



## Spring 2017 Colloquium

### Department of Computer and Information Sciences

#### *Secure Dynamic Spectrum Sharing: Challenges and Solutions*

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**Abstract:** The explosive growth of wireless traffic along with limited radio spectrum resources is making Dynamic Spectrum Sharing (DSS) a key enabler for implementing the FCC National Broadband Plan. By definition, DSS allows unlicensed wireless devices (secondary users) with cognitive radio capabilities to have more flexible and efficient access to the radio spectrum without causing interference to licensed wireless devices (primary users). In current DSS proposals, a spectrum service provider (SSP) maintains a geo-location database for real-time radio spectrum availability, in which the spectrum data can be obtained from radio propagation and terrain models, dedicated spectrum sensors at selected locations, and pervasive mobile users conducting crowdsourced spectrum sensing tasks. Secondary users are required to check with and obtain permissions from the SSP before accessing a licensed channel in the desired time and location. The full realization of DSS faces many security challenges, which have been highlighted in recent NSF and DoD solicitations. In this talk, I will present two case studies about the security challenges and countermeasures for DSS. Specifically, I will first introduce an efficient and effective scheme to authenticate secondary users by embedding spectrum-authorization information into and detecting it from physical-layer signals. Then I will present a novel scheme for the SSP to make correct decisions about spectrum availability even when most crowdsourced spectrum-sensing reports are forged.

**Bio:** Rui Zhang is an Assistant Professor in the Department of Computer and Information Sciences at the University of Delaware. He received the Ph.D. degree in Electrical Engineering from Arizona State University in 2013, the M.E. degree in Communication and Information Systems from Huazhong University of Science and Technology in 2005, and the B.E. degree in Communication Engineering from Huazhong University of Science and Technology in 2001. He was an Assistant Professor in the Department of Electrical Engineering at the University of Hawaii from 2013 to 2016. His research interests are the security and privacy issues in wireless networks, mobile crowdsourcing, mobile systems for disabled people, cloud computing, and social networks. He is an Associate Editor of IEEE Internet of Things Journal and received the NSF CAREER award in 2017.