Dr. Petrutza Caragea  
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will speak on  

**Bivariate Conditionally Specified Regression Models for Binary Data Spatial Dependence**  

**Time:** 3:00 – 4:00 PM  
**Date:** Friday, November 9, 2012  
**Place:** Alter Hall 746  

**Abstract**

Central to environmental monitoring is the detection and modeling of changes in the structure of the underlying scientific processes that govern the observable phenomena of interest. Ideally, a statistical model used in this type of situation contains parameter values, for which we can assess, for example, the patterns of interaction between species, their relationship to spatial covariates, or changes over time, that correspond to components of the underlying scientific process in an interpretable manner. A traditional approach for observations available on a discrete index random field, is to consider the overall level of a process, possibly adjusted by the influence of covariates, to be appropriately modeled as what is called the large-scale model component. When there is only one binary response variable, a typical approach is to use the logistic automodel. In this work, we introduce a bivariate autologistic model, which accounts for the statistical dependence in two response variables simultaneously, the association between them and the effect of spatial covariates. The framework introduced here is very flexible, and can be generalized to modeling simultaneously more than two variables, or to spatio-temporal models. An illustration of this model is provided, using the Pre-Euro-American Data from a Public Land Survey in the Driftless Area in the Midwest. The conceptual advantages of using the proposed model are illustrated by using a parametric bootstrap approach.