Curriculum Vitae

Yunji Zhang, Ph.D.

Center for Advanced Data Assimilation and Predictability Techniques (ADAPT),
and Department of Meteorology and Atmospheric Science
The Pennsylvania State University
University Park, PA 16801

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EDUCATION

2016 Ph.D. Meteorology Peking University, Beijing, China
Dissertation: *Practical and Intrinsic Predictability of a Severe Convective Thunderstorm Event at Storm Scales*
Advisor: Prof. Zhiyong Meng, Ph.D.

2010 B.S. Atmospheric Science Peking University, Beijing, China
Thesis: *Statistics of the Squall Lines Preceding Landfalling Tropical Cyclones in China*
Advisor: Prof. Zhiyong Meng, Ph.D.

ACADEMIC EXPERIENCE

2022–Present Assistant Professor
The Pennsylvania State University

2019–Present Member of the faculty of the Graduate School
The Pennsylvania State University

2019–Present Assistant Director
Penn State Center for Advanced Data Assimilation and Predictability Techniques

2018–2022 Assistant Research Professor
The Pennsylvania State University

2016–2018 Post-doctoral Research Scholar
The Pennsylvania State University

2012–2014 Visiting Ph.D. Student
The Pennsylvania State University

2010–2016 Ph.D. Candidate and Graduate Research Assistant
Peking University

TRAINING EXPERIENCE

July 2011, Student Participant, *Summer School for Advanced Mathematical Methods to Study Atmospheric Dynamical Processes and Predictability*, World Meteorological Organization (WMO): The Observing System Research and Predictability Experiment (THORPEX)/ Predictability and Dynamical Processes (PDP), Banff, Canada.

JOURNAL PUBLICATIONS

20. **Zhang, Y.**, H. Yu, M. Zhang, Y. Yang, and Z. Meng, 2022: Uncertainties and error growth in forecasting the record-breaking rainfall in Zhengzhou, Henan on 19–20 July 2021. *Science China: Earth Sciences*, in press.
19. Eure, K. C., P. D. Mykolajtchuk, **Y. Zhang**, D. J. Stensrud, F. Zhang, S. J. Greybush, and M. R. Kumjian, 2022: Simultaneous assimilation of radar and satellite observations to improve ensemble forecasts of convection initiation. *Monthly Weather Review*, in review.
18. DeHart, J., M. Bell, **Y. Zhang**, and Y.-L. Chen, 2022: Mechanisms contributing to the heavy rainfall associated with a Mei-yu front near Taiwan. *Monthly Weather Review*, in review.
17. **Zhang, Y.**, E. E. Clothiaux, and D. J. Stensrud, 2022: Correlation structures between satellite all-sky infrared brightness temperatures and the atmospheric states at storm scales. *Advances in Atmospheric Sciences*, **39**, 714–732.
16. **Zhang, Y.**, S. B. Sieron, Y. Lu, X. Chen, R. G. Nystrom, M. Minamide, M.-Y. Chan, C. M. Hartman, Z. Yao, J. H. Ruppert, Jr., A. Okazaki, S. J. Greybush, E. E. Clothiaux, and F. Zhang, 2021c: Ensemble-based assimilation of satellite all-sky microwave radiances improves intensity and rainfall predictions of Hurricane Harvey (2017). *Geophysical Research Letters*, **48**, e2021GL096410.
15. **Zhang, Y.**, X. Chen, and Y. Lu, 2021b: Structure and dynamics of ensemble correlations for satellite all-sky observations in an FV3-based global-to-regional nested convection-permitting ensemble forecast of Hurricane Harvey. *Monthly Weather Review*, **149**, 2409–2430.
14. **Zhang, Y.**, D. J. Stensrud, and E. E. Clothiaux, 2021a: Benefits of the Advanced Baseline Imager (ABI) for ensemble-based analysis and prediction of severe thunderstorms. *Monthly Weather Review*, **149**, 313–332.
13. Meng, Z., F. Zhang, D. Luo, Z. Tan, J. Fang, J. Sun, X. Shen, **Y. Zhang**, S. Wang, W. Han, K. Zhao, L. Zhu, Y. Hu, H. Xue, Y. Ma, L. Zhang, J. Nie, R. Zhou, S. Li, H. Liu, Y. Zhu, 2019: Review of Chinese atmospheric science research over the past 70 years: Synoptic meteorology. *Science China: Earth Sciences*, **62**, 1946–1991.
12. **Zhang, Y.**, D. J. Stensrud, and F. Zhang, 2019: Simultaneous assimilation of radar and all-sky satellite radiance observations for convection-allowing ensemble analysis and prediction of severe thunderstorms. *Monthly Weather Review*, **147**, 4389–4409.
11. Hayatbini, N., K.-L. Hsu, S. Sorroshian, **Y. Zhang**, and F. Zhang, 2019: Effective cloud detection and segmentation using a gradient-based algorithm for satellite imagery; Application to improve PERSIANN-CCS. *Journal of Hydrometeorology*, **20**, 901–913.
10. Bai, L., Z. Meng, Y. Huang, **Y. Zhang**, S. Niu, and T. Su, 2019: Convection initiation resulting from the interaction between a quasi-stationary dryline and intersecting gust fronts: A case study. *Journal*

