Zhongying Wang

PhD Candidate

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Education

University of Colorado Boulder — *Boulder, CO*
PhD Geography — *Aug 2021 - present*
- Advisor: Dr. Morteza Karimzadeh

University of Southern California — *Los Angeles, CA*
MS Spatial Data Science — *Aug 2019 - May 2021*
- Research advisor: Dr. Orhun Aydin

East China Normal University — *Shanghai, China*
BS Geographic Science — *Sep 2015 - Jun 2019*

Research Interests

- GeoAI methods for environmental health and public health applications
- High-resolution air pollution estimation using satellite, ground, and simulation data
- Spatiotemporal deep learning and data fusion for geospatial prediction
- Geospatial foundation models and pretrained location encoders

Professional Experience

2025–Present	**Graduate Research Assistant** (PI: Dr. Esther Rolf), Dept. of Computer Science, University of Colorado, Boulder
2024–2025	**Graduate Teaching Assistant**, Dept. of Geography, University of Colorado, Boulder
2022–2023	**Graduate Research Assistant** (with Dr. James L Crooks and Dr. Morteza Karimzadeh), National Jewish Health
2021–2022	**Graduate Teaching Assistant**, Dept. of Geography, University of Colorado, Boulder
2020–2021	**Graduate Research Assistant** (with Dr. Orhun Aydin), Spatial Sciences Institute & Viterbi School of Engineering, University of Southern California
2017–2019	**Undergraduate Research Assistant**, School of Geographic Sciences, East China Normal University

Publications

Peer-Reviewed Journal Articles

Karimzadeh, M., **Wang, Z.** & Crooks, J. L. 2025. Performance and generalizability impacts of incorporating geolocation into deep learning for dynamic $PM_{2.5}$ estimation. *GIScience & Remote Sensing*. In press. Also available as arXiv:2505.18461.

Wang, Z., Ngo, T. D., Zoraghein, H., Lucas, B. & Karimzadeh, M. 2025. Integrating spatiotemporal features in LSTM for spatially informed COVID-19 hospitalization forecasting. *International Journal of Geographical Information Science*, pp. 1–38.

Wang, Z., Crooks, J. L., Regan, E. A. & Karimzadeh, M. 2025. High-resolution estimation of daily $PM_{2.5}$ levels in the contiguous US using Bi-LSTM with attention. *Remote Sensing*, 17(1), p. 126.

Yu, X., Rahman, M. M., **Wang, Z.**, Carter, S. A., Schwartz, J., Chen, Z., Eckel, S. P., Hackman, D., Chen, J.-C., Xiang, A. H., et al. 2022. Evidence of susceptibility to autism risks associated with early life ambient air pollution: A systematic review. *Environmental Research*, 208, p. 112590.

Cramer, E. Y., Huang, Y., Ray, E. L., Cornell, M., Bracher, J., Brennen, A., Rivadeneira, A. J. C., Gerding, A., House, K., **Wang, Z.**, et al. 2022. The United States COVID-19 Forecast Hub dataset. *Scientific Data*, 9(1), p. 462.

Peer-Reviewed Conference Proceedings

Wang, Z., de Lima, R. P., Crooks, J. L., Regan, E. A. & Karimzadeh, M. 2023. Increasing the spatial coverage of atmospheric aerosol depth measurements using random forest and mean filters. In *IGARSS 2023 – IEEE International Geoscience and Remote Sensing Symposium*, pp. 3928–3931. IEEE.

Wang, Z. & Aydin, O. 2020. Sensitivity analysis for COVID-19 epidemiological models within a geographic framework. In *Proceedings of the 1st ACM SIGSPATIAL International Workshop on Modeling and Understanding the Spread of COVID-19*, pp. 11–14.

Manuscripts Under Review

Preprints

Crooks, J. L., **Wang, Z.**, Karimzadeh, M., Lynch, D., Bhatt, S., DeMeo, D., Hersh, C., Baraghoshi, D. & Regan, E. 2025. Respiratory exacerbations increase with chronic $PM_{2.5}$ exposure in current and former smokers. *medRxiv preprint*. doi:10.1101/2025.05.27.25328449.

Manuscripts in Preparation

Wang, Z., Crooks, J. L., Regan, E. A. & Karimzadeh, M. Multi-Task CNN–LSTM with Spatiotemporal Encoders for High-Resolution Daily O_3, NO_2, and NO Estimation over the Contiguous United States.

Wang, Z., Rolf, E. & Karimzadeh, M. Physically Grounded Representation Learning via Fusion of Observations and Climate Simulations.

Awards, Fellowships, & Grants

2025	**UCGIS CyberTraining Workshop Travel Award**, NSF-funded CyberTraining for Disaster Management Network (Award #2321069), University Consortium for Geographic Information Science	*$ 600*
2024	**James A. and Jeanne B. DeSana Graduate Research Scholarship**, Dept. of Geography, University of Colorado Boulder	*$ 1000*
2024	**GPSG Travel Grant**, Graduate & Professional Student Government, University of Colorado Boulder	*$ 500*
2023	**James A. and Jeanne B. DeSana Graduate Research Scholarship**, Dept. of Geography, University of Colorado Boulder	*$ 1000*
2021	**Inductee, Nu Theta Chapter, Gamma Theta Upsilon Honor Society**, USC Nu Theta Chapter, Gamma Theta Upsilon	
2018	**Shanghai Municipal Government Scholarship (Top 1%)**, Shanghai Municipal Education Commission	
2016	**Mingde Scholarship**, China Soong Ching Ling Foundation	

Presentations

Conference Presentations

Wang, Z., Karimzadeh, M., Crooks, J. L. & Regan, E. A. 2023. High-resolution estimation of $PM_{2.5}$ concentration in the U.S. using attention-based LSTM. Oral presentation: Geospatial Big Data for Public Health session, AAG Annual Meeting, Denver, CO.

Wang, Z., Karimzadeh, M., Crooks, J. L. & Regan, E. A. 2023. Deep learning in air pollution downscaling: Case studies in $PM_{2.5}$ and ozone. Oral presentation: Kauvar Symposium, Denver, CO.

Wang, Z., Crooks, J. L., Regan, E. A. & Karimzadeh, M. 2024. High-resolution estimation of daily surface-level ozone concentration in the contiguous U.S. using CNN–LSTM. Poster: Enhancing Air Quality Monitoring with Advanced Technologies I session, AGU Fall Meeting, Washington, D.C.

Teaching Experience

Spr 2025	**GEOG 3023 Statistics and Geographic Data**, Teaching Assistant
Fall 2024	**GEOG 5100 Special Topics: Geography: Machine Learning & Spatial Data**, Teaching Assistant
Spr 2024	**GEOG 3023 Statistics and Geographic Data**, Teaching Assistant
Fall 2021	**GEOG 4043/5043 Advanced Geovisualization and Web Mapping**, Teaching Assistant

Services

Peer Review

Scientific Reports, Humanities and Social Sciences Communications, BMC Public Health