Jonathan Poterjoy

Associate Professor and Graduate Program Director
Department of Atmospheric and Oceanic Science
University of Maryland

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EDUCATION

Ph.D., Meteorology August 2014
The Pennsylvania State University, University Park, PA

B.S., Meteorology and Applied Mathematics, *magna cum laude* May 2009
Millersville University of Pennsylvania, Millersville, PA

APPOINTMENTS

Associate Professor and Graduate Program Director July 2024 – present
Department of Atmospheric and Oceanic Science, University of Maryland, College Park, MD

Affiliate Faculty Member April 2025 – present
Applied Mathematics & Statistics, and Scientific Computation Program, University of Maryland, College Park, MD

Assistant Professor August 2018 – July 2024
Department of Atmospheric and Oceanic Science, University of Maryland, College Park, MD

National Research Council Research Associateship Postdoctoral Fellow March 2017 – August 2018
NOAA Atlantic Oceanographic and Meteorological Laboratory, Hurricane Research Division, Miami, FL

Postdoctoral Research Associate August 2016 – March 2017
Cooperative Institute for Mesoscale Meteorological Studies, NOAA National Severe Storms Laboratory, and the University of Oklahoma, Norman, OK

Advanced Study Program Postdoctoral Fellow August 2014 – August 2016
National Center for Atmospheric Research, Boulder, CO

RESEARCH INTERESTS

Data assimilation for Earth system prediction; non-Gaussian, kernel-based, and generative machine learning methods for state and parameter estimation; assimilation of observations with complex or unknown measurement operators; uncertainty quantification and observation error estimation; observing system design; sea ice and polar prediction; tropical cyclones and convective-scale weather

HONORS AND AWARDS

Graduate Program Mentoring Excellence Award, University of Maryland Graduate School (awarded to the AOSC graduate program; nominated as Graduate Program Director) 2026

Maryland Research Excellence Celebration Honoree, University of Maryland (recognizing faculty who elevated the visibility and reputation of UMD research) 2023

National Science Foundation CAREER Award 2019

National Research Council Postdoctoral Fellowship, NOAA Atlantic Oceanographic and Meteorological Laboratory — 2017 – 2018

Advanced Study Program Postdoctoral Fellowship, National Center for Atmospheric Research — 2014 – 2016

Awards Received by Advisees

UMD MPower Early Scholars Investment Fund Award, Sarah Loughran — 2026

Naval Research Enterprise Internship Program (NREIP), NRL Marine Meteorology Division: Andrew Walsworth (2020, 2021), Joseph Knisely (2022, 2023), Alvin Cheung (2024, 2025, 2026) — 2020 – 2026

Churchill Scholarship (one of 16 U.S. recipients), Malcolm Maas — 2025

NSF Graduate Research Fellowship, Maria Nikolaitchik — 2025

UMD Graduate School Flagship Fellowship: Henry Santer (2021), Alvin Cheung (2022), Dylan Major (2024), Maria Nikolaitchik (2025) — 2021 – 2025

Barry Goldwater Scholarship, Malcolm Maas — 2024

NASA Goddard CRESST II Special Thanks and Recognition (STAR) Award, Sarah Loughran — 2024

NOAA WPO WINGS Dissertation Fellowship (inaugural cohort), Joseph Knisely — 2023

NRAO Student Observing Support (SOS) Award, Sarah Loughran — 2023

NCAR Advanced Study Program Graduate Visitor Program: Kenta Kurosawa (2022), Henry Santer (2023) — 2022 – 2023

Student Presentation Awards: AGU Outstanding Student Presentation Award, Sarah Loughran (2022); AMS IOAS-AOLS Conference (second place), Henry Santer (2024); AMS Annual Meeting, Dylan Major (2025) — 2022 – 2025

PUBLICATIONS

* Graduate student or postdoc within research group

Peer-Reviewed Journal Articles

32. Cheung*, A., D. P. Stern, P. M. Finocchio, and **J. Poterjoy**, 2026: Using IMERG to Understand the Relationship Between Precipitation Structure and Intensification in Tropical Cyclones. *Mon. Wea. Rev.*, **154**, 2151–2172, https://doi.org/10.1175/MWR-D-25-0200.1.

31. Wang, X., P. J. van Leeuwen, **J. Poterjoy**, D. J. Stensrud, S. J. Greybush, Y. Zhang, H. Santer*, Y. Wang, Z. Pu, X. Chen, B. C. Stouffer, S. Chiao, K. Ide, C.-H. Lu, A. Johnson, C. Liu, N. Gasperoni, Y. Yang, J. Kim, D. Kleist, S. Frolov, and F. Carr, 2026: The Multi-University Consortium for Advanced Data Assimilation Research and Education (CADRE). *Bull. Amer. Meteor. Soc.*, **107**, E2048–E2064, https://doi.org/10.1175/BAMS-D-25-0098.1.

