University of California, Irvine
Statistics Seminar

"An introduction to Proximal Causal Learning"

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Join via Zoom: https://uci.zoom.us/s/99193076115

A standard assumption for causal inference from observational data is that one has measured a sufficiently rich set of covariates to ensure that within covariates strata, subjects are exchangeable across observed treatment values. Skepticism about the exchangeability assumption in observational studies is often warranted because it hinges on one's ability to accurately measure covariates relevant to various potential confounding mechanisms. Realistically, confounding mechanisms can rarely if ever, be learned with certainty from measured covariates. One can therefore only ever hope that covariate measurements are at best proxies of true underlying confounding mechanisms operating in an observational study, thus invalidating causal claims made on basis of standard exchangeability conditions. Causal learning from proxies is a challenging inverse problem which has to date remained unresolved. In this talk, I will introduce a formal potential outcome framework for *proximal causal learning*, which while explicitly acknowledging covariate measurements as imperfect proxies of confounding mechanisms, offers an opportunity to learn about causal effects in settings where exchangeability on the basis of measured covariates fails. Sufficient conditions for nonparametric identification are given, leading to the *proximal g-formula* and a corresponding *proximal g-computation algorithm* for estimation, both generalizations of Robins' foundational g-formula and g-computation algorithm, which explicitly account for residual confounding bias. Both point treatment and time-varying treatment settings are considered, and an application of proximal g-computation of causal effects is given as illustration.