

Zhongrui Wang

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EDUCATION

- **University of Wisconsin-Madison** Madison, WI
Ph.D. - Mathematics Jul 2023 - present
Advisor: Prof. Nan Chen
- **Nanjing University** Nanjing, China
M.S. - Atmospheric Science Sep 2020 - present
Advisor: Prof. Lili Lei
- **Nanjing University** Nanjing, China
B.S. - Atmospheric Science Sep 2016 - Jun 2020

RESEARCH EXPERIENCE

- **Research Assistant** Nanjing University
Machine learning localization methods September 2021 - Present
 - Developed two CNN-based localization methods for an ensemble Kalman filter
 - Trained the proposed methods on PyTorch and obtained improved assimilation results when testing with the Lorenz05 model*Hybrid ensemble-variational assimilation* September 2020 - September 2021
 - Developed two integrated hybrid ensemble-variational algorithms in the ensemble Kalman filter framework
 - Tested the proposed algorithms using the Lorenz05 model and obtained a 13% error reduction compared to traditional hybrid methods
 - Published a paper on Monthly Weather Review and gave a talk on the 102nd AMS Annual Meeting
- **Undergraduate Research Assistant** Nanjing University
Evaluating large-eddy simulation of traffic-related air pollution with mobile sensors Jul 2019 - Sep 2019
- **Undergraduate Innovation Training Program** Nanjing University
Cluster analysis of flow regimes related to weak stratospheric polar vortex using SOMs Mar 2018 - Mar 2019

PUBLICATIONS

- **Wang, Z.**, Lei, L., Anderson, J. L., Tan, Z., and Zhang, Y. "CNN-based adaptive localization for an ensemble Kalman filter", *Journal of Advances in Modeling Earth Systems*, 2023
- **Wang, Z.**, Sun, H., Lei, L., and Tan, Z. "The importance of data assimilation components for initial conditions and subsequent error growth", *Science China Earth Sciences*, 2023
- Lei, L., **Wang, Z.**, and Tan, Z. "Integrated Hybrid Data Assimilation for an Ensemble Kalman Filter", *Monthly Weather Review* 149, 12, 4091-4105, 2021.
- Wang, S., Ma, Y., **Wang, Z.**, Wang, L., Chi, X., Ding, A., Yao, M., Li, Y., Li, Q., Wu, M., Zhang, L., Xiao, Y., and Zhang, Y. "Mobile monitoring of urban air quality at high spatial resolution by low-cost sensors: impacts of COVID-19 pandemic lockdown", *Atmospheric Chemistry and Physics* 21, 7199-7215, 2021.
- Zhang, Y., Ye, X., Wang, S., He, X., Dong, L., Zhang, N., Wang, H., **Wang, Z.**, Ma, Y., Wang, L., Chi, X., Ding, A., Yao, M., Li, Y., Li, Q., Zhang, L., and Xiao, Y. "Large-eddy simulation of traffic-related air pollution at a very high resolution in a mega-city: evaluation against mobile sensors and insights for influencing factors", *Atmospheric Chemistry and Physics* 21, 2917-2929, 2021.

PRESENTATIONS

- 102nd AMS Annual Meeting, 26th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS), 2022 (**talk**, remote)
- 4th National Symposium on Mesoscale Meteorology, Hangzhou, China, 2022 (poster)

TEACHING

- **Teaching Assistant** Nanjing University
Course: Dynamic Meteorology Fall 2021
- *Course: Math 114* University of Wisconsin-Madison
Fall 2023

PROGRAMMING

Python(numpy, scipy, Tensorflow, Pytorch)/MATLAB/linux/C/fortran