University of Rochester
Department of Electrical and Computer Engineering Seminar

Energy Harvesting Wireless Sensors Networks:
From Device Design to Deployment

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Abstract:
The limited energy availability in traditional, battery-poweredwireless sensor networks (WSNs) is a serious concern which limits long-term deployment, especially because periodic replacement of batteries is expensive, risky for the supporting personnel, and in many cases of embedded sensors, infeasible. Energy harvesting is an enabling technology that allows replenishment of usable energy from ambient or man-made sources, thereby ensuring that the essential monitoring tasks remain uninterrupted. This talk aims to describe a framework for this new paradigm of sensors, capable of scavenging energy from electromagnetic RF waves, different from the other common alternate energy sources, like solar and wind. We present new advances on (i) RF harvesting devices and circuits interfaced with low-power sensors, (ii) formulating stochastic energy availability models for multiple harvesting sources, and (iii) revisiting the network protocol stack design for multihop WNSs under varying energy dynamics. Finally, we discuss novel use cases of this technology in medical, underwater and structural monitoring domains.

Biography:
Kaushik Chowdhury (krc@ece.neu.edu) is Assistant Professor in the Electrical and Computer Engineering Department at Northeastern University, Boston, MA, USA. He graduated with B.E. in Electronics Engineering with distinction from VJTI, Mumbai University, India, in 2003. He received his M.S. in Computer Science from the University of Cincinnati, OH, in 2006, and Ph.D. from the Georgia Institute of Technology, Atlanta, GA in 2009. His M.S. thesis was given the outstanding thesis award jointly by the ECE and CS departments at the University of Cincinnati. He received the Best Paper Award at the IEEE ICC Conference in 2009, in the Ad Hoc and Sensor Network Symposium. He is currently serving as the guest editor of the Elsevier Ad Hoc Networks journal, special issue on Cognitive Radio Ad Hoc Networks, and as a regular area editor for the same journal. He has served as the technical chair/co - chair in several workshops on the topic of wireless networks over the past several years, and is the Vice Chair for the IEEE Technical Committee on simulation.