**ECE Seminar Series**

**Time and Location:** Monday, Apr. 7, 2014 at 2pm in Engr. B103

**Speaker:** Erik Perrins, Associate Professor
Electrical Engineering & Computer Science, University of Kansas

**Title:** Fundamentals of Energy-Efficiency in Delay-Sensitive Wireless Communications

**Abstract:** Mobile video traffic is projected to double every year for the foreseeable future, and a significant portion of video applications are delay sensitive. This poses a dual challenge of providing reliable service for a large traffic volume.  Our research in this area is organized into two major thrusts: delay-sensitive physical-layer design, and energy-efficient communication under statistical delay constraints.  In this talk, we present results on channel coding over finite transport blocks, which belongs to our first thrust.

In modern wireless systems, such as LTE/LTE-Advanced, packets are partitioned into multiple transport blocks, and these transport blocks form the basic data unit in the physical layer.  When we apply coding over multiple transport blocks, the underlying wireless channel can be effectively modeled as a finite-state discrete-time Markov chain.  The key contribution of our work is to apply recent advances in non-asymptotic information theory (i.e. "channel dispersion") to this general framework.  We present numerical results that assess the throughput performance for various modulation and coding schemes.

**Bio:** Erik Perrins is an Associate Professor in the Department of Electrical Engineering & Computer Science at the University of Kansas, where he has been since 2005.  He received his Ph.D. degree in 2005 from Brigham Young University in Provo, UT.  Prior to his Ph.D. work, from 1998-2004, he was with Motorola, Inc. in Schaumburg, IL, where he was engaged in research on land mobile radio products.  He is also active as an industry consultant on problems such as reduced-complexity receiver design and receiver synchronization. His current research interests include digital communication theory, synchronization, channel coding, energy efficient communications, power line communications, and complexity reduction in receivers.  He is currently serving as an Area Editor of the IEEE Transactions on Communications, and is currently the secretary of the Communication Theory Technical Committee within the IEEE Communications Society.