

University of Rochester
Department of Electrical and Computer Engineering Colloquia

Innovating Secure IoT Solutions for Extreme Environments

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Friday, April 20, 2018

12:00 PM – 1:00 PM

Computer Studies Building, Room 601

Abstract:

This talk will introduce energy-efficient and application-driven system-level solutions for secure and spectrum-aware wireless communications. I will present a novel ultra-fast bit-level frequency-hopping scheme for physical-layer security. This scheme utilizes the frequency agility of devices in combination with novel radio frequency architectures and protocols to achieve secure wireless communications. To address the wireless spectrum crunch, future smart radio systems will evaluate the spectrum usage dynamically and opportunistically use the underutilized spectrum; this will require spectrum sensing for interferer avoidance. I will discuss a system-level approach using band-pass sparse signal processing for rapid interferer detection in a wideband spectrum to convert the abstract improvements promised by sparse signal processing theory, e.g., fewer measurements, to concrete improvements in time and energy efficiency. The tightly-coupled system solutions derived at the intersection of electronics, security, signal processing, and communications extend in applications beyond the examples provided here, enabling innovative IoT solutions for extreme environments.

Biographical Sketch:

Rabia Yazicigil is currently a Postdoctoral Associate at MIT. She received her PhD degree in Electrical Engineering from Columbia University in 2016. She received the B.S. degree in Electronics Engineering from Sabanci University, Istanbul, Turkey in 2009, and the M.S. degree in Electrical and Electronics Engineering from École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland in 2011. Her research interest lies at the interface of electronics, security, signal processing and communication to innovate system-level solutions for future energy-constrained Internet of Things applications. She has been a recipient of a number of awards, including the “Electrical Engineering Collaborative Research Award” for her PhD research on Compressive Sampling Applications in Rapid RF Spectrum Sensing (2016), the second place at the Bell Labs Future X Days Student Research Competition (2015), Analog Devices Inc. outstanding student designer award (2015) and 2014 Millman Teaching Assistant Award of Columbia University. She was selected among the top 61 female graduate students and postdoctoral scholars invited to participate and present her research work in the 2015 MIT Rising Stars in Electrical Engineering Computer Science.



Light refreshments will be provided.