UCF | Electrical and Computer Engineering

Spring 2018 Seminar Series

Novel Architectures for Low-Complexity Scalable Phased Arrays

TUESDAY MARCH 27, 2018

1:00 PM – HEC 450

Inspired by the unique advantages of phased arrays in communication and radar systems, such as increasing the channel capacity, signal-to-noise ratio, directivity, and radar resolution, my research focuses on presenting new architectures for low-complexity scalable phased arrays to facilitate their widespread use in communication and radar systems. In phased arrays, phase shifters are the key components responsible for adjusting the signal phase across the array elements. In general, phase shifters and their control circuitry play a significant role in determining the complexity and size of conventional phased arrays. Novel architectures and design techniques for scalable phased arrays with significantly reduced number of phase shifters, control complexity, and circuit size have been devised and will be presented in this talk. Design approach and performance of a limited-scan Ku-band and a wide-scan K-band scalable phased array where the number of phase shifters are reduced by at least a factor of two will be presented. The integrated phased arrays, designed based on the proposed architectures, have a potential to be utilized in commercial applications such as 5G communications and automotive radars for advanced driver assistance systems (ADAS) and autonomous vehicles.

I will also present new circuit topologies for integrated phase shifters operating at K and Ka bands with low power consumption, compact size, and simple control mechanism, designed for reducing the complexity, size, and power consumption of phased arrays.

Fatemeh Akbar

University of Michigan

Fatemeh Akbar is currently a Ph.D. candidate in the Electrical Engineering and Computer Science Department at the University of Michigan, Ann Arbor, MI, USA. She received the B.Sc. and M.Sc. degrees (with highest honors) in Electrical Engineering from Shahid Beheshti University and Sharif University of Technology, Tehran, Iran, in 2010 and 2012, respectively. The focus of her current research is on RF/mm-wave integrated phased arrays. Her research interests include analog, mixed-signal, RF, microwave, and mm-wave integrated circuits and systems for applications in wireless transceivers, radars, sensors, imaging, biomedical devices, and photonics.

Ms. Akbar was a recipient of the Engineering Graduate Symposium Technical Award of the College of Engineering, University of Michigan, in 2014, 2016, and 2017. She is a member of SigmaXi, IEEE Solid-State Circuits, IEEE Circuits and Systems, and IEEE Microwave Theory and Techniques societies.