

# Guest Editorial

**R**ECENT growth in silicon-based RF and microwave integrated circuits (ICs) has made a significant impact on today's wireless communication industry. In particular, CMOS RF has gone from being an oxymoron to becoming a reality. Microwave engineers have traditionally worked with circuits using a small number of accurately modeled transistors operating at very high frequencies. On the other hand, silicon circuit designers have used a large number of transistors relying on the high yield of silicon ICs to integrate many functional blocks using lumped circuit approximations and less-than-perfect transistor models. Silicon-based RF has brought these two communities together by providing a large number of transistors capable of operation at microwave frequencies as analog or digital circuit elements. The advent of these new low-cost high-performance highly integrated silicon RF circuits has opened a large number of possibilities for designers of high-frequency systems by combining the digital and analog functionality on the same chip leading to the so-called system-on-a-chip approach.

This TRANSACTIONS' "Special Issue on Silicon-Based RF and Microwave Integrated Circuits" intends to bridge the gap between the microwave and circuit community by gathering and disseminating the most recent advances in the field of silicon-based microwave and RF ICs including concepts, architectures, building blocks, circuits, and systems. This issue contains 11 invited papers in the areas of transceiver architectures and standards, multimode multiband circuits, the design of low-noise

and high-power building blocks, and modeling and simulation of high-frequency devices and systems. In addition to these invited papers, there are four regular and two short papers selected from among 32 papers submitted to this TRANSACTIONS.

We are indebted to the anonymous reviewers who did an excellent job in the thankless task of diligently reviewing numerous papers submitted to this Special Issue. We also would like to thank this TRANSACTIONS' Editor-in-Chief, David Rutledge, California Institute of Technology, Pasadena, and the former Editor-in-Chief of the IEEE JOURNAL OF SOLID-STATE CIRCUITS, Stephen H. Lewis, University of California at Davis, for their efforts in making this Special Issue a success. Thanks are also due to this TRANSACTIONS' Associate Editor for Special Issues, Robert York, University of California at Santa Barbara, for his guidance and support. We also wish to acknowledge Carol Sosnowski and Heather Hein, California Institute of Technology, Pasadena, and Christina M. Rezes, Staff Senior Editor of this TRANSACTIONS, for managing this project.

ALI HAJIMIRI, *Guest Editor*  
California Institute of Technology  
Moore Laboratory M/C 136-93  
Pasadena, CA 91125 USA

THOMAS H. LEE, *Guest Editor*  
Stanford University  
Center for Integrated Systems  
Stanford, CA 94305 USA

Publisher Item Identifier S 0018-9480(02)00854-2.



**Ali Hajimiri** (S'94–M'99) received the B.S. degree in electronics engineering from the Sharif University of Technology, Tehran, Iran, and the M.S. and Ph.D. degrees in electrical engineering from Stanford University, Stanford, CA, in 1996 and 1998, respectively.

From 1993 to 1994, he was a Design Engineer with Philips Semiconductors, where he was involved with a BiCMOS chipset for GSM cellular units. In 1995, he was with Sun Microsystems, where he was involved with the UltraSPARC microprocessor's cache RAM design methodology. During the summer of 1997, he was with Lucent Technologies (Bell Laboratories), Holmdel, NJ, where he investigated low phase-noise integrated oscillators. In 1998, he joined the Faculty of the California Institute of Technology, Pasadena, as an Assistant Professor of electrical engineering. His research interests are high-speed and RF ICs. He co-authored *The Design of Low Noise Oscillators* (Norwell, MA: Kluwer, 1999). He holds several U.S. and European patents.

Dr. Hajimiri is an associate editor of the IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS—PART II: ANALOG AND DIGITAL SIGNAL PROCESSING. He is a member of the

Technical Program Committees of the International Conference on Computer-Aided Design (ICCAD). He has served as a guest editor of the IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES. He was the recipient of the Gold Medal of the National Physics Competition, the Bronze Medal of the 21st International Physics Olympiad, Groningen, The Netherlands, and the IBM Faculty Partnership Award. He was a corecipient of the International Solid-State Circuits Conference 1998 Jack Kilby Outstanding Paper Award.



**Thomas H. Lee** (S'87–M'87) received the S.B., S.M., and Sc.D. degrees in electrical engineering from the Massachusetts Institute of Technology, Cambridge, in 1983, 1985, and 1990, respectively.

In 1990, he joined Analog Devices, where he was primarily engaged in the design of high-speed clock recovery devices. In 1992, he joined Rambus Inc., Mountain View, CA, where he developed high-speed analog circuitry for 500-MB/s CMOS DRAMs. He has also contributed to the development of phase-locked loops (PLLs) in the StrongARM, Alpha, and K6/K7 microprocessors. Since 1994, he has been a Professor of electrical engineering at Stanford University, Stanford, CA, where his research focus has been on gigahertz-speed wireline and wireless ICs built in conventional silicon technologies, particularly CMOS. He cofounded Matrix Semiconductor. He authored the textbook *The Design of CMOS Radio-Frequency Integrated Circuits* (Cambridge, U.K.: Cambridge Univ. Press, 1998) and co-authored three books on RF circuit design. He holds 14 U.S. patents.

Dr. Lee is a distinguished lecturer of the IEEE Solid-State Circuits Society and the IEEE Microwave Theory and Techniques Society (IEEE MTT-S). He was a two-time recipient of the Best Paper Award presented at the International Solid-State Circuits Conference. He was the recipient of the Best Paper prize presented at the CICC and was a co-recipient of a Best Student Paper presented at the International Solid-State Circuits Conference (ISSCC). He holds a Packard Foundation Fellowship.