Margaret A Lawrimore

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Research Interests

My research encompasses climate change adaptation and resilience, sustainable development, and environmental justice. I apply big-data analytics, high-performance computing, and geostatistical methods to tackle complex issues. Collaborating with local communities, planning agencies, and research institutions, I seek solutions to socio-environmental issues, emphasizing clear science communication and visualization.

Education

North Carolina State University (NCSU) — Raleigh, NC
Ph.D. Geospatial Analytics | GPA 4.0/4.0 — Expected May 2025

North Carolina State University (NCSU) — Raleigh, NC
B.S. Environmental Sciences | GPA 4.0/4.0 — May 2020

- Concentration: Geospatial Information Science (GIS)
- Minors: Computer Programming, Bassoon Performance

Professional Appointments

Graduate Research Assistant — August 2021 - Present
Urban Systems Lab | Center for Geospatial Analytics | NCSU — Raleigh, NC

Graduate Research Intern — June - September 2024
Human Geography Group | Oak Ridge National Laboratory — Oak Ridge, TN

Teaching Assistant — January - May 2023
Fundamentals of Geospatial Information Science and Technology | NCSU — Raleigh, NC

Research Assistant — September 2019 - June 2021
Center for Geospatial Analytics | NCSU — Raleigh, NC

- Food-Energy-Water-Transportation Systems Lab | February 2021 - June 2021
- Biological Invasions Lab | May 2020 - February 2021
- Urban Systems Lab | September 2019 - May 2020

Undergraduate Research Assistant — May - August 2019
North Carolina Institute for Climate Studies — Asheville, NC

Publications

Peer Reviewed Articles

Sanchez, G.M., **Lawrimore, M.A.**, Petrasova, A., Vogler, J.B., Collins, E., Petras, V., Harper, T., Butzler, E., Meentemeyer, R.K. (Accepted). The Safe Development Paradox of the United States Regulatory Floodplain. PLoS ONE.

Lawrimore, M. A., Sanchez, G. M., Cothron, C., Tulbure, M. G., BenDor, T. K., Meentemeyer, R. K. (2024). Creating spatially complete zoning maps using machine learning. Computers, Environment and Urban Systems, 112, 102157. https://doi.org/10.1016/j.compenvurbsys.2024.102157

Sanchez, G.M., Petrasova, A., Skrip, M., Collins, E., **Lawrimore, M.A.**, Vogler, J.B., Terando, A., Vukomanovic, J., Mitasova, H., Meentemeyer, R.K. (2023). Spatially interactive modeling of land change identifies location-specific adaptations most likely to lower future flood risk. Sci Rep 13, 18869. https://doi.org/10.1038/s41598-023-46195-9

Sugg, M.M., Woolard, S., **Lawrimore, M.A.**, Micheal, K.D., Runkle, J.D. (2021). Spatial Clustering of Suicides and Neighborhood Determinants in North Carolina, 2000 to 2017. Appl. Spatial Analysis 14, 395–413. https://doi.org/10.1007/s12061-020-09364-1

Articles In Preparation

Lawrimore, M.A., Sanchez, G.M., BenDor, T.K., Frazier, T., Urban, M., Meentemeyer, R.K. How Zoning Affects the Spatial Distribution of Human Population. Manuscript in preparation for Landscape and Urban Planning.

Data and Software Releases

Lawrimore, M.A., Sanchez, G.M., Cothron, C., Tulbure, M.G., BenDor, T.K., Meentemeyer, R.K. (2023). Predicted Spatially Complete Zoning Map of North Carolina. Zenodo. https://doi.org/10.5281/zenodo.8136886

Petrasova, A., Sanchez, G.M., **Lawrimore, M.A.**, Vogler, J.B., Collins, E.L., Petras, V., Harper, T., Butzler, E., and Meentemeyer, R.K. (2023). FUTURES v2: Status Quo Projections of Future Patterns of Urbanization Across the Conterminous United States from 2020 to 2100: U.S. Geological Survey data release, https://doi.org/10.5066/P94N3ICH.

Petrasova, A., Sanchez, G.M., Skrip, M.M., Collins, E.L., **Lawrimore, M.A.**, Vogler, J.B., Terando, A., Vukomanovic, J., Mitasova, H., and Meentemeyer, R.K. (2023). FUTURES v3: Scenarios of Future Patterns of Urbanization in Response to Sea Level Rise and Frequent Flooding Across the Southeast United States from 2020 to 2100: U.S. Geological Survey data release, https://doi.org/10.5066/P9BD5V4B.

