



## ECE GUEST SPEAKER



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### Secure and Robust Coordination for Multi- Robot Teams

**Friday, January 24th**

136 ISEC  
11:00 am

#### **Abstract:**

Multi-robot systems are becoming more pervasive all around us, in the form of fleets of autonomous vehicles, future delivery drones, and robotic teammates for search and rescue. As a result, it becomes increasingly critical to question the robustness of their coordination algorithms to reliable information exchange, security threats and/or corrupted data. This talk will focus on the role of controlled mobility and information exchange for enhancing situational awareness and security of these systems. Specifically, we will discuss our work in using robot mobility to realize reliable and adaptive information exchange that supports coordination objectives, the role of communication for quantifying trust in several important multi-robot algorithms, and the use of information exchange to divulge new information about the environment. We will study the vulnerabilities of important multi-robot algorithms such as consensus and coverage to malicious or erroneous data and we demonstrate the potential of communication to thwart certain attacks, for example the Sybil Attack, on these algorithms. We will present both a theoretical framework, and experimental results, for provably securing multi-robot distributed algorithms through careful use of communication. Lastly, we will present promising results on new communication-centric methods for outlier rejection and active rendezvous in distributed mapping tasks.

#### **Bio:**

Stephanie is an Assistant Professor in the School of Computing, Informatics, and Decision Systems Engineering at Arizona State University (Jan 2018). Her work centers around trust and coordination in multi-robot systems for which she has been granted an NSF CAREER award (see Improving Mission Intelligence within Fleets of Robots) and has been reviewed in MIT News (see some of her work in security for multi-robot systems and human-robot EEG based communication) as well as several other news outlets including Forbes and the Financial Times (full list on her website). Prior, she was a research scientist in the Computer Science and Artificial Intelligence Lab (CSAIL) at MIT where she also completed her Ph.D. work (2014) on multi-robot coordination and control and M.S. work (2009) on system identification and model learning. At MIT she collaborated extensively with the wireless communications group NetMIT, the result of which were two U.S. patents recently awarded in adaptive heterogeneous networks for multi-robot systems and accurate indoor positioning using Wi-Fi. She completed her B.S. at Cornell University in 2006.