**Title: PREDICTIVE COMMUNICATIONS FOR UAV SYSTEMS**

Abstract:

*High speed fixed-wing UAVs form a rapidly changing dynamic network configurations, therefore utilizing classical communication algorithms which are primarily designed for low-speed network users is highly inefficient. In this project, we propose to use predictive communications, where the core idea is two-fold: i) using a framework to predict network configuration based on UAV motion trajectories; and ii) incorporating the results of this predictive framework in different communication algorithms. We consider, fixed wing UAVs, where the motion trajectories are modeled as Gaussian Markov Motion Model (GMMM) based on popular Dubin's curve with noisy observations. We study a scenario where each UAV with a limited number of measurement resources monitors the surrounding UAVs through noisy channels. We propose a measurement policy based on Kalman filtering with intermittent observations in order to optimally assign the measurement resources among the UAVs during a measurement cycle.*

*As an implementation example, we illustrate the utility of the proposed predictive modeling by developing a predictive routing algorithm based on the celebrate Dijkstra's shortest path algorithm. The core idea is accounting for the time-varying pairwise node distances in finding the optimal path by considering the anticipated node locations when they are met by data packets. This approach significantly outperforms the conventional method of considering static network configurations.*

Bio: Dr. Razi is an Assistant professor with the School of Informatics, Computing and Cyber Security Dr. Razi is an Assistant professor with the School of Informatics, Computing and Cyber Security (SICCS) at Northern Arizona University. He received his B.S., M.S. and Ph.D. in Electrical Engineering from Sharif University and Amirkabir University, and University of Maine. He was a visiting graduate student at the University of Maryland in 2012. He also held postdoctoral appointments with Duke University (2014) and Case Western Reserve University (2015). Prior to joining the Ph.D program, he served as R&D expert, software engineer and project manager in several communications companies including MCI, and PTK. He is the recipient of several academic awards including the best graduate research assistant of year from College of Engineering school, University of Maine, 2011 and the best paper award from IEEE/CANEUS fly by wireless workshop, 2011. Dr. Razi served as PACE chair of IEEE Maine section from 2010 to 2012 and served as TPC member and a member of organizing committee for several IEEE conferences including IEEE WiOPT 2015, CISS 2015, WiSEE 2014, WiSEE 2015, and Fly By Wireless workshop 2010. His current research interests include distributed coding, Bayesian inference, predictive modeling and non-linear estimation.