



IEEE SSCS/CASS Atlanta Joint Chapter Seminar

Title: On the Relationship between Nyquist Rate and Healthcare: Silicon Systems to Close the Sub-Sampling Gap in Health Screening and Monitoring

Speaker: Professor Amin Arbabian

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Abstract: Advances in healthcare technologies have mainly focused on therapeutics, interventional procedures, and diagnostics. These treatment steps have undergone significant improvements, leading to higher survival rates and enhancements in quality of life. Nevertheless, current trends are unsustainable due to inefficiency in addressing specific critical diseases and skyrocketing national healthcare costs. An important example is cancer, where mortality rates have not seen major improvements, even with the tremendous technological advances in diagnostic imaging tools over the last four decades.



Preventive screening and continuous monitoring have the potential to completely change the landscape in the war against cancer and other complex disease states. Today, the human body is monitored/screened infrequently, in contrast with advanced electronic systems (many of which our community designs and ships), which are routinely and frequently monitored and calibrated. At best, patients only receive annual checkups with extremely low ‘resolution’. How do we bring new screening and monitoring technologies closer to the patients (i.e., consumers)? This talk summarizes our work in this general space, from new directions in low-cost, portable, and semiconductor-based, RF-Ultrasound hybrid “Tricorder” imaging systems, to ultrasound-powered implantable devices that can measure, detect, and act upon local physiological changes through closed-loop neuromodulation or “electroceuticals.” I will also briefly discuss our investigation of a noninvasive method of neuromodulation based on ultrasonic excitation.

Speaker Biography: Amin Arbabian received his Ph.D. degree in EECS from UC Berkeley in 2011 and in 2012 joined Stanford University, as an Assistant Professor of Electrical Engineering, where he is also a School of Engineering Frederick E. Terman Fellow. His research interests are in high-frequency circuits and systems, medical imaging and screening technologies, and ultra-low power sensors and implantable devices. Prof. Arbabian currently serves as an associate editor of the new IEEE Journal of Electromagnetics, RF and Microwaves in Medicine and Biology (J-ERM) and on the technical program committees for RFIC and ESSCIRC. He is the recipient or co-recipient of the 2016 Stanford University Tau Beta Pi Award for Excellence in Undergraduate Teaching, 2015 NSF CAREER award, 2014 DARPA Young Faculty Award (YFA) including the Director’s Fellowship (2016), 2013 Hellman faculty scholarship, and best paper awards from several conferences including ISSCC (2010), VLSI Circuits (2014), RFIC symposium (2008 and 2011), ICUWB (2013), PIERS (2015), and the MTT-S BioWireless symposium (2016).

Seminar Time: 2:30PM-3:30PM on April 14th 2017 **Seminar Location:** Van Leer C240, Georgia Tech

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