30. Santer*, H., **J. Poterjoy**, and M. El Gharamti, 2025: Innovation-Based Methods for Online Estimates of Observation Error Variances Within Ensemble Data Assimilation Cycles. *Mon. Wea. Rev.*, **153**, 1781–1792, https://doi.org/10.1175/MWR-D-24-0242.1.

29. Choi, Y., A. Petty, D. Felikson, and **J. Poterjoy**, 2025: Estimation of the State and Parameters in Ice Sheet Model Using an Ensemble Kalman Filter and Observing System Simulation Experiments. *The Cryosphere*, **19**, 5423–5444, https://doi.org/10.5194/tc-19-5423-2025.

28. Kurosawa*, K., and **J. Poterjoy**, 2025: Augmented Flow-Dependent Perturbations to Mitigate Sampling Errors: Experiments for a Regional Application of the NOAA Unified Forecast System. *Wea. Forecasting*, **40**, 1147–1161, https://doi.org/10.1175/WAF-D-24-0147.1.

27. McCurry*, J., and **J. Poterjoy**, 2024: Optimizing Numerical Weather Prediction Utility of the Maryland Mesonet With Observing System Simulation Experiments. *Wea. Forecasting*, **39**,

1849–1867, https://doi.org/10.1175/WAF-D-24-0089.1.

26. Knisely*, J., and **J. Poterjoy**, 2023: Implications of Self-Contained Radiance Bias Correction for Data Assimilation Within the Hurricane Analysis and Forecasting System (HAFS). *Wea. Forecasting*, **38**, 1719–1738, https://doi.org/10.1175/WAF-D-23-0027.1.
25. Walsworth*, A., **J. Poterjoy**, and E. Satterfield, 2023: Challenges for Inline Observation Error Estimation in the Presence of Misspecified Background Uncertainty. *Mon. Wea. Rev.*, **151**, 2295–2306, https://doi.org/10.1175/MWR-D-22-0298.1.
24. Santer*, H., **J. Poterjoy**, and J. McCurry*, 2023: Evaluating Contour Band Depth as a Method for Understanding Ensemble Uncertainty. *Mon. Wea. Rev.*, **151**, 2097–2113, https://doi.org/10.1175/MWR-D-22-0281.1.
23. McCurry*, J., **J. Poterjoy**, K. Knopfmeier, and L. Wicker, 2023: An Evaluation of Non-Gaussian Data Assimilation Methods in Moist Convective Regimes. *Mon. Wea. Rev.*, **151**, 1609–1629, https://doi.org/10.1175/MWR-D-22-0260.1.
22. Kurosawa*, K., and **J. Poterjoy**, 2023: A Statistical Hypothesis Testing Strategy for Adaptively Blending Particle Filters and Ensemble Kalman Filters for Data Assimilation. *Mon. Wea. Rev.*, **151**, 105–125, https://doi.org/10.1175/MWR-D-22-0108.1.
21. Schwartz*, C. S., **J. Poterjoy**, G. S. Romine, D. C. Dowell, J. R. Carley, and J. Bresch, 2022: Short-Term Convection-Allowing Ensemble Precipitation Forecast Sensitivity to Resolution of Initial Condition Perturbations and Central Initial States. *Wea. Forecasting*, **37**, 1259–1286, https://doi.org/10.1175/WAF-D-21-0165.1.
20. **Poterjoy, J.**, 2022: Regularization and Tempering for a Moment-Matching Localized Particle Filter. *Quart. J. Roy. Meteor. Soc.*, **148**, 2631–2651, https://doi.org/10.1002/qj.4328.
19. **Poterjoy, J.**, 2022: Implications of Multivariate Non-Gaussian Data Assimilation for Multiscale Weather Prediction. *Mon. Wea. Rev.*, **150**, 1475–1493, https://doi.org/10.1175/MWR-D-21-0228.1.
18. Schwartz*, C. S., **J. Poterjoy**, J. R. Carley, D. C. Dowell, G. S. Romine, and K. Ide, 2022: Comparing Partial and Continuously Cycling Ensemble Kalman Filter Data Assimilation Systems for Convection-Allowing Ensemble Forecast Initialization. *Wea. Forecasting*, **37**, 85–112, https://doi.org/10.1175/WAF-D-21-0069.1.
17. Kurosawa*, K., and **J. Poterjoy**, 2021: Data Assimilation Challenges Posed by Nonlinear Operators: A Comparative Study of Ensemble and Variational Filters and Smoothers. *Mon. Wea. Rev.*, **149**, 2369–2389, https://doi.org/10.1175/MWR-D-20-0368.1.
16. **Poterjoy, J.**, G. J. Alaka Jr., and H. R. Winterbottom, 2021: The Irreplaceable Utility of Sequential Data Assimilation for Numerical Weather Prediction System Development: Lessons Learned From an Experimental HWRF System. *Wea. Forecasting*, **36**, 661–677, https://doi.org/10.1175/WAF-D-20-0204.1.
15. Feng, J., X. Wang, and **J. Poterjoy**, 2020: A Comparison of Two Local Moment-Matching Nonlinear Filters: Local Particle Filter (LPF) and Local Nonlinear Ensemble Transform Filter (LNETF). *Mon. Wea. Rev.*, **148**, 4377–4395, https://doi.org/10.1175/MWR-D-19-0368.1.
14. **Poterjoy, J.**, L. J. Wicker, and M. Buehner, 2019: Progress Toward the Application of a Localized Particle Filter for Numerical Weather Prediction. *Mon. Wea. Rev.*, **147**, 1107–1126, https://doi.org/10.1175/MWR-D-17-0344.1.
13. Morzfeld, M., D. Hodyss, and **J. Poterjoy**, 2018: Variational Particle Smoothers and Their Localization. *Quart. J. Roy. Meteor. Soc.*, **144**, 806–825, https://doi.org/10.1002/qj.3256.

