Analog and Mixed-Signal Center
3128 TAMU
College Station, TX 77843-3128
Tel. (979) 458-4114
Fax. (979) 845-7161
E-mail:spalermo@ece.tamu.edu

ELECTRICAL & COMPUTER ENGINEERING
TEXAS A&M UNIVERSITY

S E M I N A R

Room 236C WEB

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Reconfigurable Power Amplifier Optimization for Next-Generation Radar Transmitters

by

Charles Baylis, Ph.D.
Baylor University

Abstract: The demand for wireless technology has quickly outgrown the available spectrum. Novel reconfigurable microwave circuitry and real-time optimization algorithms are needed to solve this spectrum crisis. The real-time, dynamic allocation of spectrum allows more radar and communication systems to simultaneously use this precious resource. To change frequency bands and performance in real-time, advanced circuit and waveform optimization techniques are needed for the microwave power amplifier. This presentation focuses on circuit optimization of load impedance, input power, and bias voltage to maximize amplifier power efficiency while meeting spectral performance requirements. The Smith Tube, a multi-dimensional extension of the well-known Smith Chart, is discussed as a visualization tool facilitating these multi-parameter circuit optimizations. The concept of a dynamic spectral mask based on real-time location of other spectrum users is discussed as a baseline for assigning spectrum requirements for optimization. A discussion of issues specific to radar transmitters will also be included, particularly simultaneous optimization of the waveform with the circuit, and inclusion of range and Doppler resolution objectives in the optimization. First steps toward the circuit implementation of a reconfigurable radar transmitter are discussed.

Dr. Charles Baylis is an Associate Professor of Electrical and Computer Engineering at Baylor University. At Baylor he directs the Wireless and Microwave Circuits and Systems Program, launched in 2008 to provide wireless and microwave education and research in a caring, Christian environment. His research interests include reconfigurable circuit and system technologies for cognitive and adaptive radar and communications, and his work is currently funded by the National Science Foundation and the Army Research Laboratory.