



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

The Last Untapped Spectrum: Is Terahertz Electronics Real or Fake?

Speaker: Professor Ehsan Afshari

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Abstract: There is an increasing interest in low cost THz systems for medical imaging, spectroscopy, and high data rate communication. Recent results in the lower THz frequencies ($<1\text{THz}$) suggests that standard CMOS/BiCMOS processes can compete with compound semiconductors for some applications. In this talk, we present a few “real” applications for the CMOS THz systems as well as a few “fake” ones. Next, we discuss major challenges in realizing these systems in CMOS. Moreover, we show several novel methods to overcome these challenges to generate mW-level powers with relatively low noise using oscillators, amplifiers, and frequency multipliers. Next, we show how similar approaches can result in $>100\text{ mW}$ at terahertz frequencies using GaN HEMT devices. Finally, we show how we can realize more complicated systems such as 2-D phased arrays and coherent imaging systems in silicon.



Speaker Biography: Ehsan Afshari was born in 1979. He received the B.Sc. degree in Electronics Engineering from the Sharif University of Technology, Tehran, Iran and the M.S. and Ph.D. degree in Electrical Engineering from the California Institute of Technology, Pasadena, in 2003, and 2006, respectively. In August 2006, he joined the faculty in Electrical and Computer Engineering at Cornell University as an Assistant Professor, and was promoted to Associate Professor in 2012. In Fall 2016, he joined the Electrical Engineering and Computer Science department at The University of Michigan at Ann Arbor, as an Associate Professor. His research interests are mm-wave and terahertz electronics and low-noise integrated circuits for applications in communication systems, sensing, and biomedical devices.

Prof. Afshari serves as the Distinguished Lecturer of the IEEE Solid-State Circuits Society and a member of the Technical Program Committee of the IEEE Radio Frequency Integrated Circuits Symposium (RFIC). He was the chair of the IEEE Ithaca section, the chair of Cornell Highly Integrated Physical Systems (CHIPS), a member of International Technical Committee of the IEEE Solid-State Circuit Conference (ISSCC), a member of the Analog Signal Processing Technical Committee of the IEEE Circuits and Systems Society, a member of the Technical Program Committee of the IEEE Custom Integrated Circuits Conference (CICC), and a member of Technical Program Committee of the IEEE International Conference on Ultra-Wideband (ICUWB).

He is selected as one of 50 most distinguished alumni of Sharif University. He was awarded National Science Foundation CAREER award in 2010, Cornell College of Engineering Michael Tien excellence in teaching award in 2010, Defense Advanced Research Projects Agency (DARPA) Young Faculty Award in 2008, and Iran's Best Engineering Student award by the President of Iran in 2001. He is also the recipient of the best paper award in the Custom Integrated Circuits Conference (CICC), September 2003, the first place at Stanford-Berkeley-Caltech Inventors Challenge, March 2005, the best undergraduate paper award in Iranian Conference on Electrical Engineering, 1999, the recipient of the Silver Medal in the Physics Olympiad in 1997, and the recipient of the Award of Excellence in Engineering Education from Association of Professors and Scholars of Iranian Heritage (APSIH), May 2004.

Seminar Time: 1:30PM-3:00PM on March 9th 2017 **Seminar Location:** TSRB 509, Georgia Tech

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