u> Honolulu	June 4 - 6, 2017
<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



2017 IEEE Custom Integrated Circuits Conference

It's not too late to register for [CICC 2017](#) is now open. Online Advanced registration is closed, however, you can register on-site. The conference will be held April 30 - May 3 in Austin, Texas.

CICC is the premier conference devoted to IC development. The conference program is a blend of oral presentations, exhibits, panels, and forums. The conference sessions present original first published technical work and innovative circuit technologies that tackle practical problems. CICC is the conference to find out how to solve design problems, improve circuit design techniques, get exposure to new technology areas, and network with peers, authors, and industry experts.

[Click here for registration information](#)

RFIC 2017

The 2017 IEEE Radio Frequency Integrated Circuits (RFIC) Symposium will be held in Honolulu, Hawaii during June 4-6. The RFIC Symposium is the premier IC design conference focused exclusively on the latest

RFIC 2017 Schedule Summary

Date/Time	Saturday June 3	Sunday June 4	Monday June 5	Tuesday June 6
AM		RFIC Workshops	RFIC Technical Sessions	RFIC Technical Sessions
Lunch			5G Panel	Game/Quiz Panel
PM	Registration	RFIC Workshops	RFIC Technical Sessions / *5G Summit	*5G Summit
Evening		RFIC 5G Plenary RFIC Reception Joint Industry Showcase and Interactive Forum		*5G Executive Forum

*5G Summit is a separate conference that will offer complementary 5G overview presentations

advances in RF, Microwave and Millimeter Wave integrated circuit (IC) technologies and designs, as well as innovations in high frequency analog/mixed-signal ICs. We cordially invite you to participate in this international symposium.

The 2017 RFIC symposium will begin on Sunday, June 4, 2017, with sixteen RFIC focused workshops (ten full-day and six half-day), there will be several joint

RFIC/IMS workshops on Sunday and Monday. These workshops cover a wide range of advanced topics in RFIC technology and IC design including 5G systems and beyond.

Following the full day of Sunday workshops, the RFIC Plenary Session will be held in the evening beginning with conference highlights, the presentation of the Student Paper Awards and the Industry Best Paper Award.

On Monday and Tuesday, the RFIC will have multiple tracks of oral technical paper sessions.

Please visit the RFIC 2017 website (<http://rfic-ieee.org/>) for more details and updates.

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

Vol. 52, Issue 5, May 2017

[Introduction to the Special Section on the 2016 Radio Frequency Integrated Circuits \(RFIC\) Symposium](#)

Danilo Manstretta

[A 1-3 GHz Delta-Sigma-Based Closed-Loop Fully Digital Phase Modulator in 45-nm CMOS SOI](#)

Hamed Gheidi ; Toshifumi Nakatani ; Vincent W. Leung ; Peter M. Asbeck

[A Digital Polar Transmitter With DC-DC Converter Supporting 256-QAM WLAN and 40-MHz LTE-A Carrier Aggregation](#)

Qiuyao Zhu ; Sheng Yu ; Sizhou Wang ; Lun Huang ; Zhaogang Wang ; Xuejun Zhang ; Yang Xu

[An 802.11a/b/g/n Digital Fractional- N PLL With Automatic TDC Linearity Calibration for Spur Cancellation](#)

Dongyi Liao ; Hechen Wang ; Fa Foster Dai ; Yang Xu ; Roc Berenguer ; Sara Munoz Hermoso

[An RF-Powered FDD Radio for Neural Microimplants](#)

Yashar Rajavi ; Mazhareddin Taghivand ; Kamal Aggarwal ; Andrew Ma ; Ada S. Y. Poon

[A 28-GHz Phased-Array Receiver Front End With Dual-Vector Distributed Beamforming](#)

Yi-Shin Yeh ; Benjamin Walker ; Ed Balboni ; Brian Floyd

[A 94-GHz 4TX-4RX Phased-Array FMCW Radar Transceiver With Antenna-in-Package](#)

Andrew Townley ; Paul Swirhun ; Diane Titz ; Aimeric Bisognin ; Frédéric Ganesello ; Romain Pilard ; Cyril Luxey ; Ali M. Niknejad

[An All-Passive Negative Feedback Network for Broadband and Wide Field-of-View Self-Steering Beam-Forming With Zero DC Power Consumption](#)

Min-Yu Huang ; Taiyun Chi ; Fei Wang ; Hua Wang

[A Wideband Fully Integrated Software-Defined Transceiver for FDD and TDD Operation](#)

Hazal Yüksel ; Dong Yang ; Zachariah Boynton ; Changhyuk Lee ; Thomas Tapen ; Alyosha Molnar ; Alyssa Apsel

[A Mixer Front End for a Four-Channel Modulated Wideband Converter With 62-dB Blocker Rejection](#)

Douglas Adams ; Yonina C. Eldar ; Boris Murmann

[Voltage Mode Doherty Power Amplifier](#)

Voravit Vorapipat ; Cooper S. Levy ; Peter M. Asbeck

[High-Breakdown, High- fmax Multiport Stacked-Transistor Topologies for the W - Band Power Amplifiers](#)

