



Causal Inference Program Opening Workshop December 9-11, 2019

SPEAKER TITLES/ABSTRACTS

Jose Zubizarreta
Harvard University

“Complex Discontinuity Designs Using Covariates”

Regression discontinuity designs are extensively used for causal inference in observational studies. However, they are usually confined to settings with simple treatment rules, determined by a single running variable, with a single cutoff. In this paper, we propose a new framework and methods for general discontinuity designs that encompasses complex treatment rules. These rules may be determined by multiple running variables, each with many cutoffs, and that possibly lead to the same treatment. Moreover, the running variables may be discrete and the treatments do not need to be binary. In this framework, the observed covariates play a central role for identification, estimation, and generalization of causal effects. Identification essentially relies on a local unconfoundedness assumption. Estimation proceeds as in any observational study under the strong ignorability assumption, yet in a neighborhood of the cutoffs of the running variables. We discuss estimation approaches based on matching and weighting, including additional regression adjustments in doubly robust estimators. We present assumptions for generalization; that is, for identification and estimation of average treatment effects for target populations beyond the study sample that resides in a neighborhood of the cutoffs. We also examine a new approach to select the neighborhood for the analyses and assess the plausibility of the assumptions. We argue that, in a sense, traditional continuity and local randomization frameworks for regression discontinuity designs are particular cases of our proposed framework. We motivate and illustrate this framework with an example of the impact of grade retention on juvenile crime.