**Networked System Seminar Talk**

**Speaker:** Urbashi MItra, Department of Electrical Engineering, University of Southern California

**Title:** The Confluence of Communication, Sensing and Control in Large Scale Wireless Networks

**Date:** Friday, November 8, 2013

**Time:** 11:00 AM – 12:00 PM

**Location:** Donald Bren Hall 6011

**ABSTRACT:** Modern wireless technology enables the vision of future large scale systems such as the SmartGrid, a network of ubiquitous and heterogeneous devices wirelessly connected to the Internet, and wireless health monitoring and health modifying sensor networks over communities and not just individuals.  All of these applications necessitate methods that simultaneously consider scale, communication, sensing and control. In this talk, key elements of realizing this vision are examined.  We shall focus on novel active control methods for networks described by partially observable Markov decision processes.  Such models are very general and can encompass sensing networks, as well as communication networks.  Following an innovations approach, a Kalman-like filter is derived to estimate the underlying system state.  As a case-study, numerical results are provided for physical activity detection in a heterogeneous wireless body area network.  We further examine distributed estimation in large scale networks with time-correlated behavior and explore how modern statistical methods such as compressed sensing can be applied to both the distributed estimation problem as well as the network control problem.

**BIO:** Urbashi Mitra received the B.S. and the M.S. degrees from the University of California at Berkeley and her Ph.D. from Princeton University.   She is currently a Professor in the Ming Hsieh Department of Electrical Engineering at the University of Southern California.  She is a member of the IEEE Information Theory Society's Board of Governors (2002-2007, 2012-2014) and the IEEE Signal Processing Society’s Technical Committee on Signal Processing for Communications and Networks (2012-2014). She is the recipient of:  2012 Globecom Signal Processing for Communications Symposium Best Paper Award, 2012 NAE Lillian Gilbreth Lectureship, USC Center for Excellence in Research Fellowship (2010-2013), the 2009 DCOSS Applications & Systems Best Paper Award, IEEE Fellow (2007), Texas Instruments Visiting Professor (Fall 2002, Rice University), 2001 Okawa Foundation Award, 2000 OSU College of Engineering Lumley Award for Research, and a 1996 NSF CAREER Award.  Dr. Mitra has been/is an Associate Editor for the following IEEE publications: Transactions on Signal Processing (2012--), Transactions on Information Theory (2007-2011), Journal of Oceanic Engineering (2006-2011), and Transactions on Communications (1996-2001).  Dr. Mitra has held visiting appointments at: the Delft University of Technology, Stanford University, Rice University, and the Eurecom Institute. She served as co-Director of the Communication Sciences Institute at the University of Southern California from 2004-2007.  Her research interests are in: wireless communications, communication and sensor networks, detection and estimation and the interface of communication, sensing and control.