Curriculum Vitae

Meng Zhang

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EDUCATION

Ph.D., Atmospheric Science, Texas A&M University, United States	2021
M.S., Atmospheric Science, University of Wyoming, United States	2017
B.S., Atmospheric Science, Nanjing University, China	2015

PROFESSIONAL EXPERIENCE

Post Doctoral Fellow

University of Houston

• Analyze high-resolution model simulation and observational data to understand the aerosol and sea breeze impacts on deep convective cloud properties.

Staff Research Scientist

Lawrence Livermore National Laboratory

- Analyze remote sensing observational data and develop radar and lidar instrument simulators for global climate models.
- Lead the effort to participate in COMBLE Model-Observation Intercomparison Project on behalf of the E3SM.
- Conduct climate model simulations and analyze climate model data to understand high-profile scientific questions in the cloud and precipitation.

Postdoctoral Research Staff

Lawrence Livermore National Laboratory

- Conduct climate model simulations and analyze climate model outputs.
 - Collaborate with U.S. climate model developers across the Department of Energy (DOE) national laboratories to conduct climate model simulations and evaluate climate model data;
 - Modify the earth system model on state-of-the-art DOE supercomputers to address scientific questions related to climate change (e.g., cloud/precipitation, extreme events).

01/2024 - 01/2025

02/2025 – present

01/2021 - 01/2024

- Obtain and analyze decades-long ground-based and satellite meteorological observational datasets across multiple scales (e.g., from single location data to global data) to evaluate and validate model data;
- Collaboration with climate scientists to publish papers on high-impact peer-reviewed journal articles and present at domestic and international conferences.
- Coordinate the Climate and Weather Seminar Series by connecting with atmospheric scientists across universities and national labs and hosting seminars.

Summer Student Internship

- Conducted climate model simulations and analyzed climate model outputs.
 Teamwork with U.S. DOE model developers and modified model source code to address model errors and explore scientific questions;
 - Obtained and analyzed ground-based meteorological observations to validate model simulations;
- Published one first-author peer-reviewed paper.
- Received the Poster Award at the Student Poster Symposium.

Summer Student Internship

Lawrence Livermore National Laboratory

Lawrence Livermore National Laboratory

- Conducted climate model simulations and analyzed climate model outputs.
 - Learned to run climate models in weather forecast mode (i.e., a unique model approach) in one month;
 - Teamwork with U.S. DOE model developers and modified model source code to test an improved model physics parameterization;
 - Obtained and analyzed ground-based meteorological observations to validate model simulations;
- Generated a scientific report on climate model data analysis and gave an oral presentation to the group;

OTHER EXPERIENCE

Graduate Research Assistant Texas A&M University

Graduate Research Assistant University of Wyoming

RESEARCH INTERESTS

- Cloud microphysics, convection and precipitation, extreme precipitation.
- Climate model evaluation and development.
- Aerosol and cloud interactions in mixed-phase clouds.

06/2018 - 08/2018

05/2019 - 08/2019

08/2019 - 12/2020

08/2015 - 08/2019

KEY SKILLS

- Proficient numerical climate modeling skills and experience in climate model data processing:
 - CESM/CAM and E3SM/EAM (in AMIP and coupled global simulation, nudging simulation, single column model, weather forecast mode);
 - DP-SCREAM (cloud-resolving scale model);
 - WRF;
- Advanced level computer coding skills: Python (numpy, pandas, xarray, matplotlib, scipy), Fortran, IDL, NCL, and C;
- Proficient skills in LINUX environment on state-of-the-art DOE supercomputers and parallel computation for climate models;
- Statistical analysis and visualization of big climate model and observational data;
- Machine Learning Algorithms: Classification, Regression (linear, logistic, lasso, ridge), Clustering, Decision Tree, and Random Forest.
- Effective English communication skills;

AWARDS

- PLS FY24 Summer Directorate Award at Lawrence Livermore National Laboratory (2024)
- PLS FY23 Summer Directorate Award at Lawrence Livermore National Laboratory (2023)
- Poster Award of Student Poster Symposium at Lawrence Livermore National Laboratory (2019)

