Seminar Series: Spatial Statistics Seminar

Date: Tuesday, November 22, 2016
Time: 1:30 pm – 2:30 pm
Location: BRNG 1260
Speaker: Yawen Guan
Affiliation/Organization: Department of Statistics, Pennsylvania State University

**A COMPUTATIONALLY EFFICIENT PROJECTION-BASED APPROACH FOR SPATIAL GENERALIZED LINEAR MIXED MODELS**

Abstract: Inference for spatial generalized linear mixed models (SGLMMs) for high-dimensional non-Gaussian spatial data is computationally intensive. The computational challenge is due to the high-dimensional random effects and because Markov chain Monte Carlo (MCMC) algorithms for these models tend to be slow mixing. Moreover, spatial confounding inflates the variance of fixed effect (regression coefficient) estimates. Our approach addresses both the computational and confounding issues by replacing the high-dimensional spatial random effects with a reduced-dimensional representation based on random projections. Standard MCMC algorithms mix well and the reduced-dimensional setting speeds up computations per iteration. We show, via simulated examples, that Bayesian inference for this reduced-dimensional approach works well both in terms of inference as well as prediction; our methods also compare favorably to existing “reduced-rank” approaches. We also apply our methods to two real world data examples, one on bird count data and the other classifying rock types.