TOPIC	Data fusion
ORGANIZERS	Student Leadership Council and Faculty of ACIT Institute and TECHLAV Center
AREA	Wireless Communications
SPEAKER	Dr. Nahal Maleki
DATE	Friday 20, 2017
TIME	3:00 – 4:00 P.M. (EST)
VENUE	Fort IRC 410, North Carolina A&T State University, UTSA and SIPI will be joining through video-conferencing
FEES	No Charge

SYNOPSIS

Data fusion has been investigated in a distributed detection system, consisting of several sensors and a fusion center (FC), that is tasked with solving an underlying binary hypothesis testing problem.
Each sensor makes a binary local decision based on its local observation, where these local decisions are digitally modulated and transmitted over wireless channels to neighboring sensors and/or the FC. A global binary decision is made at the FC by fusing the data received from the sensors. Due to additive Gaussian noise, multipath fading, and the effect of the wireless communication channel, the binary local decisions are corrupted, causing the global decision to be less reliable. Our goal is to maximize the reliability of the global decision. The main question is how to find the optimal distributed detection system design in the presence of multipath fading and additive Gaussian noise in a wireless communication channel. This talk will be addressing this question as we identify and address two sub-problems as follows: P1) A new class of integrated distributed detection, which harvests cooperative gain (enabled by at most 1-bit information exchange among one-hop neighboring nodes) and improves the performance of the integrated distributed detection in the presence of fading, via pushing the communication bounds. P2) We consider the problem of detecting a Gaussian signal source, when the observations at sensors are correlated samples of signal source corrupted by additive Gaussian sensing noise. Imposing either total or individual transmit power constraints at sensors, assuming linear data fusion at the FC, and different communication multiple access channel schemes, we study the optimal power allocation corresponding to coherent and non-coherent reception at the FC. We also study how the spatial correlation among sensors' observations degrades the reliability of global decision of the system and affects the power allocation of inhomogeneous sensors.

ABOUT THE SPEAKER

Dr. Maleki received her B.Sc from Shiraz University, Iran, her M.Sc from the University of Tehran, Iran and her Ph.D from University of Rochester in 2016. Her primary research interests include communication theory and wireless communications, detection and estimation theory, distributed sensing and information processing, reliable distributed detection and data fusion system design.