



THE UNIVERSITY OF  
CHICAGO

Department of Statistics

STATISTICS COLLOQUIUM

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FAN LI

Departments of Statistical Science, Biostatistics and Bioinformatics  
Duke University

## Balancing Covariate Via Propensity Score Weighting

MONDAY, March 9, 2020 at 4:00 PM

Jones 303, 5747 S. Ellis Avenue

*Refreshments after the seminar at 5:00 PM in Jones 304*

### ABSTRACT

Covariate balance is crucial for unconfounded descriptive or causal comparisons. However, lack of balance is common in observational studies. We consider weighting strategies for balancing covariates. We define a general class of weights, the balancing weights, that balance the weighted distributions of the covariates between treatment groups. These weights incorporate the propensity score to weight each group to an analyst-selected target population. This class unifies existing weighting methods, including commonly used weights such as inverse-probability weights as special cases. General large-sample results on nonparametric estimation based on these weights are derived. We further propose a new weighting scheme, the overlap weights, in which each unit's weight is proportional to the probability of that unit being assigned to the opposite group. The overlap weights are bounded, and minimize the asymptotic variance of the weighted average treatment effect among the class of balancing weights. The overlap weights also possess a desirable small-sample exact balance property, based on which we propose a new method that achieves exact balance for means of any selected set of covariates. Extensions to multiple treatments and subgroup analysis will also be discussed.

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For further information and inquiries about building access for persons with disabilities, please contact Jonathan Rodriguez at 773.702.8333 or send him an email at [jgrodriquez@galton.uchicago.edu](mailto:jgrodriquez@galton.uchicago.edu). If you wish to subscribe to our email list, please visit the following website:  
<https://lists.uchicago.edu/web/subscribe/statseminars>.