Arash Ali Amini  
University of Michigan  
Department of Statistics  
will give a talk on  

Some problems in statistical inference involving graphs  

We consider two problems of statistical inference, vaguely related by the fact that the notion of a graph plays a role in both. The first problem is the sequential detection of multiple change points in a network, and the second is that of community detection. Sequential change point detection is a classical problem. The literature is mainly focused on the case where there is a single true change point to be detected, although it can be observed by either a single agent or by a multitude of agents in a distributed fashion. We present a graphical model to accommodate the situation where there are truly multiple change points, that is, the phenomenon to be modelled is itself changing in a distributed fashion. We also present stopping rules for detecting these changes, which can be implemented by message passing among nodes. These rules are shown to be asymptotically optimal in terms of their detection delay, within a Bayesian framework. Community detection is the problem of finding closely related groups in a network, given pairwise interaction of the nodes. It has recently attracted a lot of attention, due to the availability of a large body of network data, for example, social networks as seen on the Internet, citation networks, and biological networks. We discuss the classical block model for modelling networks with community structure, present fast pseudo-likelihood methods for fitting it to data, and provide some theoretical understanding of these methods in simple cases.

1:00 PM - 2:00 PM  
Thursday, April 4, 2013  
Location: 411 West Hall  

Please sign up at:  

http://www-personal.umich.edu/~yzhanghf/signup.htm  

For questions please contact canle@umich.edu, mjing@umich.edu or yzhanghf@umich.edu.