of Geophysical Research, **124**, 2379–2396.

9. **Zhang, Y.**, F. Zhang, and D. J. Stensrud, 2018: Assimilating all-sky infrared radiances from GOES-16 ABI using an ensemble Kalman filter for convection-allowing severe thunderstorms prediction. *Monthly Weather Review*, **146**, 3363–3381.
8. Pan, J., D. Teng, F. Zhang, L. Zhou, L. Luo, Y. Weng, and **Y. Zhang**, 2018: Dynamics of local extreme rainfall of super Typhoon Soudelor (2015) in East China. *Science China: Earth Sciences*, **61**, 572–594.
7. **Zhang, Y.**, and F. Zhang, 2018: A review on the ensemble-based data assimilations for severe convective storms. *Advances in Meteorological Science and Technology (in Chinese)*, **8**, 38–52.
6. **Zhang, Y.**, F. Zhang, D. J. Stensrud, and Z. Meng, 2016: Intrinsic predictability of the tornadic thunderstorm event in Oklahoma on 20 May 2013 at storm scales. *Monthly Weather Review*, **144**, 1271–1298.
5. Zhu, L., Q. Wan, X. Shen, Z. Meng, F. Zhang, Y. Weng, J. Sippel, Y. Gao, **Y. Zhang**, and J. Yue, 2016: Prediction and predictability of high-impact western Pacific landfalling tropical cyclone Vicente (2012) through convection-permitting ensemble assimilation of Doppler radar velocity. *Monthly Weather Review*, **144**, 21–43.
4. **Zhang, Y.**, F. Zhang, D. J. Stensrud, and Z. Meng, 2015: Practical predictability of the 20 May 2013 tornadic thunderstorm event in Oklahoma: Sensitivity to synoptic timing and topographical influence. *Monthly Weather Review*, **143**, 2973–2997.
3. **Zhang, Y.**, Z. Meng, F. Zhang, and Y. Weng, 2014: Predictability of tropical cyclone intensity evaluated through 5-yr forecasts with a convection-permitting regional-scale model in the Atlantic Basin. *Weather and Forecasting*, **29**, 1003–1023.
2. Meng, Z., D. Yan, and **Y. Zhang**, 2013: General features of squall lines in East China. *Monthly Weather Review*, **141**, 1629–1647.
1. Meng, Z., and **Y. Zhang**, 2012: On the squall lines preceding landfalling tropical cyclones in China. *Monthly Weather Review*, **140**, 445–470.

INVITED PRESENTATIONS

3. **Zhang, Y.**, 2019: How well can we predict severe thunderstorms? *Department Colloquium*, Department of Meteorology and Atmospheric Science, Pennsylvania State University, University Park, PA, September 2019.
2. **Zhang, Y.**, 2019: Ensemble data assimilation for severe thunderstorms. *Multiscale Convection Summer School*, Beijing, China, May 2019.
1. **Zhang, Y.**, D. J. Stensrud, and F. Zhang, 2019: Improving analysis and probabilistic prediction of a severe thunderstorm event using remote-sensing observations with an ensemble Kalman filter. *The 3rd Workshop of the Severe Weather International Consortium*, Beijing, China, May 2019.

