IEEE SOLID-STATE CIRCUITS SOCIETY

Where ICs are in IEEE

April 2019

NEWS

UPCOMING WEBINAR

Detectability of Breast Tumor by a Hand-held Impulse-Radar Detector: Performance Evaluation and Pilot Clinical Study

Presented by Professor Takamaro Kikkawa, Hiroshima University, Hiroshima, Japan

Tuesday, May 14, 2019
11:00 AM Eastern Time (New York)

CLICK HERE TO REGISTER

ABSTRACT: A hand-held impulse-radar breast cancer detector is presented and the detectability of breast cancers is demonstrated in clinical tests at Hiroshima University Hospital. The functional core of the detector consists of 65-nm CMOS integrated circuits covering the ultra wideband spectrum to generate, transmit, and detect Gaussian monocycle pulses at an equivalent-time sampling rate of 100 GS/s, and a single-port eight-throw switching matrix for controlling a 16-antenna array. The detector is designed to be placed on the breast of a patient in the supine position. Images of breast cancers are reconstructed by confocal imaging, consistent with those rendered by Magnetic Resonance Imaging, thereby demonstrating the feasibility of the hand-held impulse-radar detector for malignant breast tumors.

BIOGRAPHY: Takamaro Kikkawa received the B.S. and M.S. degrees in Electronic Engineering from Shizuoka University, Shizuoka, Japan in 1974 and 1976,

respectively, and the Ph.D. degree in Electronic System from Tokyo Institute of Technology, Tokyo, Japan in 1994. He was with NEC Corporation, Tokyo, Japan, in 1976-1998, where he conducted the research and development of interconnect technologies for logic ULSI and DRAM. He was a Visiting Scientist at MIT, Cambridge, MA, in 1983-1984, where he studied SOI devices. He joined Hiroshima University, Hiroshima, Japan, in 1998, where he is currently a Professor at the Research Institute for Nanodevice and Bio Systems. He is an IEEE Life Fellow and Fellow of the Japan Society of Applied Physics.

Starting January 1, 2019, SSCS will be charging for CEU's and PDH's. Attendees of webinars will have to pay a fee to obtain CEU's and PDH's. However, webinar attendees can obtain a complimentary certificate of attendance.

New Episodes - SSCS Chip Chat Podcast

SCS' 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
Episode 3: Shanthi Pavan
Episode 4: R. Jacob Baker
Episode 5: Shantanu Chakrabartty
Episode 6: Alice Wang

SSCS Women in Circuits Slack Channel

We have created a Slack channel for the SSCS Women in Circuits community.

We envision the Slack channel can be used for:
- Informing members about our WiC networking events, impromptu and informal get-togethers at conferences
- Getting new women into our network ahead of conferences to make going to conferences less intimidating
- A place for giving mentoring advice or getting advice from others
- Showcasing the wonderful technical women in SSCS
- Posting full-time or internship jobs available in your company or university

Click here to get started!

SAVE THE DATE - UPCOMING SSCS EVENTS

Save the Date for These Upcoming SSCS Events - More details coming

soon!

- Young Professionals Micro-Mentoring and Career Coaching Session at VLSI Symposia 2019 (Tuesday, June 11, 2019)
- Diversity Luncheon at VLSI Symposia 2019 (Tuesday, June 11, 2019)
- Women in Circuits Boston Networking Luncheon (Friday, June 21, 2019)
- Women in Circuits Bay Area Networking Luncheon (Friday, July 19, 2019)

More information on the events coming soon. Be sure to check the SSCS website and your emails.

PUBLICATIONS

The latest in SSCS Flagship Publications...

