

Martha Barnard

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Education

- May 2026 **PhD, Biostatistics**
(Anticipated) University of Minnesota
“Statistical methods for mobile health data and causal effect estimation under positivity violations”
Advisors: Drs. Julian Wolfson and Jared Huling
- May 2021 **BA, Mathematics**, *summa cum laude*
St. Olaf College
Distinction in Mathematics, Concentrations in Statistics & Data Science and Mathematical Biology

Publications

Statistical Methodology:

* Contributed Equally

3. **Barnard, M.**, Huling, J. D., and Wolfson, J. (2025+b). A Unified Framework for Causal Estimand Selection. URL <https://arxiv.org/abs/2410.12093>. (Revision submitted to *Biometrics*)
2. **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>
1. *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

Interdisciplinary:

10. 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>
9. 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>

8. 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>
7. 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
6. 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
5. 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
4. 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
3. Holgersson, 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
1. Friedhorsky, 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

Honors and Awards

2025	R&D 100 Award (LANL EpiEarth Team)
2025	R&D Gold Medal for Corporate Social Responsibility (LANL EpiEarth Team)
2025	Student Paper Travel Award , International Conference on Health Policy Statistics
2022-2026	Graduate Research Fellowship , National Science Foundation
2022-2024	Jean Roberts Biostatistics Research Fellowship , University of Minnesota
2022	Dean’s Ph.D. Scholars Award , University of Minnesota

2022	Distinguished Student Performance Award , Los Alamos National Laboratory
2020	Phi Beta Kappa , St. Olaf College
2019	Pi Mu Epsilon Honorary Math Society , St. Olaf College
2017-2021	Buntrock Scholarship , St. Olaf College

Research Experience

2024–	Graduate Researcher Department of Family Medicine & Community Health, University of Minnesota Grant Title: “Examination of the longitudinal impact of within- and between-day fluctuations in food parenting practices on child dietary intake” Supervisors: Drs. Katie Loth and Julian Wolfson
2022–	NSF Graduate Research Fellow Division of Biostatistics & Health Data Science, University of Minnesota Supervisors: Drs. Julian Wolfson and Jared Huling
2021–2022	Postbachelor Researcher A-1 Information Systems & Modeling, Los Alamos National Laboratory Supervisors: Drs. Geoffrey Fairchild, Carrie Manore, Ashlynn Daughton, Sara Del Valle
2020	Research Assistant St. Olaf College Supervisor: Dr. Meredith Holgerson
2019	Research Assistant Dordt University Supervisor: Dr. Nathan Tintle

Teaching Experience

St. Olaf College:

Fall 2020	Teaching Assistant , Abstract Algebra I
Spring 2020	Teaching Assistant , Statistical Modeling
Fall 2018	Teaching Assistant , Calculus I
Spring 2019	

Presentations

Contributed Talks:

Aug 2025	<i>A Unified Framework for Causal Estimand Selection</i> , JSM 2025, Nashville, TN
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- Mar 2025 *A Unified Framework for Causal Estimand Selection*, ENAR 2025, New Orleans, LA
- Jan 2025 *A Unified Framework for Causal Estimand Selection*, International Conference on Health Policy Statistics 2025, San Diego, CA

Contributed Posters:

- Sep 2024 *A Unified Framework for Causal Estimand Selection*, Advances in Learning Health System Sciences 2024, Minneapolis, MN
- Mar 2024 *Adjacency Matrix Decomposition Clustering for Human Activity Data*, ENAR 2024, Baltimore, MD
- Sep 2023 *The usefulness of overlap weighting for causal inference in a learning health system: a simulation study*, Advances in Learning Health System Sciences 2023, St. Paul, MN
- Apr 2021 *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 2021, Virtual
- Apr 2021 *Modeling novel indicators of student retention at St. Olaf College*, National Conference on Undergraduate Research 2021, Virtual

Conferences/Workshops Attended:

- Feb 2025 Workshop on Emerging Statistical Methods for Digital Health Data, Banff International Research Station, Banff, AB

Service

Professional Membership:

- 2024– American Statistical Association
- 2023– International Biometrics Society - ENAR

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

- 2023– Student Advisory Council
- 2022– Biostatistics Outreach and Engagement Committee

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

- 2020-2021 Math Club & Pi Mu Epsilon Honor Society President
- 2020-2021 Association for Women in Mathematics Chapter Vice President

Referee for:

- Annals of Applied Statistics