PEER REVIEWED PUBLICATIONS

- Zhang, T., Morcrette, C., Zhang, M., Lin, W., Xie, S., Liu, Y., Van Weverberg, K., & Rodrigues, J. (2025). A Fortran–Python interface for integrating machine learning parameterization into earth system models, *Geoscientific Model Development*. 18, 1917–1928. https://doi.org/10.5194/gmd-18-1917-2025
- 12. **Zhang, M.**, Xie, S., Feng, Z., Terai, C., Lin, W., C. Tao. et al. (2024). Mesoscale Convective Systems Represented in High Resolution E3SMv2 and Impacts of New Cloud and Convection Parameterizations. *Journal of Geophysical Research: Atmospheres.* 129, e2024JD040828. https://doi.org/10.1029/2024JD040828
- Zheng, X., Zhang, Y., Klein, S. A., Zhang, M., Zhang, Z., Deng, M., et al. (2024). Using satellite and ARM observations to evaluate cold air outbreak cloud transitions in E3SM global storm-resolving simulations. *Geophysical Research Letters*, 51, e2024GL109175. https://doi.org/10.1029/2024GL109175
- Zhang, Y., Xie, S., Qin, Y., Lin, W., Golaz, J.-C., Zheng, X., Ma, P.-L., Qian, Y., Tang, Q., Terai, C., & Zhang, M. (2024). Understanding Changes in Cloud Simulations from E3SM Version 1 to Version 2. *Geosci. Model Dev.*, 17, 169–189. https://doi.org/10.5194/gmd-17-169-2024

- Tao, C., Xie, S., Ma, H.-Y., Bechtold, P., Cui, Z., Vaillancourt, P. A., et al. (2024). Diurnal cycle of precipitation over the tropics and central United States: intercomparison of general circulation models. *Quarterly Journal of the Royal Meteorological Society*, 150(759), 911(759), 911–936. https://doi.org/10.1002/qj.4629
- 8. **Zhang, M.**, Xie, S., Liu, X., Zhang, D., Lin, W., Zhang, K., et al. (2023). Evaluating EAMv2 Simulated High Latitude Clouds Using ARM Measurements in the Northern and Southern Hemispheres. *Journal of Geophysical Research: Atmospheres*. 128, e2022JD038364. https://doi.org/10.1029/2022JD038364
- Tang, Q., Golaz, J.-C., Van Roekel, L. P., Taylor, M. A., Lin, W., Hillman, B. R., Ullrich, P. A., Bradley, A. M., Guba, O., Wolfe, J. D., Zhou, T., Zhang, K., Zheng, X., Zhang, Y., Zhang, M., Wu, M., Wang, H., Tao, C., Singh, B., Rhoades, A. M., Qin, Y., Li, H.-Y., Feng, Y., Zhang, Y., Zhang, C., Zender, C. S., Xie, S., Roesler, E. L., Roberts, A. F., Mametjanov, A., Maltrud, M. E., Keen, N. D., Jacob, R. L., Jablonowski, C., Hughes, O. K., Forsyth, R. M., Di Vittorio, A. V., Caldwell, P. M., Bisht, G., McCoy, R. B., Leung, L. R., and Bader, D. C. (2022). The Fully Coupled Regionally Refined Model of E3SM Version 2: Overview of the Atmosphere, Land, and River Results, *Geosci. Model Dev.*, 16, 3953–3995. https://doi.org/10.5194/gmd-16-3953-2023
- Zhao, X., Liu, X., Burrows, S., DeMott, P. J., Diao, M., McFarquhar, G. M., Patade, S., Phillips, V., Roberts, G. C., Sanchez, K. J., Shi, Y., & Zhang, M. (2023). Important ice processes are missed by the Community Earth System Model in Southern Ocean mixedphase clouds: Bridging SOCRATES observations to model developments. *Journal of Geophysical Research: Atmospheres*, 128, e2022JD037513. https://doi.org/10.1029/2022JD037513
- Golaz, J.-C., Van Roekel, L. P., Zheng, X., Roberts, A. F., Wolfe, J. D., Lin, W., et al. (2022). The DOE E3SM Model version 2: Overview of the physical model and initial model evaluation. *Journal of Advances in Modeling Earth Systems*, 14, e2022MS003156. https://doi.org/10.1029/2022MS003156
- Zhang, M., Xie, S., Liu, X., Lin, W., Zheng, X., Golaz, J.-C., & Zhang,
 Y. (2022). Cloud phase simulation at high latitudes in EAMv2: Evaluation using
 CALIPSO observations and comparison with EAMv1. *Journal of Geophysical Research: Atmospheres*, 127, e2022JD037100. https://doi.org/10.1029/2022JD037100
- Zhang, M., Xie, S., Liu, X., Lin, W., Zhang, K., Ma, H.-Y., et al. (2020). Toward Understanding the Simulated Phase Partitioning of Arctic Single-Layer Mixed-Phase Clouds in E3SM. *Earth and Space Science*. 7, e2020EA001125. https://doi.org/10.1029/2020EA001125
- 2. **Zhang, M.**, Liu, X., Diao, M., D'Alessandro, J. J., Wang, Y., Wu, C., et al. (2019). Impacts of Representing Heterogeneous Distribution of Cloud Liquid and Ice on Phase

