# Martha Barnard

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## Education

**Ph.D., Biostatistics** September 2022 - Spring 2026 (Anticipated)
*University of Minnesota, Minneapolis, MN*
Advisors: Drs. Julian Wolfson and Jared Huling

**B.A., Mathematics** September 2017 - May 2021
Concentrations in Statistics and Data Science and Mathematical Biology
*St. Olaf College, Northfield, MN*
Graduated Summa Cum Laude with Distinction in Mathematics

## Research Experience

**Graduate Research** June 2024–Present
*University of Minnesota, Minneapolis, MN* *Advisors: Drs. Katie Loth and Julian Wolfson*

**Graduate Research** July 2023–Present
*University of Minnesota, Minneapolis, MN* *Advisors: Drs. Julian Wolfson and Jared Huling*

**Graduate Research** September 2022–Present
*University of Minnesota, Minneapolis, MN* *Advisor: Dr. Julian Wolfson*

**Post Bachelor Researcher** June 2021–June 2022
*Los Alamos National Lab, Los Alamos, NM* *Advisors: Drs. Geoffrey Fairchild, Carrie Manore, Ashlynn Daughton, Sara Del Valle*

**Research Assistant** June 2020–August 2020
*St. Olaf College, Northfield, MN* *Advisor: Dr. Meredith Holgerson*

**Research Assistant** June 2019–August 2019
*Dordt University, Sioux Center, IA* *Advisor: Dr. Nathan Tintle*

## Teaching Experience

*St. Olaf College:*

**Teaching Assistant**, Abstract Algebra I Fall 2020

**Teaching Assistant**, Statistical Modeling Spring 2020

**Teaching Assistant**, Calculus I Fall 2018, Spring 2019

## Honors and Awards

**Student Paper Travel Award**, International Conference on Health Policy Statistics 2025

**Graduate Research Fellowship**, National Science Foundation 2022-2026

**Jean Roberts Biostatistics Research Fellowship**, University of Minnesota 2022-2024

**Distinguished Student Performance Award**, Los Alamos National Lab 2022

**Dean's Ph.D. Scholars Award**, University of Minnesota 2022

**Phi Beta Kappa**, St. Olaf College 2020

**Pi Mu Epsilon Honorary Math Society**, St. Olaf College 2019

**Buntrock Scholarship**, St. Olaf College 2017–2021

## Publications

∗ Authors contributed equally

13. **Barnard, M.**, Huling, J. D., and Wolfson, J. (2025+b). A Unified Framework for Causal Estimand Selection. URL `https://arxiv.org/abs/2410.12093`. (In Revision)

12. **Barnard, M.**, Fan, Y., and Wolfson, J. (2025a). Adjacency Matrix Decomposition Clustering for Human Activity Data. *Journal of the American Statistical Association*. 10.1080/01621459.2025.2506196. URL `https://doi.org/10.1080/01621459.2025.2506196`

11. Loth, K. A., Wolfson, J., **Barnard, M.**, Hogan, N., Brandt, T. J., Fulkerson, J. A., and Fisher, J. O. (2025). Examining the Longitudinal Impact of Within- and Between-Day Fluctuations in Food Parenting Practices on Child Dietary Intake: Protocol for a Longitudinal Cohort Study Within a Sample of Preschooler-Parent Dyads. *JMIR Research Protocols*, 14(1):e73276. 10.2196/73276. URL `https://www.researchprotocols.org/2025/1/e73276`

10. Harp, R. D., Holcomb, K. M., Retkute, R., Prusokiene, A., Prusokas, A., Ertem, Z., Ajelli, M., Kummer, A. G., Litvinova, M., Merler, S., Piontti, A. P. y., Poletti, P., Vespignani, A., Wilke, A. B. B., Zardini, A., Smith, K. H., Armstrong, P., DeFelice, N., Keyel, A., Shepard, J., Smith, R., Tyre, A., Humphreys, J., Cohnstaedt, L. W., Hosseini, S., Scoglio, C., Gorris, M. E., **Barnard, M.**, Moser, S. K., Spencer, J. A., McCarter, M. S. J., Lee, C., Nolan, M. S., Barker, C. M., Staples, J. E., Nett, R. J., and Johansson, M. A. (2025). Evaluation of the 2022 West Nile virus forecasting challenge, USA. *Parasites & Vectors*, 18(1):152. 10.1186/s13071-025-06767-2. URL `https://doi.org/10.1186/s13071-025-06767-2`

9. Moser, S. K., Spencer, J. A., **Barnard, M.**, Hyman, J. M., Manore, C. A., and Gorris, M. E. (2024). Exploring Climate-Disease Connections in Geopolitical Versus Ecological Regions: The Case of West Nile Virus in the United States. *GeoHealth*, 8(6):e2024GH001024. 10.1029/2024GH001024. URL `https://onlinelibrary.wiley.com/doi/abs/10.1029/2024GH001024`

8. Mancuso, M., Martinez, K. M., Manore, C. A., Milner, F. A., **Barnard, M.**, and Godinez, H. (2023). Fusing time-varying mosquito data and continuous mosquito population dynamics models. *Frontiers in Applied Mathematics and Statistics*, 9:1207643

7. Moser, S. K., **Barnard, M.**, Frantz, R. M., Spencer, J. A., Rodarte, K. A., Crooker, I. K., Bartlow, A. W., Romero-Severson, E., and Manore, C. A. (2023). Scoping review of Culex mosquito life history trait heterogeneity in response to temperature. *Parasites & Vectors*, 16(1):200. 10.1186/s13071-023-05792-3

