Tyler D. Hoffman

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Education

Arizona State University, Tempe, AZ *2021 – 2026 (estimated)*
Ph.D, Geography; advised by Professor Peter Kedron
NSF Graduate Research Fellowship Recipient

Arizona State University, Tempe, AZ *2022*
M.A., Geography

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

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 firn 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 *2023*
Second Place Winner (with teammates Timara Crichlow and Shaylynn Trego), $2,000

ACM SIGSPATIAL 2022 Travel Grant *2022*
Award Recipient, $1,000

The College Graduate Excellence Award *2022*
Award Recipient, $100

NSF Graduate Research Fellowship Award *2021 – 2026*
Award Recipient, $169,450

University Graduate Fellowship *2021*
Award Recipient, $3,000

Maryland Undergraduate Researcher of the Year Award *2021*
Award Recipient, $1,000

UMD Flagship Fellowship *2021*
Award Winner, $60,000 (declined)

Math Department Strauss Teaching Assistant *2020 – 2021*
Award Recipient, $20,000

UMD President's Scholarship *2017 – 2021*
Award Recipient, $32,000

Conference and Workshop Presentations

T. D. Hoffman, P. Kedron. (2023). "Controlling for spatial confounding and spatial interference in causal inference: Modeling insights and the `spycause` 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 Marylad *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	Python, Julia, Unix/Linux/Bash, LaTeX, MATLAB/Octave, R, C, Java, OCaml
Familiar with	APL, J, Lean, Netlogo, Fortran, Rust, D, Go, Ruby, Perl, French, Arduino, HTML/CSS