



Seminar Series Computer Science



Passive RFID based Smart Dust

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209 Comp. Sci. Bldg.

Abstract - One of the novel approaches to energy-efficient WSNs is employment of passive RF communication. Passive backscatter communication nodes, which modulate and reflect back the incident RF signal, offer a substantial reduction in energy consumption by nodes. Consequently, such a backscatter communication technology offers numerous advantages over conventional active communication systems including battery-free operation, small-form factor, and cost-effectiveness. A typical example of such a network is the radio frequency identification (RFID) system with an active reader and passive tags. However, such conventional backscatter communication (i.e. RFID) employs only direct, reader-to-node links where a networked approach among the passive nodes is absent. Yet with recent advancements in silicon technology in terms of miniaturization and improved energy-efficiency it becomes possible to employ a collaborative and networked approach. Moreover, sensing capabilities have been incorporated into such passive tags, and a network with such nodes is termed as Wireless Passive Sensor Network (WPSN). The talk will explore various challenges and opportunities aspects of the WPSNs including collaborative beamforming, capacity analysis in a three transmission frameworks – single hop, multi hop, and multipath routing – and security challenges.

Brief Bio - Maciej J. Zawodniok (S'03, M'06) graduated from the Silesian University of Technology with a Master of Science degree in Computer Science in 1999 and received a Ph.D. degree in Computer Engineering from the University of Missouri-Rolla in 2006. Since 2008, he is at Missouri University of Science and Technology, where currently he is an Assistant Professor in Computer Engineering and Assistant Director of NSF I/UCRC on Intelligent Maintenance Systems. He has co-authored around 17 peer-reviewed journal articles, over 30 refereed IEEE conference articles, and two book chapters. Also, he received the prestigious NSF CAREER award in 2010. Dr. Zawodniok's research focuses on adaptive and energy-efficient protocols for wireless networks, network-centric systems, network security, cyber-physical and embedded systems with applications to manufacturing and maintenance.