DATE: October 14, 2021

TIME: 1:30-3:00pm

TITLE: Noise-Induced Randomization in Regression Discontinuity Designs

SPEAKER: Stefan Wager
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Abstract:
Regression discontinuity designs are used to estimate causal effects in settings where treatment is determined by whether an observed running variable crosses a pre-specified threshold. While the resulting sampling design is sometimes described as akin to a locally randomized experiment in a neighborhood of the threshold, standard formal analyses do not make reference to probabilistic treatment assignment and instead identify treatment effects via continuity arguments. Here we propose a new approach to identification, estimation, and inference in regression discontinuity designs that exploits measurement error in the running variable. Under an assumption that the measurement error is exogenous, we show how to consistently estimate causal effects using a class of linear estimators that weight treated and control units so as to balance a latent variable of which the running variable is a noisy measure. We find this approach to facilitate identification of both familiar estimands from the literature, as well as policy-relevant estimands that correspond to the effects of realistic changes to the existing treatment assignment rule. We demonstrate the method with a study of retention of HIV patients and evaluate its performance using simulated data and a regression discontinuity design artificially constructed from test scores in early childhood.

*This presentation is based on joint work with Dean Eckles, Nikolaos Ignatiadis, and Han Wu.

Suggested Reading:

- Regression discontinuity designs: A guide to practice

*Because the Biostats Workshop doubles as a class, the current university response to the pandemic requires us to restrict in-person attendance to Stanford students, faculty, & staff. We hope to be able to revise these restrictions soon & welcome back all our workshop community.