

KATHERINE BRUMBERG

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Legal name: Katherine Morgan

ACADEMIC APPOINTMENTS

Assistant Professor | *Statistics*

Jul. 2024 – Present

University of Michigan

EDUCATION

Ph.D. | *Statistics and Data Science*

Aug. 2019 – May 2024 (Expected)

The Wharton School of the University of Pennsylvania

“Novel Stratification and Matching Methods in Observational Studies”, *advisors: Paul Rosenbaum and Dylan Small*

Certificate | *Teaching and Learning*

Jan. 2023

Center for Teaching and Learning at the University of Pennsylvania

B.S. and M.A. | *Statistics and Data Science*

Aug. 2015 – May 2019

Yale University

RESEARCH EXPERIENCE

Graduate Researcher

Mar. 2020 – Present

The Wharton School: Paul Rosenbaum and Dylan Small

- Developed new methods for stratification and matching to achieve covariate balance in observational studies

Undergraduate Researcher

Aug. 2016 – May 2019

Townsend Lab at Yale University

- Applied a population genetics and probabilistic framework to cancer evolution research, updating the group’s prior model of mutation to account for altered selection due to epistatic interactions

Research Experience for Undergraduates at Mathematical Biosciences Institute

Jun. 2017 – Aug. 2017

Ohio State University and Harvard School of Public Health

- Applied inverse probability weighting to adjust for selection bias in a secondary outcome study
- Used causality model selection techniques to determine ordering of events in prostate cancer study

TEACHING EXPERIENCE

Professor

Fall 2024

University of Michigan Statistics Department

- Applied Regression Analysis

Instructor of Record

Summers 2022 & 2023

Wharton Statistics and Data Science Department

- Taught the condensed six week summer course “Introductory Statistics” online (twice)
- Syllabi and evaluations available at www.kbrumberg.com/teaching

Graduate Teaching Assistant

Fall 2021 & Spring 2022

Wharton Statistics and Data Science Department

- Led recitation sections, assisted the professor with course preparation, and graded for the course “Introductory Statistics”

Undergraduate Learning Assistant

Fall 2017 – Spring 2019

Yale Statistics and Data Science Dept.

- Helped instruct students and grade for the courses “Computational Tools for Data Science,” “Theory of Statistics,” “Data Mining and Machine Learning,” and “Data Analysis”

WORK EXPERIENCE

Modeling and Informatics Intern

Summers 2018 & 2019

Vertex Pharmaceuticals

- Implemented permutation tests to run alongside the predictive models for compound activity to make sure that released models are performing better than random
- Implemented iterative focused screening to select the best compounds to include in high throughput screens
- Created an RShiny application to detect anomalies in the performance of control compounds over time

Research Assistant

Summer 2018

Yale Statistics and Data Science Department

- Developed an RShiny application to help the department match undergraduate learning assistants with courses

PUBLICATIONS

6. Silber, J.H., Rosenbaum, P.R., Reiter, J.G., Jain, S., Ramadan, O.I., Hill, A.S., **Brumberg, K.**, Fleisher, L.A. (2024+). Grading Hospitals Using Multivariate Matching. *Submitted*.
5. **Brumberg, K.**, Small, D.S., & Rosenbaum, P.R. (2024). An Observational Study of the Effects of High School Football on Cognition Late in Life Using a New Matching Method. *Annals of Applied Statistics*. In press. Protocol available via *Zenodo*: <https://doi.org/10.5281/zenodo.8349374>.
4. **Brumberg, K.**, Small, D.S. & Rosenbaum, P.R. (2024). Optimal Refinement of Strata to Balance Covariates. *Biometrics*. 80(3). <https://doi.org/10.1093/biomtc/ujae061>.
3. **Brumberg, K.**, Ellis, D.E., Small, D.S., Hennessy, S. & Rosenbaum, P.R. (2023). Using Natural Strata When Examining Unmeasured Biases in an Observational Study of Neurological Side Effects of Antibiotics. *J R Stat Soc Series C*. 72(2):314-329. <https://doi.org/10.1093/jrssc/qlad010>.
2. **Brumberg, K.**, Small, D.S. & Rosenbaum, P.R. (2022). Using Randomized Rounding of Linear Programs to Obtain Unweighted Natural Strata that Balance Many Covariates. *J R Stat Soc Series A*. 185(4):1931-1951. <https://doi.org/10.1111/rssa.12848>.
1. Sinnott, J.A, **Brumberg, K.**, Wilson, K.M., Ebot, E.M., Giovannucci, E.L., Mucci, L.A. & Rider, J.R (2018). Differential Gene Expression in Prostate Tissue. *European Urology*. 74(5):545-548. <https://doi.org/10.1016/j.eururo.2018.05.006>.

