

MICHIGAN STATE UNIVERSITY
Department of Statistics and Probability

COLLOQUIUM

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High Dimensional Inference: Semiparametrics, Counterfactuals, and Heterogeneity

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11:30 AM - 12:20 PM

Refreshments 11:10 AM

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Abstract

Semiparametric regressions enjoy the flexibility of nonparametric models as well as the interpretability of linear models. These advantages can be further leveraged with recent advance in high dimensional statistics. This talk begins with a simple partially linear model, $Y_i = \mathbf{X}_i\beta^* + g^*(\mathbf{Z}_i) + \varepsilon_i$, where the parameter vector of interest, β^* , is high dimensional but sufficiently sparse, and g^* is an unknown nuisance function. In spite of its simple form, this high dimensional partially linear model plays a crucial role in counterfactual studies of heterogeneous treatment effects. I present an inference procedure for *any* sub-vector (regardless of its dimension) of the high dimensional β^* . This method works when the vector of covariates, \mathbf{Z}_i , is high dimensional, provided that the function classes $\mathbb{E}(X_{ij}|\mathbf{Z}_i)$ s and $\mathbb{E}(Y_i|\mathbf{Z}_i)$ belong to exhibit certain sparsity features, e.g., a sparse additive (nonparametric) decomposition. In this talk, I also discuss the connections between semiparametric modeling and the potential outcomes framework enriched by “big data”, as well as a public health-related application that motivates the various methods (including the one presented in this talk and those from my other papers).

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