CONFERENCE PRESENTATIONS

26. **Zhang, Y.**, H. Yu, M. Zhang, Y. Yang, and Z. Meng, 2022: Uncertainties and error growth in forecasting the record-breaking rainfall in Zhengzhou, Henan on 19–20 July 2021. The 19th AOGS Annual Meeting, virtual meeting, August 2022.

25. **Zhang, Y.**, S. Sieron, Y. Lu, X. Chen, R. G. Nystrom, M. Minamide, M. Y. Chan, C. M. Hartman, Z. Yao, J. H. Ruppert Jr., A. Okazaki, S. J. Greybush, E. E. Clothiaux, and F. Zhang, 2022: Improving forecasts of Hurricane Harvey (2017) with ensemble-based assimilation of all-sky microwave observations. *The 35th Conference on Hurricanes and Tropical Meteorology*, New Orleans, LA, May 2022.
24. **Zhang, Y.**, R. Rios-Berrios, X. Chen, and M. Bell, 2022: Real-time global and regional convection-permitting forecasts for the PRECIP field campaign. *International Conference on Heavy Rainfall and Tropical Cyclone in East Asia*, virtual meeting, March 2022.
23. Hartman, C. M., X. Chen, and **Y. Zhang**, 2022: Impacts of adaptive vertical localization of GOES-16 all-sky brightness temperature observations on the forecasts of severe weather events using an EnKF. *The 102nd AMS Annual Meeting*, virtual meeting, January 2022.
22. **Zhang, Y.**, M. Zhang, H. Yu, Y. Yang, and Z. Meng, 2022: Predictability of the Extremely Heavy Rainfall in Henan Province of China on 20 July 2021. *The 102nd AMS Annual Meeting*, virtual meeting, January 2022.
21. **Zhang, Y.,** S. Sieron, Y. Lu, X. Chen, E. E. Clothiaux, and D. J. Stensrud, 2022: Improving weather hazards predictions with ensemble assimilation of all-sky microwave observations. *The 102nd AMS Annual Meeting*, virtual meeting, January 2022.
20. **Zhang, Y.,** X. Chen, and M. M. Bell, 2022: Real-time PSU WRF-EnKF system performance during the PRECIP field campaign with the assimilation of all-sky infrared radiances: Two years, two regions. *The 102nd AMS Annual Meeting*, virtual meeting, January 2022.
19. **Zhang, Y.**, S. B. Sieron, Y. Lu, X. Chen, R. G. Nystrom, and E. E. Clothiaux, 2021: Ensemble correlation structure and data assimilation of satellite all-sky microwave observations for the analysis and prediction of Hurricane Harvey (2017). *The 34th Conference on Hurricanes and Tropical Meteorology*, virtual meeting, May 2021.
18. **Zhang, Y.**, E. E. Clothiaux, and D. J. Stensrud, 2021: Correlation structure between satellite all-sky infrared brightness temperatures and atmospheric states at storm scales. *The 101st AMS Annual Meeting*, virtual meeting, January 2021.
17. **Zhang, Y.**, and X. Chen, 2021: Performance of the teal-time PSU WRF-EnKF system during the PRECIP field campaign with the assimilation of all-sky infrared radiances from Himawari-8. *The 101st AMS Annual Meeting*, virtual meeting, January 2021.
16. **Zhang, Y.**, D. J. Stensrud, and E. E. Clothiaux, 2021: Benefits of the Advanced Baseline Imager (ABI) for Ensemble-Based Analysis and Prediction of Severe Thunderstorms. *The 101st AMS Annual Meeting*, virtual meeting, January 2021.
15. **Zhang, Y.**, M. Minamide, S. Sieron, Y. Lu, R. Nystrom, M.-Y. Chan, C. Hartman, Z. Yao, E. Clothiaux, D. J. Stensrud, X. Chen, S. Greybush, F. Zhang, 2020: Ensemble-based all-sky infrared and microwave radiance assimilation for the analysis and prediction of tropical cyclones and severe thunderstorms. *The 4th ECMWF/JCSDA Workshop on Assimilating Satellite Cloud and Precipitation Observations for NWP*, ECMWF, Reading, UK, February 2020.
14. **Zhang, Y.**, D. J. Stensrud, and F. Zhang, 2020: Simultaneous assimilation of radar and all-sky satellite infrared radiance observations for convection-allowing ensemble analysis and prediction of severe thunderstorms. *The 100th AMS Annual Meeting*, Boston, MA, January 2020.
13. **Zhang, Y.**, D. J. Stensrud, and F. Zhang, 2019: Simultaneous assimilation of radar and all-sky satellite radiance observations for convection-allowing ensemble analysis and prediction of severe

thunderstorms. *The 18th Conference on Mesoscale Processes*, Savannah, GA, July 2019.