6. Beesley, L. J., Patelli, P., Kaufeld, K., Schwenk, J., Martinez, K. M., Pitts, T., **Barnard, M.**, McMahon, B., and Valle, S. Y. D. (2023). Multi-dimensional resilience: A quantitative exploration of disease outcomes and economic, political, and social resilience to the COVID-19 pandemic in six countries. *PLOS ONE*, 18(1):e0279894. 10.1371/journal.pone.0279894

5. Trejo, I., **Barnard, M.**, Spencer, J. A., Keithley, J., Martinez, K. M., Crooker, I., Hengartner, N., Romero-Severson, E. O., and Manore, C. (2023). Changing temperature profiles and the risk of dengue outbreaks. *PLOS Climate*, 2(2):e0000115. 10.1371/journal.pclm.0000115

4. Holgerson, M. A., **Barnard, M.**, Ahn, B., Hayes, M. P., and Strecker, A. L. (2022). Freshwater floodplain habitats buffer native food webs from negative effects of nonnative centrarchids and bullfrogs. *Freshwater Science*, 41(2):327–341. 10.1086/720137

2. Daughton, A. R., Shelley, C. D., **Barnard, M.**, Gerts, D., Ross, C. W., Crooker, I., Nadiga, G., Mukundan, N., Chavez, N. Y. V., Parikh, N., Pitts, T., and Fairchild, G. (2021). Mining and Validating Social Media Data for COVID-19–Related Human Behaviors Between January and July 2020: Infodemiology Study. *Journal of Medical Internet Research*, 23(5):e27059. 10.2196/27059

2. *Wolf, J.M., ***Barnard, M.**, Xia, X., Ryder, N., Westra, J., and Tintle, N. (2019). Computationally efficient, exact, covariate-adjusted genetic principal component analysis by leveraging individual marker summary statistics from large biobanks. In *Pacific Symposium in Biocomputing 2020*, pages 719–730, Kohala Coast, Hawaii, USA. ISBN 9789811215629 9789811215636. 10.1142/9789811215636_0063

1. Priedhorsky, R., Daughton, A. R., ***Barnard, M.**, *O'Connell, F., and Osthus, D. (2019). Estimating influenza incidence using search query deceptiveness and generalized ridge regression. *PLOS Computational Biology*, 15(10):e1007165. 10.1371/journal.pcbi.1007165

## Presentations

∧ Author, but did not present

9. **Barnard, M.**, Huling, J. D., and Wolfson, J. A Unified Framework for Causal Estimand Selection. *JSM*, Nashville, TN, August 2025 (Contributed Presentation)

8. **Barnard, M.**, Huling, J. D., and Wolfson, J. A Unified Framework for Causal Estimand Selection. *ENAR*, New Orleans, LA, March 2025 (Contributed Presentation)

7. **Barnard, M.**, Huling, J. D., and Wolfson, J. A Unified Framework for Causal Estimand Selection. *International Conference on Health Policy Statistics*, San Diego, CA, January 2025 (Contributed Presentation)

6. **Barnard, M.**, Huling, J. D., and Wolfson, J. A Unified Framework for Causal Estimand Selection. *Advances in Learning Health System Sciences*, Minneapolis, MN, September 2024 (Contributed Poster)

5. **Barnard, M.**, Fan, Y., and Wolfson, J. Adjacency Matrix Decomposition Clustering for Human Activity Data. *ENAR*, Baltimore, MD, March 2024 (Contributed Poster)

4. **Barnard, M.**, Loth, M., Wolfson, J., and Huling, J. The usefulness of overlap weighting for causal inference in a learning health system: a simulation study. *Advances in Learning Health System Sciences*, St. Paul, MN, September 2023 (Contributed Poster)

3. Holgerson, M. A., **Barnard, M.**, Ahn, B., Hayes, M. P., and Strecker, A. L. Native fishes and larval salamanders of the chehalis river basin exhibit trophic niche shifts when co-occurring with non-native vertebrates. *Midwest Interdisciplinary Symposium for Scientific Thought*, Northfield, MN, April 2021 (Contributed Poster)

2. **Barnard, M.**, Jansen, L., Rudberg, K., Feiler, L., Chapp, C., and Roback, P. Modeling novel indicators of student retention at St. Olaf College. *National Conference on Undergraduate Research*, Virtual, April 2021 (Contributed Poster)

1. Wolf, J. M., **Barnard, M.**, Xia, X., Ryder, N., Westra, J., and Tintle, N. Computational efficient, exact, covariate-adjusted genetic principal component analysis by leveraging individual marker summary statistics from large biobanks. *Pacific Symposium in Biocomputing*, Waimea, HI, January 2020 (Contributed Presentation)^

## Service

*Journals:*

**Reviewer**, Annals of Applied Statistics

*Professional Membership:*

**Member**, American Statistical Association 2024-Present

**Member**, International Biometrics Society - ENAR 2023-Present

*University of Minnesota, Division of Biostatistics and Health Data Science:*

**Member**, Student Advisory Council 2023-Present

**Member**, Biostatistics Outreach and Engagement Committee 2022-Present

*St. Olaf College, Department of Mathematics, Statistics, and Computer Science:*

**President**, Math Club  Pi Mu Epsilon Honor Society 2020-2021

**Vice President**, Association for Women in Mathematics Chapter 2020-2021