Partitioning of Arctic Mixed-Phase Clouds with NCAR CAM5. *Journal of Geophysical Research: Atmospheres*, 124, 13071-13090. https://doi.org/10.1029/2019JD030502

 Zhang, M., Huang, A., Ji, X., Wang, M., & Tan, Y. (2016). Validation of satellite precipitation products over Qinghai-Xizang Plateau region, *Plateau Meteorology*, 35(1): 34-43. https://doi.org/10.7522/j.issn.1000-0534.2014.00152 (in Chinese)

CONFERENCE PRESENTATIONS

- Zhang, M., Xie, S., Feng, Z., Terai, C., Lin, W., Chen, C., Fan, J., Golaz, J-C., Leung, R., Richter, J., Shan, Y., Song, X., Tang, Q., Zhang, G. Mesoscale Convective Systems in E3SMv2 with Default and New Cloud Microphysics and Convection Parameterizations. (Poster Presentation). AGU 2023 Fall Meeting, San Francisco, California
- 2023 **Zhang, M.**, Xie, S., Liu, X., Zhang, D., Lin, W., Zhang, K., Golaz, J-C., Zheng, X., Zhang, Y. Evaluating EAMv2 simulated stratiform mixed-phase clouds at Northern and Southern high latitudes using ARM measurements. (Poster Presentation). 2023 Joint ARM User Facility/ASR PI Meeting, Rockville, Maryland
- 2023 Zhang, M., Xie, S., Feng, Z., Lin, W., Terai, C., Leung, R., Golaz, J-C., Tang, Q., Zhang, G., Song, X., Fan, J., Shan, Y., Chen, J., Richter, Y. Investigating the impact of new physics parameterizations on the simulation of mesoscale convective systems in E3SM. (Poster Presentation). *E3SM All-Hands Meeting, Denver, Colorado*
- 2022 **Zhang, M.**, Xie, S., Liu, X., Lin, W., Zheng, X., Golaz, J-C, Zhang, Y. Cloud Phase Simulation at High Latitudes in EAMv2: Evaluation using CALIPSO Observations and Comparison with EAMv1. (Poster Presentation). *AGU 2022 Fall Meeting, Chicago, Illinois*
- 2022 Zhang, M., Xie, S., Liu, X., Lin, W., Zhang, K., Ma, H.-Y., Zheng, X., and Zhang, Y. Toward Understanding the Characteristics of Mixed-Phase Clouds Simulated in E3SM with ARM MPACE Observations. (Poster Presentation). PAN-GASS Conference, Monterey, California.
- 2020 **Zhang, M.**, Liu, X., Wang, Z., Zhang, D., and Xie, S. Hemispheric differences in macrophysical and microphysical properties of low-level mixed-phase clouds from observations and E3SM simulations. (Poster Presentation). *AGU 2020 Fall Meeting, virtual.*
- 2019 Zhang, M., Xie, S., Liu, X., Lin, W., Zhang, K., Ma, H.-Y., Zheng, X., and Zhang, Y. Toward Understanding the Characteristics of Mixed-Phase Clouds Simulated in E3SM with ARM MPACE Observations. (Oral Presentation). AGU 2019 Fall Meeting, San Francisco, California.

- 2018 **Zhang, M.**, Liu, X., Xie, S., Lin, W., Diao, M., Ma, H.-Y., Zheng, X., and D'Alessandro, J. Testing heterogeneous mixing between cloud liquid and ice in mixed-phase clouds using E3SM with short-term hindcast approach. (Poster Presentation). *AGU 2018 Fall Meeting, Washington, D.C.*
- 2017 **Zhang, M.**, Liu, X., Zhang, D., Wang, Z., and Wang, Y. Impacts of Subgrid Heterogeneous Mixing between Cloud Liquid and Ice on the Wegner-Bergeron-Findeisen Process and Mixed-phase Clouds in NCAR CAM5. (Oral Presentation). *AGU 2017 Fall Meeting, New Orleans, Louisiana.*