

Colloquium



Date, time & venue: Thursday, March 9th, 2017, 4:00-5:15 p.m. in BB213

Title: **Trust in Networks and Its Applications**

Speaker: **Dr. Jin-Hee Cho, U.S. Army Research Laboratory (USARL), Adelphi, Maryland**

Hosted by: Feng Chen

Abstract: In an increasingly networked world, increased connectivity could lead to improved information sharing, facilitate collaboration, and enable distributed decision making, which are underlying concepts in Network Centric Operations. Battlefield communication networks must cope with hostile environments, node heterogeneity, often stringent performance constraints, node subversion, high-tempo operations leading to rapid changes in network topology and service requirements, and dynamically formed communities of interest wherein participants may not have predefined trust relationships. In net-centric military environments, decision making based on perceived trust towards entities in a network is critical to achieving successful mission completion. To date, trust has often been interpreted as a single dimension of an entity (e.g., node) or system mainly in terms of reliability in engineering fields. Originally the trust concept derived from social sciences and has been defined with more than 100 definitions across different domains. In our work, we adopt the consensus of many disciplines and define trust as the willingness to take a risk. That is, inherently trusting behavior reveals vulnerability (e.g., risk or security breach) to a trustor with a potential betrayal of a trustee when the trustee does not behave as the trustor expected. In this talk, I would like to discuss ARL's current trust research effort and findings in terms of the following: (1) composite trust models considering multidimensional aspects of trust in an entity and reflects interactions between multiple layers of a complex, tactical network; (2) how the trust models are applied in various types of security or tactical applications including secure routing, intrusion detection, public key management, resource allocation (i.e., task assignment and service binding/composition), and information fusion/sharing; and (3) modeling of cyber interactions in social networks including cyber attack-defender game, online phishing susceptibility, privacy and social capital in online social networks, and opinion evolution and dynamics in social networks. Lastly, I would like to discuss the current and future research interest and directions.

Speaker's brief bio: Jin-Hee Cho received the MS and PhD degrees in computer science from the Virginia Tech in 2004 and 2008, respectively. She is currently a computer scientist at the U.S. Army Research Laboratory (USARL), Adelphi, Maryland. Dr. Cho has published over 80 peer-reviewed journal and conference papers in the areas of trust management, cybersecurity, network performance analysis, resource allocation, agent-based modeling, social network analysis, and uncertainty reasoning based on belief models. She received the best paper awards in IEEE TrustCom09 and BRIMS13. She is a winner of the 2015 IEEE Communications Society William R. Bennett Prize in the Field of Communications Networking. In 2016, Dr. Cho is selected for the 2013 Presidential Early Career Award for Scientists and Engineers (PECASE), which is the highest honor bestowed by the United States government on outstanding scientists and engineers in the early stages of their independent research careers. She is a senior member of the IEEE and a member of the ACM.