



Causal Inference Program Opening Workshop December 9-11, 2019

SPEAKER TITLES/ABSTRACTS

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“Experimenting in Equilibrium”

We study experimental design in large-scale stochastic systems with substantial uncertainty and structured cross-unit interference. We consider the problem of a platform that seeks to optimize supply-side payments p in a centralized marketplace where different suppliers interact via their effects on the overall supply-demand equilibrium, and propose a class of local experimentation schemes that can be used to optimize these payments without perturbing the overall market equilibrium. We show that, as the system size grows, our scheme can estimate the gradient of the platform’s utility with respect to p while perturbing the overall market equilibrium by only a vanishingly small amount. We can then use these gradient estimates to optimize p via any stochastic first-order optimization method. These results stem from the insight that, while the system involves a large number of interacting units, any interference can only be channeled through a small number of key statistics, and this structure allows us to accurately predict feedback effects that arise from global system changes using only information collected while remaining in equilibrium.