Zhongrui Wang

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Education

- **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 fiter 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*
  - Cross-calibrated the mobile sensors measurements using a gradient boost decision tree
- **Undergraduate Innovation Training Program** — Nanjing University
  Cluster analysis of 500-hPa Flow Regimes before polar vortex intensification 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*, 2022 (under review)
- **Wang, Z.**, Sun, H., Lei, L., and Tan, Z. "The importance of data assimilation components for initial conditions and subsequent error growth", *Journal of Advances in Modeling Earth Systems*, 2022 (under review)
- 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*

Awards

- People's Scholarship - 2017, 2018, 2019

Programming

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