



# THE UNIVERSITY OF CHICAGO

Department of Statistics

## MASTER'S THESIS PRESENTATION

---

DANIEL SCHWARTZ

Department of Statistics  
The University of Chicago

Estimation in Multisite Randomized Trials with Heterogeneous  
Treatment Effects

TUESDAY, April 25, 2017, at 11:00 AM  
Jones 304, 5747 S. Ellis Avenue

### ABSTRACT

This paper makes three main contributions to the analysis and design of multisite trials (randomized block designs) with heterogeneous treatment effects, which are common in education, social policy, and clinical trials. First, we use potential outcomes and a superpopulation framework to precisely describe different potential populations and estimands of interest, which may diverge considerably when effects vary. Second, we introduce a weighted hierarchical model (WHM) to derive consistent estimators of means and covariance components under weak assumptions for any identifiable population. Third, we show that for some natural populations of interest the WHM estimators may be embarrassingly inefficient (to the point of being improved by throwing out data), so a surprisingly difficult bias-variance tradeoff can arise. We provide theoretical tools to diagnose and manage this tradeoff. The methods are illustrated on two iconic multisite trials in education and social welfare. Implications for study design and analysis appear to be profound.

---

For information about building access for persons with disabilities, please contact Laura Rigazzi at 773.702-0541 or send an email to [lrigazzi@galton.uchicago.edu](mailto:lrigazzi@galton.uchicago.edu). If you wish to subscribe to our email list, please visit the following web site: <https://lists.uchicago.edu/web/arc/statseminars>.