IEEE Journal of Solid-State Circuits

Vol. 54, Issue 5, May 2019

Special Section on the 2018 RFIC Symposium

Introduction to the Special Section on the 2018 RFIC Symposium Mona Mostafa Hella
A Nonuniform Sparse 2-D Large-FOV Optical Phased Array With a Low-Power PWM Drive Reza Fatemi ; Aroutin Khachaturian ; Ali Hajimiri
A 32-Unit 240-GHz Heterodyne Receiver Array in 65-nm CMOS With Array-Wide Phase Locking Zhi Hu ; Cheng Wang ; Ruonan Han
A 28-GHz CMOS Phased-Array Transceiver Based on LO Phase-Shifting Architecture With Gain Invariant Phase Tuning for 5G New Radio Jian Pang ; Rui Wu ; Yun Wang ; Masato Dome ; Hisashi Kato ; Hongye Huang ; Aravind Tharayil Narayanan ; Hanli Liu ; Bangan Liu ; Takeshi Nakamura ; Takuya Fujimura ; Masaru Kawabuchi ; Ryo Kubozoe ; Tsuyoshi Miura ; Daiki Matsumoto ; Zheng Li ; Naoki Oshima ; Keiichi Motoi ; Shinichi Hori ; Kazuaki Kunihiro ; Tomoya Kaneko ; Atsushi Shirane ; Kenichi Okada
A 28-GHz Flip-Chip Packaged Chireix Transmitter With On-Antenna Outphasing Active Load Modulation Sensen Li ; Taiyun Chi ; Jong-Seok Park ; Huy Thong Nguyen ; Hua Wang

A 28-nm 75-fsrms Analog Fractional- N Sampling PLL With a Highly Linear DTC Incorporating Background DTC Gain Calibration and Reference Clock Duty Cycle Correction
Wanghua Wu ; Chih-Wei Yao ; Kunal Godbole ; Ronghua Ni ; Pei-Yuan Chiang ; Yongping Han ; Yongrong Zuo ; Ashutosh Verma ; Ivan Siu-Chuang Lu ; Sang Won Son ; Thomas Byunghak Cho

An E -Band Power Amplifier With 26.3% PAE and 24-GHz Bandwidth in 22-nm FinFET CMOS
Steven Callender ; Stefano Pellerano ; Christopher Hull

A Watt-Level Quadrature Class-G Switched-Capacitor Power Amplifier With Linearization Techniques
Si-Wook Yoo ; Shih-Chang Hung ; Sang-Min Yoo

Non-Magnetic CMOS Switched-Transmission-Line Circulators With High Power Handling and Antenna Balancing: Theory and Implementation
Aravind Nagulu ; Harish Krishnaswamy

A 1-GHz 16-Element Four-Beam True-Time-Delay Digital Beamformer
Sunmin Jang ; Rundao Lu ; Jaehun Jeong ; Michael P. Flynn

A Flexible Phased-Array Architecture for Reception and Rapid Direction-of-Arrival Finding Utilizing Pseudo-Random Antenna Weight Modulation and Compressive Sampling
Matthew Bajor ; Tanbir Haque ; Guoxiang Han ; Ciyuan Zhang ; John Wright ; Peter R Kinget

Secure Satellite Communication Digital IF CMOS Q -Band Transmitter and K -Band Receiver
Tim R. LaRocca ; Khanh Thai ; Robert Snyder ; Richard Jai ; Daniel Kultran ; Owen Fordham ; Bryan Yi-Cheng Wu ; Yeat Yang ; Monte K. Watanabe ; Paul Rodgers ; Daniel Lam ; Eric B. Nakamura ; Naveen Daftari ; Farbod Kamgar

Analysis and Design of an Ultra-Low-Power Bluetooth Low-Energy Transmitter With Ring Oscillator-Based ADPLL and 4 X Frequency Edge Combiner
Xing Chen ; Jacob Breiholz ; Farah B. Yahya ; Christopher J. Lukas ; Hun-Seok Kim ; Benton H. Cal

A 0.2-V Energy-Harvesting BLE Transmitter With a Micropower Manager Achieving 25% System Efficiency at 0-dBm Output and 5.2-nW Sleep Power in 28-nm CMOS
Shiheng Yang ; Jun Yin ; Haidong Yi ; Wei-Han Yu ; Pui-In Mak ; Rui P. Martins