SOFTWARE PACKAGES

3. **Brumberg, K.** (2023). triplesmatch: Match Triples Consisting of Two Controls and a Treated Unit or Vice Versa. <https://CRAN.R-project.org/package=triplesmatch>.
2. **Brumberg, K.** (2022). optrefine: Optimally Refine Strata. <https://CRAN.R-project.org/package=optrefine>.
1. **Brumberg, K.** (2021). natstrat: Obtain Unweighted Natural Strata that Balance Many Covariates. <https://CRAN.R-project.org/package=natstrat>.

BOOKS

2. **Brumberg, K.** (2024). Novel Stratification and Matching Methods in Observational Studies. *Proquest*.
<https://repository.upenn.edu/handle/20.500.14332/60102>.
1. Ewens, W., **Brumberg, K.** (2023). Introductory Statistics for Data Analysis. *Springer Nature*.
<https://doi.org/10.1007/978-3-031-28189-1>.

HONORS AND AWARDS

LSA Collegiate Fellow University of Michigan	2024
J. Parker Bursk Research Prize Wharton School	2023
Brown Best Student Paper Award Wharton School	2022
Donald S. Murray Teaching Prize Wharton School	2022
George James Doctoral Fellowship Wharton School	2019
Graduate Research Fellowship National Science Foundation	2019
Statistics and Data Science Senior Award Yale University	2019
Y-Work Award for Outstanding Student Employees Yale University	2019
Henry S. McNeil Summer Fellowship Yale University	2016
Yale Club of Boston Scholarship Yale University	2015, 2016, 2018
Lori Laitman Roseblum Scholarship Yale University	2015

SERVICE

Peer Reviewer Journal of Causal Inference, Springer	Aug. 2023 – Present
Web Developer Learning Unlimited <ul style="list-style-type: none">Developed and reviewed code for the website used by educational outreach Splash programs nationwide	Mar. 2018 – Present
President Wharton Society for the Advancement of Women in Business Academia (WSAWBA) <ul style="list-style-type: none">Led the organization which aims to support women in the Wharton doctoral programs	Sep. 2019 – Aug. 2023

Pen-pal	Sep. 2019 – Jun. 2023
Letters to a Pre-scientist	
<ul style="list-style-type: none"> Wrote letters to a middle school student at a underresourced school to broaden awareness of what STEM professionals look like and serve as a source of inspiration 	
Mentor	Sep. 2022 – Dec. 2022
Wharton Pre-Doctoral Directed Reading Program	
<ul style="list-style-type: none"> Developed a reading plan with an undergraduate student and met weekly to discuss the reading 	
Advisory Board Member	Sep. 2021 – May 2022
Wharton Pre-Doctoral Directed Reading Program	
<ul style="list-style-type: none"> Matched undergraduate students with graduate members for the program and helped to develop the new program 	
Committee Member	Jan. 2022 – Apr. 2022
Wharton Statistics and Data Science Quinquennial Review	
<ul style="list-style-type: none"> Gathered doctoral student feedback for the quinquennial departmental review 	
Mentor	Jan. 2021 – Jun. 2021
Graduate School Mentoring Initiative	
<ul style="list-style-type: none"> Mentored a first generation low income undergraduate student interested in applying to graduate school 	
Co-President	Sep. 2015 – May 2019
Splash at Yale	
<ul style="list-style-type: none"> Led the nonprofit educational outreach organization which brings 1000 middle and high school students to campus to take hour long seminars taught by Yale students 	
Tutor	
New Haven Reads	Feb. 2016 – May 2017
<ul style="list-style-type: none"> Volunteered as a tutor for underresourced students reading below grade level in the New Haven school district 	

EXTERNAL CONFERENCES AND PRESENTATIONS

Optimal Stratification to Address Selection Bias in Observational Studies	Oral presentation
University of Notre Dame	Jan. 2024
Villanova University	Dec. 2023
Wake Forest University	Nov. 2023
University of Michigan	Nov. 2023
Hamilton College	Nov. 2023
Swarthmore College	Nov. 2023
Vassar College	Nov. 2023
Reed College	Nov. 2023
Optimal Refinement of Strata to Balance Covariates	Oral presentation
Joint Statistical Meetings	Aug. 2023
Atlantic Causal Inference Conference	May 2023
Lawrence D. Brown PhD Workshop	Nov. 2022
Obtaining Unweighted Natural Strata that Balance Many Covariates Using Randomized Rounding of Linear Programs	Speed presentation
Joint Statistical Meetings	Aug. 2021

SKILLS

Softwares: R, RShiny, Python, MATLAB, Mathematica, Stata, SPSS

Environments: LaTeX, Linux, Microsoft Office