Stanford University  
Department of Statistics

DEPARTMENTAL SEMINAR

4:30pm, Tuesday, August 2  
Sequoia Hall Room 200  
Cookies served at 4pm, 1st floor Lounge.

Speaker: Stéphane Robin, AgroParisTech / INRA

Title: Stochastic block model and logistic regression for networks:  
A variational Bayes approach

Abstract:

The stochastic block model (SBM) has become a standard tool for the analysis of network-structured data. This model is one of the many state-space models that have been proposed for network analysis and, as such, its inference raises specific issues that can be circumvented using variational (Bayes) techniques. Another general network model, still much less popular, is the W-graph model, which is characterized by the so-called graphon function. We will show how an estimate of this function can be obtained using Bayesian averaging over a series of stochastic block models. This inferred graphon function provides a new description of the network, although its interpretation suffers from identifiability issues.

When covariates are available, the logistic regression model constitutes a natural and simple tool to understand how they contribute to explain the topology of a (binary) network. We will show how the logistic model for graph can be combined with a graphon-like residual term. This residual term is supposed to characterize the residual structure of the network, that is not explained by the covariates. The goodness-of-fit of the logistic regression then amounts to check if the residual graphon function is constant. This presentation will be illustrated with several examples from social and life sciences.

This is joint work with Pierre Latouche (univ. Paris 1 Sorbonne) and Sarah Ouadah (AgroParisTech / INRA)