A 60-GHz 3.0-Gb/s Spectrum Efficient BPOOK Transceiver for Low-Power Short-Range Wireless in 65-nm CMOS
Yun Wang ; Bangan Liu ; Rui Wu ; Hanli Liu ; Aravind Tharayil Narayanan ; Jian Pang ; Ning Li ; Toru Yoshioka ; Yuki Terashima ; Haosheng Zhang ; Dexian Tang ; Makihiko Katsuragi ; Daeyoung Lee ; Sungtae Choi ; Kenichi Okada ; Akira Matsuzawa

A 50.1-Gb/s 60-GHz CMOS Transceiver for IEEE 802.11ay With Calibration of LO Feedthrough and I/Q Imbalance
Jian Pang ; Shotaro Maki ; Seitarou Kawai ; Noriaki Nagashima ; Yuuki Seo ; Masato Dome ; Hisashi Kato ; Makihiko Katsuragi ; Kento Kimura ; Satoshi Kondo ; Yuki Terashima ; Hanli Liu ; Teerachot Siriburanon ; Aravind Tharayil Narayanan ; Nurul Fajri ; Tohru Kaneko ; Toru Yoshioka ; Bangan Liu ; Yun Wang ; Rui Wu ; Ning Li ; Korkut Kaan Tokgoz ; Masaya Miyahara ; Atsushi Shirane ; Kenichi Okada

A Reconfigurable 28-/37-GHz MMSE-Adaptive Hybrid-Beamforming Receiver for Carrier Aggregation and Multi-Standard MIMO Communication
Susnata Mondal ; Jeyanandh Paramesh

A 2.4-GHz Reference-Sampling Phase-Locked Loop That Simultaneously Achieves Low-Noise and Low-Spur Performance
Jahnavi Sharma ; Harish Krishnaswamy

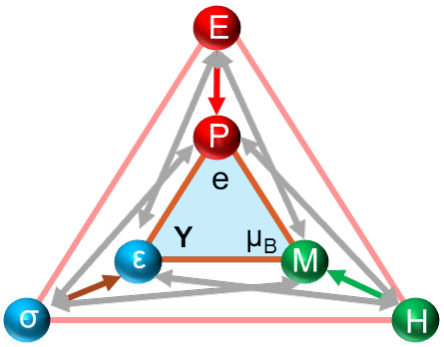
A 75.3-dB SNDR 24-MS/s Ring Amplifier-Based Pipelined ADC Using Averaging Correlated Level Shifting and Reference Swapping for Reducing Errors From Finite Opamp Gain and Capacitor Mismatch
Tsung-Chih Hung ; Tai-Haur Kuo

Inverter-Based Subthreshold Amplifier Techniques and Their Application in 0.3-V Delta Sigma-Modulators

Lishan Lv ; Xiong Zhou ; Zhiliang Qiao ; Qiang Li
A 12-Bit, 300-MS/s Single-Channel Pipelined-SAR ADC With an Open-Loop MDAC Chao Wu ; Jie Yuan
A Dynamic Power Reduction Technique for Incremental Delta Sigma Modulators Patrick Vogelmann ; Johannes Wagner ; Michael Haas ; Maurits Ortmanns
A 40-GHz Mirrored-Cascode Differential Transimpedance Amplifier in 65-nm CMOS Sang Gyun Kim ; Chaerin Hong ; Yun Seong Eo ; Jihoon Kim ; Sung Min Park
Ultrasonic Wake-Up With Precharged Transducers Angad S. Rekhi ; Amin Arbabian
A pW-Power Hz-Range Oscillator Operating With a 0.3-1.8-V Unregulated Supply Orazio Aiello ; Paolo Crovetti ; Longyang Lin ; Massimo Alioto
A Noise-Immunity-Enhanced Analog Front-End for 36Ã-64 Touch-Screen Controllers With 20- VPP Noise Tolerance at 100 kHz Jun-Eun Park ; Jiheon Park ; Young-Ha Hwang ; Jonghyun Oh ; Deog-Kyoon Jeong

IEEE Journal on Exploratory Solid-State Computational Devices and Circuits

Issue 1, June 2019



Synchronous Circuit Design With Beyond-CMOS Magnetoelectric Spin-Orbit Devices Toward 100-mV Logic Huichu Liu ; Sasikanth Manipatruni ; Daniel H. Morris ; Kaushik Vaidyanathan ; Dmitri E. Nikonov ; Tanay Karnik ; Ian A. Young

JxCDC papers listed in order of popularity can be found online HERE.

