

# DEPARTMENT OF STATISTICS SEMINAR SERIES

SIDNEY SMITH HALL, ROOM SS1083

---

**THURSDAY, 1 NOVEMBER 2012 AT 3:30PM**

## *Merging Multiple Longitudinal Studies with Study-Specific Missing Covariates: A Joint Estimating Function Approach*

### **Peter Song**

**School of Public Health  
University of Michigan**

Merging multiple datasets collected from studies with identical or similar scientific objectives is often undertaken in practice to increase statistical power. In this talk I will present the development of an effective statistical method that enables to merge multiple longitudinal datasets subject to various heterogeneous characteristics, such as different follow-up schedules and misaligned covariates. In particular, the presence of study-specific missing covariates (e.g. covariates observed in some studies but completely missing in other studies) gives rise to a great challenge in data merging and analysis. We propose a joint estimating function approach to addressing this key challenge, in which a novel nonparametric estimating function constructed via splines-based sieve approximation is utilized to bridge estimating equations from studies with missing covariates to those with fully observed covariates. Under mild regularity conditions, we show that the proposed estimator is consistent and asymptotically normal. We evaluate finite sample performances of the proposed method through simulation studies. In comparison to the conventional multiple imputation approach, our method exhibits smaller estimation bias. We provide an illustrative data analysis using multi-stage longitudinal cohorts collected to assess the effect of environmental exposures on children's somatic growth.

This is a joint work with Fei Wang and Lu Wang from University of Michigan.