Kunal Datta ; Hossein Hashemi

[A Multiphase Switched Capacitor Power Amplifier](#)

Wen Yuan ; Jeffrey S. Walling

[A Wideband Noise-Canceling CMOS LNA With Enhanced Linearity by Using Complementary nMOS and pMOS Configurations](#)

Benqing Guo ; Jun Chen ; Lei Li ; Haiyan Jin ; Guoning Yang

[Efficient Digital Quadrature Transmitter Based on IQ Cell Sharing](#)

Hadong Jin ; Dongsu Kim ; Bumman Kim

[A CMOS Passive LPTV Nonmagnetic Circulator and Its Application in a Full-Duplex](#)

[Receiver](#)

Negar Reiskarimian ; Jin Zhou ; Harish Krishnaswamy

[A 60-GHz Dual-Vector Doherty Beamformer](#)

Kevin Greene ; Anirban Sarkar ; Brian Floyd

[A 0.7-V 0.6- \$\mu\$ W 100-kS/s Low-Power SAR ADC With Statistical Estimation-Based Noise Reduction](#)

Long Chen ; Xiyuan Tang ; Arindam Sanyal ; Yeonam Yoon ; Jie Cong ; Nan Sun

[A 2.8 mW/Gb/s, 14 Gb/s Serial Link Transceiver](#)

Saurabh Saxena ; Guanghua Shu ; Romesh Kumar Nandwana ; Mrunmay Talegaonkar ; Ahmed Elkholy ; Tejasvi Anand ; Woo-Seok Choi ; Pavan Kumar Hanumolu

[A 6.78-MHz Single-Stage Wireless Power Receiver Using a 3-Mode Reconfigurable Resonant Regulating Rectifier](#)

Lin Cheng ; Wing-Hung Ki ; Chi-Ying Tsui

[An AC Input Switching-Converter-Free LED Driver With Low-Frequency-Flicker Reduction](#)

Yuan Gao ; Lisong Li ; Philip K. T. Mok

[A 58-nm 2-Gb MLC "B4-Flash" Memory with Flexible Multisector Architecture](#)

Taku Ogura ; Yasushi Kasa ; Kazuhide Kurosaki ; Mitsuhiro Tomoeda ; Hisakazu Otoi ; Satoshi Shimizu ; Masafumi Katsumata ; Natsuo Ajika ; Kazuo Kobayashi

[A Subthreshold Voltage Reference With Scalable Output Voltage for Low-Power IoT Systems](#)

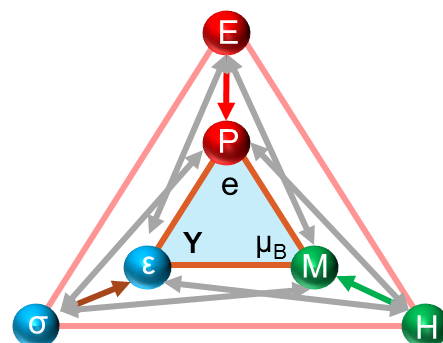
Inhee Lee ; Dennis Sylvester ; David Blaauw

[A 1.5-GHz 6.144T Correlations/s 64 \$\times\$ 64 Cross-Correlator With 128 Integrated ADCs for Real-Time Synthetic Aperture Imaging](#)

John Bell ; Phil Knag ; Shuanghong Sun ; Yong Lim ; Thomas Chen ; Jeffrey Fredenburg ; Chia-Hsiang Chen ; Chunyang Zhai ; Aaron Rocca ; Nicholas Collins ; Andres Tamez ; Jorge A. Pernillo ; Justin M. Correll ; Alan B. Tanner ; Zhengya Zhang ; Michael P. Flynn

IEEE Journal on Exploratory Solid-State Computational Devices and Circuits

Volume 3: 2017



[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

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

In conjunction with the [Custom Integrated Circuits Conference 2017 \(CICC\)](#), the Solid-State Circuits Society (SSCS) will be holding a Young Professionals & Graduate Students Mentoring and Career Coaching Session.

The event will be held on Tuesday, May 2nd at 5:30 PM in the Lady Bird Studio room at the Hotel Van Zandt in Austin, Texas. The complementary 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 complimentary SSCS membership.

If you're a graduate student or a young professional, [please click here to RSVP](#). Walk-in's are welcome.



Do you Qualify for IEEE Senior Member Grade?

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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



The screenshot shows the Solid-State Circuits Society Resource Center website. The header includes the SSCS logo (IEEE Solid-State Circuits Society) and the IEEE logo. The main content area features a video titled "CMOS Terahertz Integrated Circuits and Systems Video" under the "SSCS Webinars" section. Pricing information is displayed: SSCS Members: Free, IEEE Members: \$11.00, and Non-members: \$13.00. The navigation bar includes links for "Short Courses and Tutorials", "Webinars", "VLSix", "Join IEEE Solid-State Circuit Society", and "IEEE SSCS Website", along with social media icons and a search bar.

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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