

# Tyler D. Hoffman

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## Education

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**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

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6. **T. D. Hoffman**, P. Kedron. "Spatial autoregressive models." Geographic Information Science & Technology Body of Knowledge. In review.
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

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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

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**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*

<b>University Graduate Fellowship</b> <i>Award Recipient, \$3,000</i>	2021
<b>Maryland Undergraduate Researcher of the Year Award</b> <i>Award Recipient, \$1,000</i>	2021
<b>UMD Flagship Fellowship</b> <i>Award Winner, \$60,000 (declined)</i>	2021
<b>Math Department Strauss Teaching Assistant</b> <i>Award Recipient, \$20,000</i>	2020 – 2021
<b>UMD President’s Scholarship</b> <i>Award Recipient, \$32,000</i>	2017 – 2021

## Research and Teaching Experience

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<b>Google Summer of Code, Python Spatial Analysis Library</b> <i>Contributor</i>	2022
<ul style="list-style-type: none"> <li>— Extended Wilkinson formulas to spatial regression models (repository).</li> <li>— Designed scikit-learn style interfaces for spatial regression models in the Python Spatial Analysis Library (repository).</li> </ul>	
<b>GIScience, Kedron Lab, Arizona State University</b> <i>Graduate Researcher</i>	2021 – Present
<ul style="list-style-type: none"> <li>— Designing methods to enable causal inference in spatial settings.</li> <li>— Integrating novel ideas of process into geographic information systems.</li> </ul>	
<b>Spatial Data Science, GEOSMASH Lab, University of Maryland</b> <i>Affiliate (2021–Present); Previously Undergraduate Researcher (2020–2021)</i>	2020 – Present
<ul style="list-style-type: none"> <li>— Developing open source software for the widespread use of spatial interaction modeling and the study of spatial scale.</li> <li>— Software has been incorporated in the Python Spatial Analysis Library (PySAL) Spatial Interaction (SpInt) module and can be found at this Github link.</li> </ul>	
<b>Strauss Teaching Assistant, Department of Mathematics, University of Maryland</b> <i>Undergraduate Teaching Assistant</i>	2020 – 2021
<ul style="list-style-type: none"> <li>— Received the Strauss Teaching Assistant award to teach a section of Calculus I in the fall and Calculus II in the spring.</li> </ul>	
<b>Mathematical Biology, Fagan Lab, University of Maryland</b> <i>Undergraduate Researcher</i>	2018 – 2021
<ul style="list-style-type: none"> <li>— Designed and implemented a complex system model to study the evolution of vision.</li> <li>— 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.</li> <li>— Analyzed dynamical systems relating to the spread of disease and the vector-host relationship.</li> </ul>	
<b>Computational Statistics, University of North Carolina Greensboro</b> <i>Research Experience for Undergraduates (REU) Participant</i>	2020
<ul style="list-style-type: none"> <li>— Employed unsupervised learning for outlier detection in topological data analysis settings to extract insights from sea ice datasets.</li> </ul>	

**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.

## Conference Presentations and Workshops

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**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.

**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.

## Leadership and Service

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**Review for Peer-Reviewed Journals** 2022 – Present

- *Statistics and Computing*

**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.

- 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

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<b>Proficient in</b>	Python, Julia, Unix/Linux/Bash, $\LaTeX$ , MATLAB/Octave, R, C, Java, OCaml
<b>Familiar with</b>	APL, J, Lean, Netlogo, Fortran, Rust, D, Go, Ruby, Perl, French, Arduino, HTML/CSS