# Tyler D. Hoffman

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Data scientist seeking to apply quantitative methods for social good; skilled written and oral communicator with experience developing interpretable code, impactful data visualizations, and technical training materials. Now, I'm seeking positions where I can make an impact supporting researchers and businesses with transparent, reliable software to enable insight generation and inform decision-making.

### Education

**Arizona State University, Tempe, AZ** M.A., Geography; Certificate in Statistics and Data Science National Science Foundation Graduate Research Fellowship Recipient

**University of Maryland, College Park, MD** B.S., Mathematics (High Honors); Minors in Computer Science and History

# **Research Experience**

Data Analyst

Spatial Data Science Lab, University of North Texas

- Develop a data pipeline in R and Python to automate data collection and cleaning of housing data from 34 state housing finance agencies over 12 years for evaluation examining the impact of place-based incentives on the spatial distribution of low-income housing tax credits.
- Analyze the effect of the Emergency Rental Assistance programs on mental health outcomes during the COVID-19 pandemic using Bayesian spatial multilevel models.

# Graduate Researcher

Kedron Lab, School of Geographical Sciences and Urban Planning, Arizona State University

- Collaborated with a team of professors and graduate students to conduct a study on the transmission of COVID-19 in Phoenix using Bayesian spatial models in Python.
- Created publication-ready data visualizations to illustrate complex statistical inferences in a digestible manner, including tables, plots, and maps.
- Wrote technical appendix and contributed to writing the main body of the resulting peer-reviewed paper.

# **Open Source Developer Intern**

Python Spatial Analysis Library (PySAL) via Google Summer of Code

- Implemented a generalized formula parser for spatial regression models that facilitates recommended statistical practices and simplifies analysis workflows.
- Standardized interfaces to library code to conform to Python community standards, enhancing the user experience and enabling integration into broader data science pipelines.

### Data Analysis Team Lead

Georgetown Massive Data Institute Green Space Data Challenge (2nd place winner)

- Convened and led a team to explore the relationship between green space and gentrification in 6 urban environments across the US. Contributed to the conceptualization and writing of manuscript.
- Assembled, cleaned, and merged large scale geographic data from FEMA, CDC, academic sources, and nonprofits to determine gentrification risk and create proxies for environmental injustice. This work was done in Python and SQL.
- Developed spatial and nonspatial Bayesian models in Stan to control for spatial dependence and other covariates while evaluating the effects of green space on gentrification.

# Aug 2021 – Dec 2023

Aug 2017 – May 2021

Jan 2024 – Jun 2024

*May* 2022 – *Oct* 2022

Aug 2021 – Dec 2023

March 2023

### **Visiting Research Fellow**

Regulation, Evaluation, and Governance Lab (RegLab), Stanford University

- Wrote novel Bayesian statistical algorithms in Python and R to model geographically dispersed exposure effects for epidemiological and environmental applications.
- Merged data from the California Department of Public Health with satellite detections of concentrated animal feeding operations (CAFOs) to examine the impact of CAFOs on health outcomes, applying novel spatial modeling techniques such as adaptively parametrized spatial dependence structures.
- Collaborated closely with professors and domain experts to inform choice of data sources, computational platforms, and modeling decisions.

### Skills, Languages, and Tools

Statistical computingPython, R, Excel, SQL, Stan, LATEX, Julia, MATLAB, SASOther languages and toolsGithub, Slurm, C, Unix/Linux/Bash, Java, Fortran, OCaml, Netlogo, French

### **Selected Publications and Conference Presentations**

- **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, open access, 1–11.
- 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.).
- **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.).
- **T. D. Hoffman**, P. Kedron. (2022). "Operationalizing Spatial Causal Inference." UCSB Spatial Data Science Symposium 2022 Short Paper Proceedings.
- 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.
- 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.
- **T. D. Hoffman**, T. Oshan. (2022). "A model-driven approach to regionalization and spatial change-of-support." Association of American Geographers 2022 Annual Meeting (virtual).
- **T. D. Hoffman**, T. Oshan. (2021). "A Supervised Heuristic for a Balanced Approach to Regionalization." GIS Research UK (GISRUK) 2021, Cardiff, UK (virtual).
- **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, Salt Lake City, UT (virtual).

#### **Selected Awards**

National Science Foundation Graduate Research Fellowship Award Recipient	2021
John Odland Student Paper Competition Second Place Winner	2023
<b>Georgetown Massive Data Institute Green Space Data Challenge</b> Second Place Winner (with teammates Timara Crichlow and Shaylynn Trego)	2023
<b>University of Maryland Undergraduate Researcher of the Year</b> <i>Award Recipient</i>	2021