12. **Zhang, Y.**, D. J. Stensrud, F. Zhang, J. Sorber, J. Banghoff, K. C. Eure, and P. Mykolajtchuk, 2019: Improving probabilistic prediction of convection initiation using boundary layer height observations derived from dual-polarized Doppler weather radars with an ensemble Kalman filter. *The 18th Conference on Mesoscale Processes*, Savannah, GA, July 2019.
11. **Zhang, Y.**, D. J Stensrud, and F. Zhang, 2018: Simultaneous assimilation of WSR-88D radar and all-sky GOES16 ABI infrared radiance observations using EnKF for severe thunderstorm prediction. *Second ADAPT Symposium on Advanced Understanding, Monitoring and Prediction of Weather, Climate and Environment Systems*, University Park, December 2018.
10. **Zhang, Y.**, F. Zhang, M. Minamide, and D. J. Stensrud, 2018: Assimilating all-sky infrared radiances from GOES-16 ABI using an ensemble Kalman filter for convection-allowing severe thunderstorms prediction. *2018 AGU Fall Meeting*, Washington, D. C., December 2018.
9. **Zhang Y.**, F. Zhang, and D. J. Stensrud, 2018: Assimilating all-sky infrared radiance from GOES-16 ABI using ensemble Kalman filter for convection-permitting severe thunderstorm predictions. *The 8th EnKF Data Assimilation Workshop*, Montréal, Québec, Canada, May 2018.
8. **Zhang, Y.**, and F. Zhang, 2017: Correlation length scale and data assimilation of radar and satellite observations in convection-permitting ensemble simulations of a severe thunderstorm event. *The 17th Conference on Mesoscale Processes*, San Diego, CA, July 2017.
7. **Zhang, Y.**, and F. Zhang, 2017: EnKF assimilation of synthetic ABI infrared radiance observations at storm scales with vertical localization. *PSU-UMD Data Assimilation Workshop*, College Park, MD, June 2017.
6. **Zhang, Y.**, F. Zhang, D. J. Stensrud, and Z. Meng, 2015: Intrinsic predictability of the 20 May 2013 tornadic thunderstorm event in Oklahoma at storm scales. *The 16th Conference on Mesoscale Processes*, Boston, MA, August 2015.
5. **Zhang, Y.**, F. Zhang, D. J. Stensrud, and Z. Meng, 2015: Mesoscale practical predictability of the 20 May 2013 tornadic thunderstorm event in Oklahoma. *The 16th Conference on Mesoscale Processes*, Boston, MA, August 2015.
4. **Zhang, Y.**, and F. Zhang, 2014: Ensemble assimilation and predictability of a tornadic supercell event. *The 6th EnKF Workshop*, Buffalo, NY, May 2014.
3. **Zhang, Y.**, F. Zhang, D. J. Stensrud, and Z. Meng, 2014: Assimilating WSR-88D radial velocity data into WRF model with ensemble Kalman filter: The 20 May 2013 Moore, Oklahoma tornadic supercell. *The 94th AMS Annual Meeting*, Atlanta, GA, February 2014.
2. **Zhang, Y.**, Z. Meng, F. Zhang, and Y. Weng, 2014: Predictability of tropical cyclone intensity evaluated through 5-year forecasts with a convection-permitting regional-scale model in the Atlantic basin. *The 94th AMS Annual Meeting*, Atlanta, GA, February 2014.
1. **Zhang, Y.**, and Z. Meng, 2011: On the squall lines preceding land-falling tropical cyclones. *The International Conference on Mesoscale Convective Systems and High-Impact Weather in East Asia (ICMCS-8)*, Nagoya, Japan, March 2011.

AWARDS

4. August 2019, *Best Very Early Career Presentation*, 18th Conference on Mesoscale Processes, The American Meteorological Society.

