

Tyler D. Hoffman

he/him/his • td@tdhoffman.com • <https://tdhoffman.com> • <https://github.com/tdhoffman>

Education

Arizona State University, Tempe, AZ 2022

M.A., Geography

Statistics and Data Science Certificate (2023)

University of Maryland, College Park, MD 2017 – 2021

B.S. with High Honors, Mathematics; minors in Computer Science and History

President's Scholarship Recipient; Earned University Honors Certificate in April 2019

Publications

9. **T. D. Hoffman**. (2023). "Representing spatial dependence in count data: an exploration of shared structure between two models." In preparation.
8. **T. D. Hoffman**, P. Kedron. (2023). "Controlling for spatial confounding and spatial interference in causal inference: Modeling insights from a computational experiment." *Annals of GIS*, in press.
7. P. Kedron, **T. D. Hoffman**, S. Bardin. (2023). "Chapter 18: Reproducibility and Replicability in GeoAI." *Handbook of Geospatial Artificial Intelligence*. S. Gao, Y. Hu, W. Li (Ed.).
6. **T. D. Hoffman**, P. Kedron. (2023). "Spatial Autoregressive Models." *The Geographic Information Science & Technology Body of Knowledge (2nd Quarter 2023 Edition)*. John P. Wilson (Ed.).
5. P. Kedron, S. Bardin, **T. D. Hoffman**, M. Sachdeva, M. Quick, J. Holler. (2022). "A Replication of DiMaggio et al. (2020) in Phoenix, AZ." *Annals of Epidemiology*, 74, 8–14.
4. W. F. Fagan, C. Saborio, **T. D. Hoffman**, E. Gurarie, R. S. Cantrell, C. Cosner. (2022). "What's in a resource gradient? Comparing alternative cues for foraging in dynamic environments via movement, perception, and memory." *Theoretical Ecology*, open access, 1–16.
3. A. Swain*, **T. Hoffman***, W. F. Fagan. (2021). "Trade-offs in sensory characteristics shape the evolution of perception." *Frontiers in Ecology and Evolution*, 9.
2. A. Lawson, **T. Hoffman**, Y. Chung, K. Keegan, S. Day. (2021). "A density-based approach to feature detection in persistence diagrams for firm data." *Foundations of Data Science*.
1. W. F. Fagan, **T. Hoffman**, D. Dahiya, E. Gurarie, R. S. Cantrell, C. Cosner. (2019). "Improved foraging by switching between diffusion and advection: benefits from movement that depends on spatial context." *Theoretical Ecology*, 13 (2), 127–136.

**equal contributions*

Conference Proceedings

2. **T. D. Hoffman**, P. Kedron. (2022). "Operationalizing Spatial Causal Inference." *UCSB Spatial Data Science Symposium 2022 Short Paper Proceedings*.
1. **T. D. Hoffman**, T. Oshan. (2021). "A Supervised Heuristic for a Balanced Approach to Regionalization." *GIS Research UK Conference Proceedings*.

Grants and Awards

John Odland Student Paper Competition 2023

Second Place Winner, \$400

Georgetown Massive Data Institute Green Space Data Challenge <i>Second Place Winner (with teammates Timara Crichlow and Shaylynn Trego), \$2,000</i>	2023
ACM SIGSPATIAL 2022 Travel Grant <i>Award Recipient, \$1,000</i>	2022
The College Graduate Excellence Award <i>Award Recipient, \$100</i>	2022
NSF Graduate Research Fellowship Award <i>Award Recipient, \$169,450</i>	2021 – 2026
University Graduate Fellowship <i>Award Recipient, \$3,000</i>	2021
Maryland Undergraduate Researcher of the Year Award <i>Award Recipient, \$1,000</i>	2021
UMD Flagship Fellowship <i>Award Winner, \$60,000 (declined)</i>	2021
Math Department Strauss Teaching Assistant <i>Award Recipient, \$20,000</i>	2020 – 2021
UMD President's Scholarship <i>Award Recipient, \$32,000</i>	2017 – 2021

Conference and Workshop Presentations

- T. D. Hoffman**, P. Kedron. (2023). "Controlling for spatial confounding and spatial interference in causal inference: Modeling insights and the `spycouse` package." American Association of Geographers Annual Meeting.
- T. D. Hoffman**, P. Kedron. (2022). "Operationalizing Spatial Causal Inference." UCSB Spatial Data Science Symposium 2022 Short Paper Proceedings.
- T. D. Hoffman**, T. Oshan. (2022). "A model-driven approach to regionalization and spatial change-of-support." Association of American Geographers 2022 Annual Meeting.
- T. D. Hoffman**, T. Oshan. (2021). "A Supervised Heuristic for a Balanced Approach to Regionalization." GIS Research UK (GISRUK) 2021.
- T. Hoffman**, A. Swain, K. Leyba, W.F. Fagan. (2020). "Perceptual evolution: How the spatially explicit interplay of biological and environmental factors shapes resource uptake." Ecological Society of America 2020 Meeting.

