Introduction to the Special Section on the 2017 IEEE BCTM and IEEE CSICS Conferences

THIS Special Section of the IEEE JOURNAL OF SOLID-STATE CIRCUITS Features expanded versions of key invited papers that were presented at the 2017 IEEE Bipolar and BiCMOS Circuits and Technology Meeting (BCTM), held at Miami Marriott Biscayne Bay, Miami, FL, USA, on October 19–21, 2017, and the 2017 IEEE Compound Semiconductor Integrated Circuits Symposium (CSICS), held also at Miami Marriott Biscayne Bay, Miami, FL, USA, on October 22–25, 2017.

BCTM and CSICS are the premier forums for developments in bipolar, BiCMOS, and compound semiconductor integrated circuits (ICs), devices, and technologies. The two conferences together cover the latest research on SiGe and III–V/CMOS IC technologies, including materials, device fabrication, device phenomena, TCAD modeling, and compact modeling, and their use in state-of-the-art IC design, testing, and system applications, including wireless, analog, RF, microwave, high-speed digital, mixed-signal, optoelectronic, millimeter-wave, and terahertz electronics.

Seven outstanding papers were selected, four from 2017 BCTM and three from 2017 CSICS, for publication in this special issue of the Journal, each offering additional materials such as mathematical analysis, in-depth circuit descriptions, more experimental results, and benchmarking data.

The invited papers from BCTM present a 61-GHz SiGe transmitter (TX) with integrated antennas for passive radio-frequency IC single-chip tag applications, a multi-phase high-performance voltage-controlled oscillator topology with dual-tank magnetic coupling, two D-Band BiCMOS frequency quadruplers using stacked boot-strapping topology and injection locking technique, and a wideband 100-Gbit/s 2-V_{pp} SiGe-BiCMOS power multiplexer for driving a monolithically integrated plasmonic Mach–Zehnder modulator in a silicon photonics TX.

A variety of topics are presented in the papers selected from CSICS. The first paper describes a general technique for reducing oscillator phase noise through a circuit topology that decouples the *LC* tank from the active devices. The second paper describes a 130-nm SiGe BiCMOS power- and area-efficient low-voltage differential signaling ac coupled receiver (RX) for short links without requiring large, board-mounted ac coupling capacitors or a slow, rail-to-rail input stage. The final paper demonstrates a 94-GHz dual-polarized phased array TX and RX ICs in the 130-nm BiCMOS technology where the TX and RX ICs are functional up to 105 °C, maintaining PSAT $>$ 6.5 dBm per channel in TX and NF $<$ 12 dB in RX.

The Guest Editors wish to thank the authors for their commitment to write excellent manuscripts under a tight publication schedule. We thank the anonymous reviewers for their constructive feedback to help improve the quality of the manuscripts. Special thanks go to the 2017 BCTM Organizing Committee, including Foster Dai, Peter Magnee, Peter Zampardi, and Doug Weiser, and the 2017 CSICS Organizing Committee, including Jim Carroll, Brian Moser, Peter Zampardi, and Bruce Green. Furthermore, great thanks to J. Craninckx, JSSC Editor-in-Chief for his guidance, and finally M. Erickson and the JSSC administrators for their excellent assistance in publishing this issue.

We hope that this JSSC Special Section provides a flavor of the state-of-the-art developments in SiGe and III–V/CMOS IC technologies and their usage in IC designs and system applications.

Starting in 2018, the two conferences will join forces under a new name: IEEE BiCMOS and Compound Semiconductor Integrated Circuits and Technology Symposium (BCICTS), pronounced "Be-Six." We would like to encourage readers to attend the 2018 BCICTS Symposium that will be held on October 14–17 at the Sheraton San Diego Hotel and Marina, San Diego, CA, USA. For more information, please visit the conference website at https://bcicts.org/. See you all in San Diego!

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Hua Wang (S'05–M'09–SM'15) received the M.S. and Ph.D. degrees in electrical engineering from the California Institute of Technology, Pasadena, CA, USA, in 2007 and 2009, respectively.

He was with Intel Corporation and Skyworks Solutions. He joined the School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA, USA, in 2012, where he is currently the Demetrius T. Paris Associate Professor. His current research interests include innovating mixed-signal, RF, and millimeter-wave integrated circuits and hybrid systems for wireless communication, radar, imaging, and bioelectronics applications.

Dr. Wang received the National Science Foundation CAREER Award in 2015, the Georgia Tech Roger P. Webb ECE Outstanding Junior Faculty Member Award in 2015, the Lockheed Dean's Excellence in Teaching Award in 2015, the Georgia Tech Sigma Xi Young Faculty Award in 2016, the IEEE MTT-S Outstanding Young Engineer Award in 2017, and the DARPA Young Faculty Award in 2018. His research group, Georgia Tech Electronics and Micro-System Lab, received multiple best paper awards, including the IEEE RFIC Best Student Paper Awards (First Place in 2014, Second Place in 2016, and Second Place in 2018), the IEEE CICC Outstanding Student Paper Awards (Second Place in 2015 and Second Place in 2018), the IEEE CICC Best Conference Paper Award in 2017, the 2016 IEEE Microwave Magazine Best Paper Award, the IEEE SENSORS Best Live Demo Award (Second Place in 2016), and multiple best paper award finalists at IEEE conferences. He is a Technical Program Committee Member of the IEEE ISSCC, RFIC, CICC, and BiCMOS and Compound Semiconductor Integrated Circuits and Technology Symposium conferences. He is a Steering Committee Member of the IEEE RFIC and CICC. He serves as the Chair for the Atlanta's IEEE CAS/SSCS Joint Chapter and received the IEEE SSCS Outstanding Chapter Award in 2014. He is an Associate Editor of the IEEE MICROWAVE AND WIRELESS COMPONENTS LETTERS and a Guest Editor of the IEEE JOURNAL OF SOLID-STATE CIRCUITS.

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Dr. Shahramian is a member of the Technical Program Committee of the IEEE Compound Semiconductor Integrated Circuits Symposium (CSICS) and the IEEE BiCMOS and Compound Semiconductor Integrated Circuits and Technology Symposium. He was a recipient of the Ontario Graduate Scholarship, the University of Toronto Fellowship, and the Best Paper Award at the CSICS Symposium in 2005 and 2015 and the 2015 Radio Frequency Integrated Circuits Symposium. He has received several teaching awards. He is also a Guest Editor of the IEEE JOURNAL OF SOLID-STATE CIRCUITS. He is the Founder and the Host of The Signal Path educational video series.