

# Zhongrui Wang

Email: zrwang@smail.nju.edu.cn

Mobile: +86-153-6610-0021

Website: zhongruiw.github.io

## 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

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- **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
    - 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

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- **Wang, Z.**, Lei, L., and Tan, Z. “CNN-based adaptive localization for an ensemble Kalman filter”, 2022 (in preparation)
  - **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

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- 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

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- **Teaching Assistant** Nanjing University  
Course: Dynamic Meteorology Fall 2021

## AWARDS

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- People’s Scholarship - 2017, 2018, 2019

## PROGRAMMING

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