12. **Poterjoy, J.**, R. A. Sobash, and J. L. Anderson, 2017: Convective-Scale Data Assimilation for the Weather Research and Forecasting Model Using the Local Particle Filter. *Mon. Wea. Rev.*, **145**, 1897–1918, https://doi.org/10.1175/MWR-D-16-0298.1.
11. **Poterjoy, J.**, and J. L. Anderson, 2016: Efficient Assimilation of Simulated Observations in a High-Dimensional Geophysical System Using a Localized Particle Filter. *Mon. Wea. Rev.*, **144**, 2007–2020, https://doi.org/10.1175/MWR-D-15-0322.1.
10. **Poterjoy, J.**, and F. Zhang, 2016: Comparison of Hybrid Four-Dimensional Data Assimilation Methods With and Without the Tangent Linear and Adjoint Models for Predicting the Life Cycle of Hurricane Karl (2010). *Mon. Wea. Rev.*, **144**, 1449–1468, https://doi.org/10.1175/MWR-D-15-0116.1.
9. **Poterjoy, J.**, 2016: A Localized Particle Filter for High-Dimensional Nonlinear Systems. *Mon. Wea. Rev.*, **144**, 59–76, https://doi.org/10.1175/MWR-D-15-0163.1.
8. **Poterjoy, J.**, and F. Zhang, 2015: Systematic Comparison of Four-Dimensional Data Assimilation Methods With and Without a Tangent Linear Model Using Hybrid Background Error Covariance: E4DVar Versus 4DEnVar. *Mon. Wea. Rev.*, **143**, 1601–1621, https://doi.org/10.1175/MWR-D-14-00224.1.
7. **Poterjoy, J.**, and F. Zhang, 2014: Intercomparison and Coupling of Ensemble and Four-Dimensional Variational Data Assimilation Methods for the Analysis and Forecasting of Hurricane Karl (2010). *Mon. Wea. Rev.*, **142**, 3347–3364, https://doi.org/10.1175/MWR-D-13-00394.1.
6. **Poterjoy, J.**, and F. Zhang, 2014: Predictability and Genesis of Hurricane Karl (2010) Examined Through the EnKF Assimilation of Field Observations Collected During PREDICT. *J. Atmos. Sci.*, **71**, 1260–1275, https://doi.org/10.1175/JAS-D-13-0291.1.
5. **Poterjoy, J.**, F. Zhang, and Y. Weng, 2014: The Effects of Sampling Errors on the EnKF Assimilation of Inner-Core Hurricane Observations. *Mon. Wea. Rev.*, **142**, 1609–1630, https://doi.org/10.1175/MWR-D-13-00305.1.
4. Zhang, X., X.-Y. Huang, J. Liu, **J. Poterjoy**, Y. Weng, F. Zhang, and H. Wang, 2014: Development of an Efficient Regional Four-Dimensional Variational Data Assimilation System for WRF. *J. Atmos. Oceanic Technol.*, **31**, 2777–2794, https://doi.org/10.1175/JTECH-D-13-00076.1.
3. Zhang, F., M. Zhang, and **J. Poterjoy**, 2013: E3DVar: Coupling an Ensemble Kalman Filter With Three-Dimensional Variational Data Assimilation in a Limited-Area Weather Prediction Model and Comparison to E4DVar. *Mon. Wea. Rev.*, **141**, 900–917, https://doi.org/10.1175/MWR-D-12-00075.1.
2. Xie, B., F. Zhang, Q. Zhang, **J. Poterjoy**, and Y. Weng, 2013: Observing Strategy and Observation Targeting for Tropical Cyclones Using Ensemble-Based Sensitivity Analysis and Data Assimilation. *Mon. Wea. Rev.*, **141**, 1437–1453, https://doi.org/10.1175/MWR-D-12-00188.1.
1. **Poterjoy, J.**, and F. Zhang, 2011: Dynamics and Structure of Forecast Error Covariance in the Core of a Developing Hurricane. *J. Atmos. Sci.*, **68**, 1586–1606, https://doi.org/10.1175/2011JAS3681.1.