For paper submission details, click HERE.

IEEE Solid-State Circuits Letters

Issue 10, October 2018

A 2.7-u W Neuromodulation AFE With 200 mVpp Differential-Mode Stimulus Artifact Canceler Including On-Chip LMS Adaptation Seobin Jung ; Paul Kwon ; David Piech ; Michel Maharbiz ; Jan Rabaey ; Elad Alon
34.3 fJ/conv.-step 8-MHz Bandwidth Fourth-Order Pseudo-Differential Ring-Amplifier-

Based Continuous-Time Delta-Sigma ADC in 65 nm
Pere Llimós Muntal ; Ivan Harald Holger Jørgensen

EDUCATION

May 2019 Distinguished Lectures

SSCS San Diego	Ultra-Low-Power Integrated Circuits and Physiochemical Sensors for Next-Generation "Unawearables" - Presented by Patrick Mercier	May 2, 2019	Qualcomm, San Diego, California **For more information, please click here**
SSCS Utah	Signal processing techniques to improve IC performance - Presented by Sudhakar Pamarti	May 3, 2019	Sorenson Molecular Biotechnology Building, Salt Lake City, Utah **For more information, please click here**
SSCS Montreal	Adaptive and Resilient Circuits for Processors - Presented by Keith Bowman	May 9, 2019	ReSMIQ, Montreal, Canada **For more information, please click here**
SSCS San Diego	Design of Broadband, Linear, and High-Efficiency mm-Wave Power Amplifiers in Silicon for 5G Applications - Presented by Hua Wang	May 15, 2019	Qualcomm, San Diego, California **For more information, please click here**
SSCS Japan	Merging Antenna Designs with Electronic Circuits - Multi-Feed Antennas Based Mm-Wave Front-Ends in Silicon for On-Antenna Power Combining, Active Load Modulation, and Full Duplex Operations - Presented by Hua Wang	May 25, 2019	Iwanumaya, Sendai, Japan **For more information, please click here**
SSCS Japan	Millimeter-Wave Phased-Array Transceiver Design for 5G New Radio - Presented by Kenichi Okada	May 25, 2019	Iwanumaya, Sendai, Japan **For more information, please click here**
SSCS Oregon	TBD - Presented by Hua Wang	May 29, 2019	Portland, Oregon **For more information, please**

			click here

CONFERENCES

Upcoming SSCS-Sponsored Conferences

2019 IEEE Radio Frequency Integrated Circuits Symposium (RFIC) Boston, Massachusetts	**June 2 - 4, 2019**
2019 Symposium on VLSI Circuits Kyoto, Japan	**June 9 - 14, 2019**
2019 IEEE Hot Chips 31 Symposium (HCS) Cupertino, California	**August 18 - 29, 2019**
ESSCIRC/ESSDERC 2019 - IEEE 45th European Solid-State Circuits Conference (ESSCIRC)/49th European Solid-State Device Research Conference Cracow, Poland	**September 23 - 26, 2019**
2019 IEEE Biomedical Circuits and Systems Conference (BioCAS) Nara, Japan	**October 17 - 19, 2019**
2019 IEEE BiCMOS and Compound Semiconductor Integrated Circuits and Technology Symposium (BCICTS) Nashville, Tennessee	**November 3 - 6, 2019**

SSCS-Sponsored Conferences: Proceedings

Click the links below to access the latest SSCS-Sponsored conference proceedings.

