Abstract
Does receiving a medical education outside the United States impact a surgeon's performance? We study this question by matching operations performed by internationally-trained surgeons to those performed by US-trained surgeons in reanalysis of a large health outcomes study. An effective matched design must achieve several goals, including balancing covariate distributions marginally, ensuring units within individual pairs have similar values on key covariates, and using a sufficiently large sample from the raw data. Yet in our study, optimizing some of these goals forces less desirable results on others. We address such tradeoffs from a multi-objective optimization perspective by creating matched designs that are Pareto optimal with respect to two goals. We provide general tools for generating representative subsets of Pareto optimal solution sets and articulate how they can be used to improve decision-making in observational study design. In the motivating surgical outcomes study, formulating a multi-objective version of the problem helps us balance an important variable without sacrificing two other design goals, average closeness of matched pairs on a multivariate distance and size of the final matched sample. This is joint work with Rachel Kelz.

Bio
Sam Pimentel is Assistant Professor in the Statistics Department at UC Berkeley. His research centers on methodology for causal inference in observational studies. He also works on applications of these methods in health services research, public policy, and the social sciences.

Zoom details can be found at: https://stt.natsci.msu.edu/stt-colloquium-zoom-info/

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