Introduction to the Special Section on the 2019 RFIC Symposium

THIS Special Section of the IEEE JOURNAL OF SOLID-STATE CIRCUITS (JSSC) covers expanded articles from the 2019 Radio Frequency Integrated Circuits Symposium (RFIC Symposium), which was held on June 2–4, 2019, in Boston, MA, USA.

The RFIC Symposium is the premier IC design conference focused exclusively on the latest advances in RF, microwave, and millimeter-wave (mmWave) integrated circuit (IC) technologies and designs, as well as innovations in high-frequency analog/mixed-signal ICs. This year the conference also extended its focus on emerging circuit technologies related to RFIC, such as RF circuits and systems incorporating sensors and actuators, heterogeneous and 3-D ICs, silicon photonics, quantum computing ICs, hardware security and machine-learning applications, wearable and implantable systems, biomedical applications, and autonomous systems such as automotive and drones.

Fourteen outstanding articles from the 2019 RFIC Symposium are invited and peer-reviewed for publication in this Special Section of the JSSC. The content of these selected articles includes additional background material, in-depth analysis, comprehensive design details, and benchmark comparisons to the state of the art.

The RFIC designs are rapidly moving forward to embrace artificial intelligence (AI) and other intelligent technologies for the Internet of Things (IoT), high data rate wireless, smart sensing, medical/implantable devices, and so on. The first two articles present ultra-low-power radio techniques targeting IoT and sensor network applications that mandate extended battery life and low cost. The next three articles propose new wideband high-linearity receiver architectures in both sub-6 GHz and mmWave 5G frequency ranges. High blocker tolerance, built-in out-of-band rejection, and calibration-free techniques for advanced wireless SoC applications, such as WLAN and 4G/5G, are described

As 5G continues to be a key focus area for RFIC symposium, this Special Section includes multiple articles that cover 64-element phased-array CMOS transceiver, single-wire interface for massive multiple-input–multiple-output (MIMO), self-interference rejection for full duplex, high-efficiency mmWave Doherty power amplifier (PA), and broadband sub-2-dB noise figure (NF) mmWave low-noise amplifier (LNA). These are the key ingredients of high-performance transceiver for 5G radio. The remaining articles cover a wide range of applications, such as 60-GHz radar, mmWave digital PA, PAM4 Si-photonic transmitter, and cryogenic circulator for quantum computing.

On behalf of the RFIC Symposium Committee, we would like to extend special thanks to all the authors and reviewers of this Special Section. Thanks to their dedication and commitment to the highest technical quality, the IEEE JSSC continues to be such an impactful publication. Special thanks go to Prof. Pavan Kumar Hanumolu, JSSC Editor-in-Chief, for his guidance, and to the JSSC administrators for their assistance. We hope the readers enjoy this Special Section of the IEEE JSSC.

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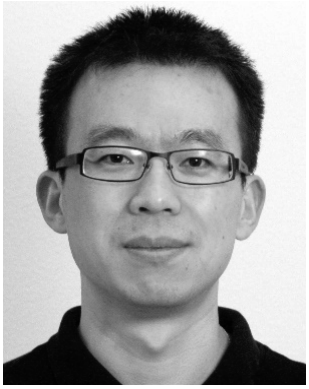

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He was with the Intel Labs, Hillsboro, OR, USA. In 2015, he joined the School of Microelectronics, Fudan University, as a Full Professor. He has authored or coauthored more than 50 journal and conference papers. He holds 12 U.S. patents in the areas of RF transceiver and front-end module. His technical interests include innovative analog/RF/millimeter-wave circuits and wireless systems for communication and sensing.

Dr. Xu serves as an Associate Editor for the IEEE MICROWAVE AND WIRELESS COMPONENT LETTERS. He is currently a Steering Committee Member and/or a Technical Program Committee Member for the IEEE International Solid-State Circuits Conference (ISSCC), the IEEE Radio Frequency Integrated Circuits Symposium (RFIC) and the IEEE International Wireless Symposium (IWS).

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