3. July 2016, *Outstanding Ph.D. Dissertation*, Peking University.
2. November 2015, *Xie Yibing Award of Young Scientists in Meteorological Science and Technology*, Department of Atmospheric and Oceanic Sciences, Peking University.
1. August 2015, *Student Presentation Competition: 1st Place Poster*, 16th Conference on Mesoscale Processes, The American Meteorological Society.

GRANTS AND FUNDINGS

5. Co-I, NASA 80NSSC22K0613, 02/04/2022–02/03/2025, $488,081, "Understanding the dynamics and predictability of tropical cyclones using PMM microwave observations"
4. Co-PI, NASA 80NSSC19K0728, 03/26/2019–03/25/2023, $526,986, "Advanced Hurricane Analysis and Prediction through Convection-Allowing Ensemble Assimilation of Multi-Sensor All-Sky Satellite Radiance Observations"
3. Co-PI and PI, NSF AGS-1712290, 8/15/2017–7/31/2022, $816,099, "Coupling of Gravity Waves and Convection, and Their Impacts on the Dynamics and Predictability of Multiscale Processes Associated with Moist Baroclinic Jet-Front Systems"
2. Co-I, NASA NNX16AD84G, 01/21/2016–01/20/2020, $509,698, "Improving Weather Prediction and Precipitation Estimation through Advanced Ensemble Assimilation Using GPM Microwave Brightness Temperature with Coherent Microphysics Parameterization and Radiative Transfer Models"
1. PI, NASA NNX15AQ51G, 01/01/2016–12/31/2019, $515,496, "Assimilating GOES-R Satellite Observations with Advanced Ensemble-Based Data Assimilation for Prediction and Predictability of Tornadic Thunderstorms"

PROFESSIONAL ACTIVITIES

Field campaign participants:

2020 – Present: Prediction of Rainfall Extremes Campaign In the Pacific (PRECIP)

Professional committee member:

2021 – Present, Committee on Mesoscale Processes, the American Meteorology Society

Graduate student advisor:

Jordan Rendon	M.S., 2022	
Keenan Eure	M.S., 2021	(Co-advised with David J. Stensrud)
Paul Mykolajtchuk	M.S., 2021	(Co-advised with David J. Stensrud)

Graduate student committee member:

Katriella Tenembaum	M.S., 2022	The Pennsylvania State University

Zhu Yao	M.S., 2022	The Pennsylvania State University
Jonathan Unger	M.S., 2021	The Pennsylvania State University

Schreyer honors thesis advisor:

Alisha Wellington	2022	(Co-advised with Xingchao Chen)

Research Experience for Undergraduates mentor:

Phoebe Lin	2022	Massachusetts Institute of Technology
Faith Colbert	2021	The North Carolina Agricultural and Technical State University
Alisha Wellington	2020	The Pennsylvania State University
Anie Shahnazarian	2018	The University of Maryland, Baltimore County

Grant application reviewer:

National Science Foundation (NSF); National Oceanic and Atmospheric Administration (NOAA); National Aeronautics and Space Administration (NASA)

Journal editor:

Monthly Weather Review, associate editor, 2022–present.

Journal article reviewer:

Monthly Weather Review, Journal of Applied Meteorology and Climatology, Weather and Forecasting, Journal of Geophysical Research, Quarterly Journal of the Royal Meteorological Society, Journal of the Meteorological Society of Japan, Atmospheric Research, Science China Earth Sciences, Journal of Meteorological Research, Dynamics of Atmospheres and Oceans, Theoretical and Applied Climatology

Conference chairs and participants:

January 2022, Session Chair, *19th Conference on Mesoscale Processes*, virtual meeting
July 2019, Session Chair, *18th Conference on Mesoscale Processes*, Savannah, GA
May 2019, Session Chair, *3rd Workshop of Severe Weather International Consortium*, Beijing, China
August 2015, Session Chair, *16th Conference on Mesoscale Processes*, Boston, MA
June 2011, Student Participant, *The 61st Lindau Nobel Laureate Meetings*, Lindau, Germany

Professional organization member:

2019 – Present, Member, American Association for the Advancement of Science
2019 – Present, Member, Chinese Meteorology Society
2017 – Present, Member, American Geophysical Union

2012 – Present, Member, American Meteorological Society