



THE UNIVERSITY OF  
CHICAGO

DEPARTMENT OF STATISTICS

## Statistics Colloquium

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“Asymptotic Efficiency Bounds for a Class of Experimental Designs”

Monday November 10, 2025, at 11:30 AM

Jones 303, 5747 S. Ellis Avenue

*Pre-Seminar refreshments will be served in Jones 303 at 11:00 am*

### Abstract

We consider an experimental design setting in which units are assigned to treatment after being sampled sequentially from an infinite population. We derive asymptotic efficiency bounds that apply to data from any experiment that assigns treatment as a (possibly randomized) function of covariates and past outcome data, including stratification on covariates and adaptive designs. For estimating the average treatment effect of a binary treatment, our results show that no further first order asymptotic efficiency improvement is possible relative to an estimator that achieves the Hahn (1998) bound in an experimental design where the propensity score is chosen to minimize this bound. Our results also apply to settings with multiple treatments with possible constraints on treatment, as well as covariate based sampling of a single outcome.