

The Fox School of Business

www.fox.temple.edu

Department of Statistics



Temple University

ANNOUNCES A
COLLOQUIUM

Inyoung Kim

Division of Biostatistics

Department of Epidemiology and Public Health

Yale University

will speak on

Bayesian Semiparametric Method for Pathway Analysis

Time: 3:00 – 4:00 PM

Date: Friday, January 26, 2007

Place: Speakman Hall 318

Abstract

Pathways are sets of genes that serve a particular cellular or physiological function. The genes within the same pathway are expected to function together and hence may interact with each other. It is, therefore, of scientific interest to study their overall effect rather than each individual effect. Limited work has been done in the regression settings to study the effects of clinical covariates and large numbers of gene expression levels on a clinical outcome. In this paper we propose a Bayesian MCMC method for identifying pathways related to a clinical outcome based on the regression setting. A semiparametric mixed model (Liu, *et al.*, 2006) is used to build dependence among genes using covariance structure with Gaussian, Polynomial, and Neural network kernels. The clinical covariate effects are modeled parametrically but gene expression effects are modeled nonparametrically. All variance components and nonparametric effect of genes are directly estimated using Bayesian MCMC approach. We compare our Bayesian MCMC approach with the method proposed by Liu *et al.* (2006) which was developed by connecting a least squares kernel machine with a linear mixed model. We show that our approach is comparable with the Liu *et al.*'s approach based on type I error and power using simulation. Our simulation study also indicates that our approach has smaller mean squares error than the other method for estimating parameters. An example of type II diabetes dataset (Mootha *et al.*, 2003) is used to demonstrate our approaches. This is joint work with Herbert Pang and Hongyu Zhao.

**Guest Parking Available in Visitors' Parking Area 3
(Park Avenue between Cecil B. Moore Avenue & Oxford Street)**