USC Viterbi
School of Engineering
Ming Hsieh Department of Electrical and Computer Engineering

Ming Hsieh Institute **Seminar Series**

Integrated Systems

RF Integrated Systems: Antenna-to-Computation

Dr. Roxann Broughton-Blanchard
Sr. Manager RF Design, Advanced Data Converters, Analog Device, USA

Date: Friday, September 15th, 2023 - Time: 2:00pm -Location: EEB 248
Zoom Meeting ID: 919 9842 7261, Passcode: 520437
Refreshments will be served

Abstract: For decades, expanding wireless capacity has been driven by advances in RF IC technology towards the most efficient use of electromagnetic spectrum. Smaller, faster silicon devices have enabled the calibrations and DSP required for complex channel coding, pushing lower-frequency wireless systems close to the Shannon limit of capacity. The advent of SiGe BiCMOS and fine line RF CMOS has extended RF signal processing to 100 GHz and beyond, expanding the usable electromagnetic spectrum and wireless data capacity. Advanced materials have given rise to single-function superstar LNA's, switches and PA's to efficiently interface with the antenna, the highest performing now well beyond 100 GHz. Today with 5G beamforming, communication system technologies have borrowed from and converged with mature radar technologies, and the wireless connectivity universe is expanding even more rapidly. But this expansion of the data capacity in the airwaves has pushed us up against the bottleneck of processing and off-loading data in the wired world. To take full advantage of the potential of these RF IC technologies, next-generation integrated systems must adopt a more holistic approach to optimize not just the entire signal chain, but the entire data chain. A system that was once defined from the antenna to bits and back again, must now be defined from antenna to computation and back again, including the algorithms and software required to drive complex RF SoCs. This talk will look at the evolution of the RF ICs that comprise a typical communication system, their connectivity to each other, their intersection with the RF transceivers of today, and the future challenges and opportunities awaiting the next generation of integrated system designers.

Biography:
Roxann R. Broughton-Blanchard (M'99) received the B.S. degree from the University of Vermont, Burlington, and the M.S. and Ph.D. degrees from the Massachusetts Institute of Technology (MIT), Cambridge, in 1989, 1994, and 1999, respectively, all in electrical engineering. Her Ph.D. research focused on GaAs and InP microwave device performance and reliability, with seminal work on the impact of hydrogen on devices fabricated with Ti/Pt/Au gates. She joined Analog Devices Inc (ADI) in 1999 where she has pursued RFIC design in SiGe BiCMOS and RF CMOS technologies for the Mobile Communications and WIFR markets. Since 2018 she has led the RF design team for some of ADI's most advanced Direct-Conversion RF Transceivers and SoCs. Her current research interests are in the area of high-performance RF SoC integration through advanced packaging and heterogeneous integration, with emphasis on performance optimization of the full system solution. Dr. Broughton-Blanchard holds 3 patents and has published over 25 refereed papers through the IEEE and ADI internal conferences, with multiple Best Paper awards. She currently serves on the RFIC Technical Program Committee and will be the 2024 sub-committee chair for Wireless Radios and Systems-on-Chip.

Hosted by Prof. Hossein Hashemi, Prof. Mike Chen and Prof. Constantine Sideris
Organized and hosted by Juzheng Liu(juzhengl@usc.edu).