2018

2018 IEEE International Solid-State Circuits Conference (ISSCC)
2018 IEEE Custom Integrated Circuits Conference (CICC)
2018 IEEE Symposium on VLSI Circuits (VLSI)
2018 IEEE 44th European Solid-State Circuits Conference (ESSCIRC)
2018 IEEE Asian Solid-State Circuits Conference (A-SSCC)

2019

2019 IEEE International Solid-State Circuits Conference (ISSCC)

IEEE Radio Frequency Integrated Circuits Symposium

2-4 June 2019

Boston, Massachusetts

The **2019 IEEE Radio Frequency Integrated Circuits Symposium (RFIC 2019)** will be held in Boston, MA on 2-4 June 2019. The RFIC Symposium is an annual IEEE conference that is combined with the International Microwave Symposium (IMS), ARFTG, and the Industry Exhibition to form the "Microwave Week", the largest worldwide RF/microwave technical meeting of the year. In 2019, the conference will also extend its focus to emerging circuit technologies related to RFIC, such as MEMS sensors and actuators, heterogeneous and 3D ICs, silicon photonics, biomedical applications, quantum computing and more. We cordially invite you to participate in this international symposium.

To encourage student attendance, the IMS'19 is offering deep registration discounts and numerous benefits for student volunteers who are IEEE members and willing to help with conference activities. For more details, visit **https://ims-ieee.org/students-main/student-volunteers.**

For 2019, RFIC is promoting a new educational experience for the attendees: a "Technical Lecture" comprising a 1 ½ hour interactive short course delivered by a distinguished speaker during lunchtime on Sunday, between the AM and PM workshops. For 2019, Prof. Ali Niknejad from University of California, Berkeley, will teach "Fundamentals of mmWave IC Design in CMOS".

The 2019 RFIC Symposium will begin on Sunday, June 2nd 2019, with 12 RFIC focused workshops and one technical lecture. In addition, 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 power amplifiers, 5G systems, silicon photonics, quantum computing, hardware security, and beyond. The 2019 RFIC Plenary Session on Sunday will conclude the day with two visionary plenary talks: Dr. Greg Henderson, Senior Vice President, Automotive, Communications and Aerospace/Defense at Analog Devices, will outline "The Digital Future of RFICs", and Dr. Ir. Michael Peeters, Program Director Connectivity and Humanized Technology at IMEC, will address the question "Do the networks of the future care about the materials of the past?". Immediately after the plenary session, the RFIC reception will follow, with highlight from our industry showcase and student paper finalists in an engaging social and technical evening event supported by the RFIC Symposium corporate sponsors. You will not want to miss the RFIC reception!

On Monday and Tuesday, the RFIC Symposium will have multiple tracks of oral technical paper sessions. The 5G Summit technical sessions on Tuesday afternoon will provide high-level 5G overview presentations that will complement the 5G-focused RFIC technical sessions on Tuesday morning. Two enlightening panels will be featured during lunchtime on both days: "The Internet of Things (IoT) - back to the future, or no future?" on Monday and "Will Artificial Intelligence (AI) and Machine Learning (ML) take away my job as an RF/Analog Designer?" on Tuesday.

On behalf of the RFIC Steering and Executive Committees, we welcome you to join us at the 2019 RFIC Symposium in Boston, Massachusetts! Please visit the RFIC 2019 website **(http://rfic-ieee.org/)** for more details and updates.

CALL FOR PAPERS

BioCAS 2019 : Call for Papers

Biomedical Circuits and Systems Conference

October 17 - 19, 2019

Nara, Japan

BioCAS 2019 is a premier international forum for presenting the interdisciplinary research and development activities at the crossroads of medicine, life sciences, physical sciences and engineering that shape tomorrow's medical devices and healthcare systems.

This conference brings together members of our communities to broaden their knowledge in emerging areas of research at the interface of the life sciences and the circuits and systems engineering. The three-day single-track program for BioCAS 2019 is

multidisciplinary in topics including but not limited to:

Biomedical Technologies:
* Assistive, Rehabilitation, and Quality of Life Technologies
* Biofeedback, Neuromodulation, and Closed-Loop Systems
* Bio-Inspired and Neuromorphic Circuits and Systems
* Biosensor Devices and Interface Circuits
* Biotelemetry and Energy Harvesting/Scavenging Circuits and Systems
* Body Area/Sensor Network and Wireless/Wearable Health Monitoring
* Electronics for Neuroscience
* Implantable Medical Electronics
* Lab-on-Chip and BioMEMS
* Point-of-Care Technologies for Healthcare

