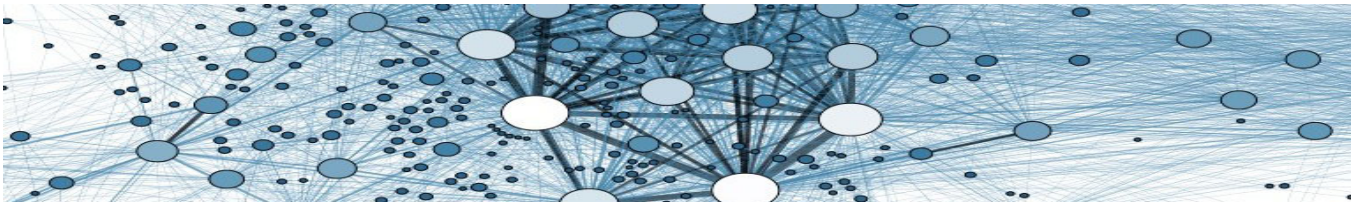

Department of Statistics Seminar

Tuesday, April 18, 2017

3:45 – 4:45 p.m., Room 420, Olmsted Hall

Reception in Olmsted 1331 at 3:15 p.m.

Dynamic Models for Multivariate Times Series of Counts

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Abstract:

Discrete-valued time series modeling is emerging as an important research area with diverse applications, as discussed in the recent CRC Handbook of Discrete-valued Time Series. Using Markov Chain Monte Carlo (MCMC) methods for Bayesian hierarchical dynamic modeling of vector time series of counts under a multivariate Poisson sampling distributional assumption may be computationally demanding, especially in high dimensions. An alternate flexible level correlated model (LCM) framework is described in this talk. This enables us to combine different marginal count distributions and to build a hierarchical model for the vector time series of counts, while accounting for association between components of the response vector. We employ the Integrated Nested Laplace Approximation for fast approximate Bayesian modeling using the R-INLA package (r-inla.org). The approach lends itself to application in diverse areas such as ecology, marketing and transportation safety. This talk illustrates analysis of marketing data from a large multinational pharmaceutical firm, and describes models for monthly new prescription counts that are written by physicians for the firm's focal drug and for competing drugs, as functions of physician-specific and time-varying predictors. To enhance computational speed, we first build a model for each physician, use features of the estimated trends in the time-varying parameters in order to cluster the physicians into groups, and fit aggregate models for all physicians within each cluster. Our three-stage analysis can provide useful guidance to the pharmaceutical firm on their marketing actions.

Biography:

Dr. Ravishanker is a Professor and Undergraduate Program Director in the Department of Statistics at the University of Connecticut in Storrs, CT. She earned her Ph.D. in Statistics from the New York University Stern School of Business in 1987. Dr. Ravishanker's research interests include (I) Time Series Analysis; (II) Times-to-events Analysis; (III) Signal Processing; (IV) Predictive Inference; and (V) Software Reliability.