Grants and Fellowships

PI: Sanchez, G.M.; **I: Lawrimore, M.A.** (Awarded) Amount: $10,000. Smart Zoning for Coastal Flood Adaptation and Resilience. NC Sea Grant program. September 2022 - September 2023.

Lawrimore, M.A. (Awarded) Amount: $4,000. University Graduate Fellowship (2021-2022). North Carolina State University.

Presentations

Invited Talks

Lawrimore, M.A., et al. (September 2024). Leveraging Machine Learning to Fill Zoning Data Gaps. Smart Cities Consortium. University of Texas at Austin. Oral presentation.

Lawrimore, M.A., et al. (February 2024). Creating Spatially Complete Zoning Maps Using Machine Learning. NCSU Geospatial Forum. Raleigh, NC. Oral presentation.

Conference Presentations

Lawrimore, M.A., et al. (April 2024). Creating Spatially Complete Zoning Maps Using Machine Learning. International Association for Landscape Ecology - North America. Oklahoma City, OK. Oral presentation.

Lawrimore, M.A., et al. (December 2023). Spatially Interactive Modeling of Urban Growth and Human Migration Driven by Future Flood Hazard Conditions. AGU23. San Fransico, CA. Oral presentation.

Lawrimore, M.A., et al. (October 2023). Forecasting Human Mobility and Development Patterns Driven by Future Flood Hazard Conditions. Envisioning Urban Futures Symposium. NCSU, Raleigh, NC. Poster presentation.

Lawrimore, M.A., et al. (March 2023). Creating Spatially Continuous Zoning Maps Using Machine Learning. CNR Graduate Research Symposium. NCSU, Raleigh, NC. Poster presentation.

Lawrimore, M.A., et al. (November 2022). Smart Zoning for Coastal Flood Adaptation and Resilience. North Carolina Coastal Conference. Raleigh, NC. Poster presentation.

Lawrimore, M.A., et al. (September 2022). Forecasting Scenarios of Human Mobility and Shifts in Development Patterns Driven by Future Flood Hazard Conditions. 2022 Southeast Climate Adaptation Science Symposium. Gulf Shores, AL. Poster presentation.

Research Engagement

Research Partnership and Collaboration

Understanding Zoning's Influence on Human Population — June 2024 - Present

- Partner: Human Geography Group | Oak Ridge National Laboratory
- Goal: Assess the influence of zoning regulations on human land use and population dynamics

Smart Zoning for Coastal Flood Adaptation and Resilience September 2022-September 2023

- Stakeholder: Town of Leland, NC, Economic and Community Development Department
- Partner: North Carolina Sea Grant
- Goal: Assess zoning regulations, flood exposure, and future development to identify areas for strategic interventions
- Summary Report: Lawrimore, M.A., Sanchez, G.M. (2023). Smart zoning for coastal flood resilience and adaptation. Submitted to the Community Development Planning Department at the Town of Leland, NC.

Civic Technology / Citizen Science Volunteer

Civic Hacking for Affordable Housing March 2023 - Present

- Organizations: Code with the Carolinas and the National Zoning Atlas
- Co-lead bi-weekly meetings to introduce volunteers to civic-technology volunteering
- Assist the organization in gathering zoning data for North and South Carolina and contribute to the National Zoning Atlas

Awards

North Carolina State University Center for Geospatial Analytics Travel Award (Fall 2024). Amount: $1000.

IALE-NA Student Travel Award (Spring 2024) Amount: $500.

North Carolina State University Center for Geospatial Analytics Travel Award (Fall 2023). Amount: $800.

First Prize - Outreach. Predicting Municipal Zoning in Wake County, NC. 2022. NCSU Graduate Student Infographic Contest.

Honorable mention. Flood-prone Development in Charleston, SC. 2022. NCSU Research Image Contest.
Work showcased across University promotional materials, websites, and social media 15+times from 2022-2024.

Leadership

Co-President May 2023 - May 2024

Geospatial Graduate Student Organization | NCSU Elected March 2023

- Organize and lead events, organization spokesperson, student advocate, student-administration liaison

Mentorship August 2021 - May 2022

Center for Geospatial Analytics | NCSU

- Mentored undergraduate research assistant on lab protocols, data and time management, and how to transition from undergraduate studies to the workforce

Technical Skills

- **Programming Languages**:
  Proficiency: Python, R
  Experience: C++, C, Bash, HTML
- **Geographic Information Systems (GIS)**:
  GRASS GIS, QGIS, ArcGIS Pro, ArcMap
- **Co-production**: Git, GitHub