

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 impactful data visualizations, conference presentations, and peer-reviewed publications. Now, I'm seeking positions where I can make an impact combining statistical analysis with science communication to inform decision-makers in urban policy and sustainability.

Education

Arizona State University, Tempe, AZ

Aug 2021 – Dec 2023

M.A., Geography; Certificate in Statistics and Data Science

National Science Foundation Graduate Research Fellowship Recipient

University of Maryland, College Park, MD

Aug 2017 – May 2021

B.S., Mathematics (High Honors); Minors in Computer Science and History

Research Experience

Graduate Researcher

Aug 2021 – Dec 2023

Kedron Lab, Arizona State University

- **Replication of work by DiMaggio et al. (2020)**

- Analyzed associations between COVID-19 rates and various sociodemographic characteristics using a Bayesian spatial model programmed in Python.
- Wrote technical appendix and contributed to the conceptualization and writing of manuscript.

- **American Association of Geographers John Odland Student Paper Competition (2nd place winner)**

- Designed and executed a literature review on the interface of causal inference and spatial statistics.
- Simulated 16 spatial datasets using Python and analyzed the statistical properties of 42 Bayesian causal models implemented in Stan on different spatial structures. Code was published as an open source package for reproducibility and future usage.
- Presented findings from the study and review during the American Association of Geographers' 2023 Annual Meeting in Denver, CO.

- **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.

Visiting Research Fellow

May 2023 – Aug 2023

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

- Created novel 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 using the new algorithms.

Publications

10. **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.
9. 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.).
8. **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.).
7. **T. D. Hoffman**, P. Kedron. (2022). "Operationalizing Spatial Causal Inference." *UCSB Spatial Data Science Symposium 2022 Short Paper Proceedings*.
6. 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.
5. 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.
4. **T. D. Hoffman**, T. Oshan. (2021). "A Supervised Heuristic for a Balanced Approach to Regionalization." *GIS Research UK Conference Proceedings*.
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. **equal contributions*
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.

Conference Presentations

- T. D. Hoffman**, P. Kedron. (2023). "Controlling for spatial confounding and spatial interference in causal inference: Modeling insights and the spycause package." *American Causal Inference Conference*, Austin, TX.
- 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*, Denver, CO.
- T. D. Hoffman**, P. Kedron. (2022). "Operationalizing Spatial Causal Inference." *UCSB Spatial Data Science Symposium 2022 Short Paper Proceedings*, Santa Barbara, CA (virtual).
- 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).

Skills, Languages, and Tools

Statistical computing Python, R, Excel, SQL, Unix/Linux/Bash, Stan, \LaTeX , Julia, MATLAB
Other computing Github, C, Java, Fortran, OCaml, D, Lean, Netlogo, Rust, Go, APL, J