Research and Teaching Experience

- Google Summer of Code, Python Spatial Analysis Library** 2022
Contributor
- Extended Wilkinson formulas to spatial regression models (repository).
 - Designed `scikit-learn` style interfaces for spatial regression models in the Python Spatial Analysis Library (repository).

GIScience, Kedron Lab, Arizona State University 2021 – Present
Graduate Researcher

- Designing methods to enable causal inference in spatial settings.
- Integrating novel ideas of process into geographic information systems.

Spatial Data Science, GEOSMASH Lab, University of Maryland

2020 – Present

Affiliate (2021–Present); Previously Undergraduate Researcher (2020–2021)

- Developing open source software for the widespread use of spatial interaction modeling and the study of spatial scale.
- Software has been incorporated in the Python Spatial Analysis Library (PySAL) Spatial Interaction (SpInt) module and can be found at this Github link.

Strauss Teaching Assistant, Department of Mathematics, University of Maryland

2020 – 2021

Undergraduate Teaching Assistant

- Received the Strauss Teaching Assistant award to teach a section of Calculus I in the fall and Calculus II in the spring.

Mathematical Biology, Fagan Lab, University of Maryland

2018 – 2021

Undergraduate Researcher

- Designed and implemented a complex system model to study the evolution of vision.
- Pursued novel modeling techniques in the fields of population dynamics and movement ecology by partial differential equations (PDEs) and agent-based simulations to examine forager motion.
- Analyzed dynamical systems relating to the spread of disease and the vector-host relationship.

Computational Statistics, University of North Carolina Greensboro

2020

Research Experience for Undergraduates (REU) Participant

- Employed unsupervised learning for outlier detection in topological data analysis settings to extract insights from sea ice datasets.

UMD COMBINE Network Epidemiology Online Workshop Series

2020

Participant

- Attended a series of lectures from prominent epidemiological network scientists on cutting-edge techniques in the field and their relevance to the contemporary coronavirus epidemic.
- Led a team of graduate students and post-baccalaureate scholars to research epidemiological network science and produce a poster which introduces and explains current research for public health officials.

Structural Acoustics, Naval Surface Warfare Center Carderock Division

2019

Naval Research Enterprise Internship Program (NREIP) Intern

- Evaluated new finite and boundary element methods to solve computationally hard problems relating to acoustic-structure interaction.
- Created a tool which implements a boundary element method for arbitrary geometries.

Math Success Program, Department of Resident Life, University of Maryland

2018 – 2019

Math Success Coach (2018); Calculus II Collaborative Study Group Leader (2019)

- Tutored a variety of mathematics courses from Calculus I to Real Analysis.
- Tutored and delivered impromptu lessons to a collaborative study group of 15 Calculus II students.

SpiderSmart Learning Centers, Montgomery County, MD

2018

Tutor

- Tutored high school students in Math, English, and SAT/ACT Test Prep.

- Helped students with the college application process through test prep and application essay editing.

Math Directed Reading Program, University of Maryland

2018

Participant

- Studied manifold theory under the direction of a graduate student mentor.
- Delivered a talk proving that the Klein bottle cannot be embedded in three dimensions.

Leadership and Service

Review for Peer-Reviewed Journals

2022 – Present

- *Statistics and Computing*

Office of National Scholarships Advisement

2022

NSF GRF Peer Mentor

- Reviewed applications and advised NSF GRF applicants for the 2022-2023 application cycle.

School of Geographical Sciences Graduate Student Committee

2022

President

- Elected President of the committee for the 2022 calendar year. The President serves as an immediate liaison between the faculty and administration and the graduate student body.

American Statistical Association

2022 – Present

Student Member

Association of American Geographers

2021 – 2022

Student Member

Model United Nations Team

2017 – 2021

Senior Executive Advisor; Vice President; Undersecretary-General for Crisis at UMUNC I

- Vice President and founding member of the University of Maryland Model United Nations Team.
- Helped to raise the team from unranked to Top 50 nationwide in two seasons.
- Outstanding Delegate (Second Place), William & Mary Model UN Conference (April 2019)
- Honorable Delegate (Third Place), NYU Model UN Conference (April 2018)

University Senate, College of Computer, Mathematical, and Natural Sciences

2018 – 2019

Senator and Programs, Courses, and Curricula (PCC) Committee Member

- Participated in Senate discussions on campus affairs. Engaged in coalitions to better the university.
- Reviewed proposals for new and modified majors, minors, and certificate programs as a member of the Programs, Courses, and Curricula Committee.

Skills and Languages

Proficient in Familiar with

Python, R, Julia, Unix/Linux/Bash, L^AT_EX, MATLAB/Octave, C, Java, OCaml, SQL
APL, J, Lean, Netlogo, Fortran, Rust, D, Go, Ruby, Perl, French, Arduino, HTML/CSS