Invited Book Chapters

Poterjoy, J., 2026: Data Assimilation. *Encyclopedia of Atmospheric Sciences*, 3rd ed., W. A. Robinson, Ed., Vol. 1, Academic Press, 237–240, https://doi.org/10.1016/B978-0-323-96026-7.00070-9.

Preprints

Jung*, H.-S., **J. Poterjoy**, and A. Petty, 2026: A State-Dependent Error Covariance Model of Surface Atmospheric Forcings Over the Arctic Sea Ice. *EarthArXiv* [preprint; submitted to *J. Atmos. Oceanic Technol.*], https://doi.org/10.31223/X5SN37.

RESEARCH FUNDING

Funded Grants

NASA PREFIRE Science Team · Co-I (PI: Alek Petty) 6/1/2026 – 5/31/2029
Advancing Polar Sea Ice Prediction With PREFIRE Radiance Observations and Next-Generation Data Assimilation Methods
Award #80NSSC26K0892; $178,233 (Year 1 funding to date)

NOAA · Institutional PI 3/11/2024 – 3/10/2027
A Multi-University Consortium for Advanced Data Assimilation Research and Education (CADRE)
Award #NA24OARX459C0005; $708,709

NRAO/SOS · Subrecipient PI 10/1/2023 – 12/31/2025
NRAO Student Observing Support for Sarah Loughran
Award #SOSPADA-033; $40,000

NOAA · PI 9/1/2023 – 8/31/2027
Non-Gaussian Ensemble Data Assimilation Within a Rapidly Updating Global Prediction System
Award #NA23OAR4590379; $506,318

NOAA CISESS · Task Leader 8/1/2023 – 6/30/2025
Advancing the NOAA Unified Forecast System Through Improvements in Cloud Microphysics and Novel Sea Ice Data Assimilation Developments
Award #NA19NES4320002; $335,000

NOAA · PI 9/1/2022 – 8/31/2026
Multi-Institution Collaborative Proposal: Integration of a Fully Functional Atmospheric UFS-HAFS Into JEDI With Weakly Coupled Ocean Data Assimilation Capability
Award #NA22OAR4590184; $299,976

NASA · Co-I (PI: Alek Petty) 8/15/2022 – 8/14/2026
New Sea Ice and Ice Sheet OSSE Frameworks for Determining Ice Topography Science Requirements From a Future STV Mission
Award #80NSSC22K1112; $980,904 (total award)

NSF · PI 1/1/2022 – 12/31/2026
Online Uncertainty Quantification for Novel Atmospheric Measurements
Award #AGS2136969; $413,678

NOAA CISESS · Task Leader 9/1/2021 – 8/31/2022
Advancing NOAA Earth System Modeling Efforts Through Improvements in Model Physics and Sea Ice Data Assimilation
Award #NA19NES4320002; $320,000

NOAA · PI 7/1/2020 – 7/1/2022
HU-2 Accelerate the Development of the Hurricane Analysis and Forecasting System (HAFS)
Award #NA20OAR4600281; $250,000

NOAA CISESS · Task Leader 7/1/2019 – 6/30/2022
Improving Hurricane Predictions Through Advanced Data Assimilation, Ensemble Forecasting, and

Observing System Design
Award #NA19NES4320002; $137,602

NSF CAREER · PI 4/1/2019 – 3/31/2025
Improving Convective-Scale Weather Prediction Through Advanced Bayesian Filtering, Verification, and Uncertainty Quantification
Award #AGS1848363; $548,222

