

# Zhongying Wang

PHD CANDIDATE

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## Education

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### University of Colorado Boulder

PHD GEOGRAPHY

- Advisor: Dr. Morteza Karimzadeh

Boulder, CO

Aug 2021 - present

### University of Southern California

MS SPATIAL DATA SCIENCE

- Research advisor: Dr. Orhun Aydin

Los Angeles, CA

Aug 2019 - May 2021

### East China Normal University

BS GEOGRAPHIC SCIENCE

Shanghai, China

Sep 2015 - Jun 2019

## Research Interests

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- 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

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

## Publications

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### 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<sub>2.5</sub> 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<sub>2.5</sub> 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<sub>2.5</sub> 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<sub>3</sub>, NO<sub>2</sub>, 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

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

## Presentations

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### CONFERENCE PRESENTATIONS

**Wang, Z.**, Karimzadeh, M., Crooks, J. L. & Regan, E. A. 2023. High-resolution estimation of PM<sub>2.5</sub> 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<sub>2.5</sub> 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

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- 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

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### PEER REVIEW

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