Department of Mathematical Sciences
The University of Texas at El Paso

Colloquium

Robert T. Krafty

Temple University

Friday, April 17, 2015 at 3pm in Bell Hall 143

Spectral Analysis of Multiple Time Series from Modern Biomedical Studies

Technological advances have led to an increase in the number of studies that record time series signals such as EEG, heart rate, fMRI and actigraphy from multiple participants. Frequency patterns of many signals, which are quantified through power spectra, contain important and interpretable information about complex processes. Although methods for quantifying associations between time trends and other study variables have been well studied, a dearth of statistical methods for analyzing frequency patterns among multiple time series has limited the scope of scientific questions that can be answered from data collected in modern studies. In this talk, we discuss the first formal methodology for analyzing associations between multivariate power spectra and clinical and behavioral outcomes. A tensor product model of modified Cholesky components of inverse spectral matrices is developed to nonparametrically quantify associations with study outcomes while preserving the complex geometric restrictions of multivariate spectra and providing a tractable Whittle likelihood. The methodology is motivated by and used to analyze data from a study of poor sleep in older adults and points to a connection between nocturnal heart rate variability and self-reported sleep.

For further information, please contact Dr. Emil Schwab, eschwab@utep.edu
Refreshments will be served in front of the colloquium room,
15 minutes before the start of the colloquium.