

STATISTICS COLLOQUIUM

MONDAY, SEPTEMBER 16, 2013

TALK: 4:15 PM — SCIENCE CENTER RM. 705

RECEPTION: 3:50 PM — SCIENCE CENTER, 7TH FLOOR

“Uncertainty in Propensity Score Estimation: Bayesian Methods for Variable Selection and Model Averaged Causal Effects”

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ABSTRACT

Causal inference with observational data frequently relies on the notion of the propensity score (PS) to adjust treatment comparisons for observed confounding factors. As comparative effectiveness research in the era of “big data” increasingly relies on large and complex collections of administrative resources, researchers are frequently confronted with decisions regarding which of a high-dimensional covariate set to include in the PS model in order to satisfy the assumptions necessary for estimating average causal effects. Typically, simple or ad-hoc methods are employed to arrive at a single PS model, without acknowledging the uncertainty associated with the model selection. We propose Bayesian methods for PS variable selection and model averaging that 1) select relevant variables from a set of candidate variables to include in the PS model and 2) estimate causal treatment effects as weighted averages of estimates under different PS models. The associated weight for each PS model reflects the data-driven support for that model's ability to adjust for the necessary variables. We illustrate features of our proposed approaches with a simulation study, and ultimately use our methods to compare the effectiveness of treatments for brain tumors among Medicare beneficiaries.