



Causal Inference Program Opening Workshop December 9-11, 2019

SPEAKER TITLES/ABSTRACTS

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“Smooth Extensions to BART for Heterogeneous Treatment Effect Estimation, with Applications to Women's Healthcare Practice and Policy”

Bayesian Additive Regression Trees (BART) has been shown to be an effective framework for modeling nonlinear regression functions, with strong predictive performance in a variety of contexts. The BART prior over a regression function is defined by independent prior distributions on tree structure and leaf or end-node parameters. In observational data settings, Bayesian Causal Forests (BCF) has successfully adapted BART for estimating heterogeneous treatment effects, particularly in cases where standard methods yield biased estimates due to strong confounding.

We introduce BART with Targeted Smoothing, an extension which induces smoothness over a single covariate by replacing independent Gaussian leaf priors with smooth functions. We then introduce a new version of the Bayesian Causal Forest prior, which incorporates targeted smoothing for modeling heterogeneous treatment effects which vary smoothly over a target covariate. We demonstrate the utility of this approach by applying our model to a timely women's health and policy problem: comparing two dosing regimens for an early medical abortion protocol, where the outcome of interest is the probability of a successful early medical abortion procedure at varying gestational ages, conditional on patient covariates. We discuss the benefits of this approach in other women's health and obstetrics modeling problems where gestational age is a typical covariate.