

## Data Science Seminar

Hosted by Department of Mathematical Sciences

- Date: Tuesday, May 9, 2017
- Time: 12:00-1:00
- Room: WH-100E
- Speaker: Yuying Xie (Michigan State University)
- Title: Joint Estimation of Multiple Dependent Gaussian Graphical Models with Applications to Mouse Genomics

### **Abstract**

Gaussian graphical models are widely used to represent conditional dependence among random variables. In this paper, we propose a novel estimator for data arising from a group of Gaussian graphical models that are themselves dependent. A motivating example is that of modeling gene expression collected on multiple tissues from the same individual: here the multivariate outcome is affected by dependencies acting not only at the level of the specific tissues, but also at the level of the whole body; existing methods that assume independence among graphs are not applicable in this case. To estimate multiple dependent graphs, we decompose the problem into two graphical layers: the systemic layer, which affects all outcomes and thereby induces cross-graph dependence, and the category-specific layer, which represents graph-specific variation. We propose a graphical EM technique that estimates both layers jointly, establish estimation consistency and selection sparsistency of the proposed estimator, and confirm by simulation that the EM method is superior to a simple one-step method. We apply our technique to mouse genomics data and obtain biologically plausible results.

More details about the Data Science seminar can be found at <https://www2.math.binghamton.edu/p/seminars/sml>

From:  
<http://www2.math.binghamton.edu/> - **Binghamton University Department of Mathematical Sciences**

Permanent link:  
<http://www2.math.binghamton.edu/p/seminars/datasci/170509>

Last update: **2017/06/12 16:41**