Biomedical Applications:
* Biomedical Imaging and Image Processing
* Biosignal Recording, Processing, and Machine Learning
* Human-Machine Interfaces
* Medical Information Systems and Bioinformatics

Submission Guidelines:
The complete 4-page paper (in standard IEEE double-column format), including the title, authors' names, affiliations and e-mail addresses, as well as a short abstract and an optional demonstration video link (3 minute max) are requested. Papers must be submitted electronically in PDF format through **www.biocas2019.org.**

Important Dates:
Monday, June 10, 2019 - Regular Paper Submission Deadline
Monday, July 15, 2019 - Live Demo Submission Deadline
Monday, August 12, 2019 - Author Notification Date
Sunday, September 15, 2019 - Final Paper Submission Deadline

IEEE NEWS

Register for Summer 2019: TryEngineering Summer Institute

Want to provide the future engineer in your life with an unforgettable summer experience? Look no further than IEEE's TryEngineering Summer Institute.

Organized in two-week sessions each summer, on three dynamic college campuses across the United States, the TryEngineering Summer Institute unites students aged 12-17 years old from around the world to:

- engage in hands-on design challenges
- experience the work firsthand with behind-the-scenes tours with real-life engineers
- discover not just what's happening today, but what's coming tomorrow, through conversations with renowned guest speakers and incredible TryEngineering Summer Institute counselors

Give us two weeks, and we'll give you a new definition of what it means to be an engineer.

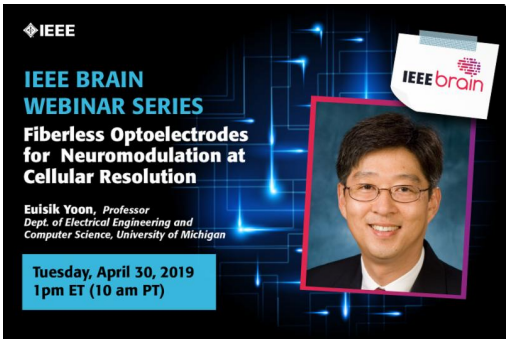
Our 2019 sites are:

- Texas A&M University
- University of California, Riverside
- Vaughn College of Engineering (New York)

All sites will run concurrently both Introductory and Advanced-level programs, for the duration of two weeks, for two sessions. The curriculum for Session 1 mirrors the curriculum for Session 2, but students who choose to attend both will have the opportunity to explore the content in new ways.

Session 1: 7 - 20 July 2019
Session 2: 21 July - 3 August 2019

To register and for more information, please click here!



Upcoming IEEE Brain Webinar

Fiberless Optoelectrodes for Selective Optical Neuromodulation at Cellular Resolution

Presented by Euisik Yoon, Univ. of Michigan

Tuesday, April 30, 2019 @ 1:00 PM ET

This talk will review the evolution of Michigan neural probe technologies toward scaling up the number of recording sites, enhancing the recording reliability, and introducing multi-modalities in neural interface including optogenetics. Modular system integration and compact 3D packaging approaches have been explored to realize high-density neural probe arrays for recording of more than 1,000 channels simultaneously. In order to obtain optical stimulation capability, optical waveguides were monolithically integrated on the silicon substrate to bring light to the probe shank tips. Excitation and inhibition of neural activities could be successfully validated by switching the wavelengths delivered to the distal end of the waveguide. For scaling of the number of stimulation sites, multiple micro-LEDs were directly integrated on the probe shank to achieve high spatial temporal modulation of neural circuits. Independent control of distinct cells was demonstrated ~50 μm apart and of differential somato-dendritic compartments of single neurons in the CA1 pyramidal layer of anesthetized and freely-moving mice.

Click here to register for free!

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 Altvater, SSCS Magazine News Editor, for inclusion in an upcoming issue of the magazine. Please email - **Abira.Altvater@ieee.org**. We look forward to receiving your news articles!

For more chapter news, check out the Winter 2019 issue of the Solid-State Circuits Magazine.

e-newsletter. If you'd like to unsubscribe, please follow the "UNSUBSCRIBE" link below.

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