



IEEE Solid-State Circuits Society SSCS Distinguished Lecture IEEE SSCS/CASS Atlanta Joint Chapter Seminar

Title: Millimeter-wave and Terahertz Integrated Circuits in Silicon Technologies: Challenges and Solutions

Speaker: Professor Payam Heydari

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Abstract: The vastly under-utilized spectrum across millimeter-wave (mm-wave) and terahertz (THz) bands has generated great deal of excitement to investigate futuristic systems for 10+ gigabit short-range wireless as well as wideband sensing/imaging applications. Simply put, the shorter wavelength associated with the mm-wave/THz band is appealing since the physical dimensions of the antenna and associated electronics are reduced in size, making it possible to design multi-antenna structures to achieve beamforming, spatial diversity and multiplexing. Owing to aggressive scaling in feature size and device f_T/f_{max} , nanoscale (Bi)CMOS technology potentially enables integration of sophisticated systems at THz frequency range, once only be implemented in compound III-IV semiconductor technologies.

This talk will give an overview of recent advances in designing silicon-based integrated circuits will be capable of operating close to the maximum operation limits of silicon-based transistors. The talk then will discuss in depth about two case studies designed in UCI's Nanoscale Communication Integrated Circuits (NCIC) Labs; namely, the world's highest fundamental frequency fully differential transceiver in CMOS at 210 GHz, and the world's highest frequency PLL-based Synthesizer in Silicon at 300GHz with a wide tuning range.

Speaker Biography: Payam Heydari received his B.S. and M.S. degrees (Honors) in Electrical Engineering from Sharif University of Technology in 1992 and 1995, respectively. He received his Ph.D. degree from the University of Southern California in 2001. He is currently a Professor of Electrical Engineering at the University of California, Irvine.

His research covers the design of terahertz/millimeter-wave/RF/analog integrated circuits. He is the (co)-author of two books, one book chapter, and more than 110 journal and conference papers. He has given Keynote Speech to IEEE GlobalSIP 2013 Symposium on Millimeter Wave Imaging and Communications and served as Invited Distinguished Speaker to the 2014 IEEE Midwest Symp. on Circuits and Systems. He is the Distinguished Lecturer of IEEE Solid-State Circuits Society.

Dr. Heydari is recipient of the Distinguished Engineering Educator Award from Orange County Engineering Council. He is the recipient of the 2010 Faculty of the Year Award from UC-Irvine's Engineering Student Council (ECS), the 2009 School of Engineering Best Faculty Research Award, the 2007 IEEE Circuits and Systems Society Guillemain-Cauer Award, the 2005 IEEE Circuits and Systems Society Darlington Award, the 2005 National Science Foundation (NSF) CAREER Award, the 2005 Henry Samueli School of Engineering Teaching Excellence Award, and the Best Paper Award at the 2000 IEEE Int'l Conference on Computer Design (ICCD). The Office of Technology Alliances at UCI has named Dr. Heydari one of 10 Outstanding Innovators at the university. He is the co-recipient of the 2009 Business Plan Competition First Place Prize Award and Best Concept Paper Award both from Paul Merage School of Business at UC-Irvine. He was recognized as the 2004 Outstanding Faculty in the EECS Department of the University of California,



Irvine. His research on novel low-power multi-purpose multi-antenna RF front-ends received the Low-Power Design Contest Award at the 2008 IEEE Int'l Symposium on Low-Power Electronics and Design (ISLPED).

Dr. Heydari currently serves on the Technical Program of International Solid-State Circuits Conference (ISSCC). He served as the Guest Editor of IEEE Journal of Solid-State Circuits (JSSC), and Associate Editor of IEEE Trans. on Circuits and Systems - I, and served on the Technical Program Committees of Compound Semiconductor IC Symposium (CSICS), Custom Integrated Circuits Conference (CICC), and ISLPED. He served on the Technical Program Committees of and Int'l Symposium on Quality Electronic Design (ISQED), IEEE Design and Test in Europe (DATE) and International Symposium on Physical Design (ISPD). He is the director of the Nanoscale Communication IC (NCIC) Labs.

Seminar Time: 1:30PM-3:00PM on April 7th 2015 **Seminar Location:** TSRB 1st Floor Room 175, Georgia Tech.

Organizer: Dr. Hua Wang, IEEE SSCS/CASS Atlanta Joint Chapter Chair, Assistant Professor, School of ECE, Georgia Technology. Email: hua.wang@ece.gatech.edu. Phone: (404) 385-6003