Computing Allocations

NCAR/CISL HPC Computing Proposal · PI 10/20/2020 – 6/30/2026
Bayesian Filtering for Convective-Scale Weather Prediction Through Large Monte Carlo Simulations
17.2 M core hours

INVITED PRESENTATIONS

Conferences and Workshops

2026 Operator-Free Data Assimilation for Complex Measurement Processes, *Minisymposium on Uncertainty Quantification in Data Assimilation Methods, SIAM Conference on Uncertainty Quantification (UQ26)*, Minneapolis, MN

2026 Panelist, Town Hall on Artificial Intelligence for Data Assimilation, *Forecast Improvement Group, 106th AMS Annual Meeting*, Houston, TX

2025 Practical Approaches to Assimilating Observations That Exhibit State-Dependent, Non-Gaussian Errors in Earth-System Models, *Data Meets Dynamics: Workshop on Data Assimilation for Complex Systems and Applications*, Madison, WI

2022 Progress and Long-Term Obstacles for Tropical Cyclone Data Assimilation and Prediction, *35th AMS Conference on Hurricanes and Tropical Meteorology*, New Orleans, LA

2022 Panelist, Young Career Workforce and Student Panel, *NOAA Unifying Innovations in Forecasting Capabilities Workshop*, College Park, MD

2021 High-Dimensional Data Assimilation Using Regularization and Iterative Resampling With the Local Particle Filter, *International Symposium on Data Assimilation – Online* (virtual)

2021 Tempered and Hybrid Particle Filter Methodology for Geophysical Data Assimilation, *25th AMS Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface, 101st AMS Annual Meeting* (virtual)

2019 Particle Filter-Based Data Assimilation for Numerical Weather Prediction, *1st International Workshop in Data Assimilation*, Medellín, Colombia (virtual)

2019 Benefits of a Localized Particle Filter Explored Using the AOML-UMD Ensemble Prediction System, *International Union of Geodesy and Geophysics General Assembly*, Montréal, QC, Canada

2018 Regional Weather Prediction Using the Local Particle Filter in an Experimental HWRF Modeling System, *2nd ADAPT Symposium on "Advanced Understanding, Monitoring and Prediction of Weather, Climate and Environmental Systems,"* State College, PA

2018 Regional Weather Forecasting Using the Local Particle Filter, *5th International Workshop on Nonhydrostatic Models*, Tokyo, Japan

2018 Toward the Application of Particle Filters for Numerical Weather Prediction and Research, *8th EnKF Data Assimilation Workshop*, Sainte-Adèle, QC, Canada

2017 Localized Particle Filters for Weather Prediction and Research, *National Strategic Computing*

Initiative Workshop, Arlington, VA

2017 Storm-Scale Weather Analysis and Prediction at the NOAA National Severe Storms Laboratory Using a Non-Gaussian Filter, *3rd RIKEN International Symposium on Data Assimilation*, Kobe, Japan

2016 Probabilistic Weather Analysis and Prediction Using the Local Particle Filter, *Advances in Data Assimilation, Predictability, and Uncertainty Quantification, American Geophysical Union Fall Meeting*, San Francisco, CA

2016 Efficient Assimilation of Observations via a Localized Particle Filter in High-Dimensional Geophysical Systems, *Perspectives on Model-Informed Data Assimilation, SIAM Conference on Uncertainty Quantification*, Lausanne, Switzerland

2014 Hybrid Four-Dimensional Data Assimilation With and Without Tangent Linear Model Operators, *6th EnKF Data Assimilation Workshop*, Buffalo, NY

Seminars and Lectures

2026 A Research Framework for Sea Ice Data Assimilation in the Presence of Complex Observation Processes, *NASA Jet Propulsion Laboratory, Center for Climate Sciences Friday Seminar*, Pasadena, CA (virtual)

2026 Kernel and Generative Strategies for Handling Complex Observation Processes in Geophysical Data Assimilation, *University of Maryland, Baltimore County, Department of Mathematics and Statistics Colloquium*, Baltimore, MD

2026 Kernel and Generative Strategies for Handling Complex Observation Processes in Geophysical Data Assimilation, *University of Maryland, Applied Mathematics & Statistics, and Scientific Computation (AMSC) Seminar*, College Park, MD

2025 Assimilating Earth System Measurements With Unknown or Error-Prone Measurement Operators, *University of Reading, Data Assimilation Research Centre (DARC)–CADRE Joint Seminar*, Reading, UK (virtual)

2023 Designing Fully Non-Parametric State and Parameter Estimation Methods for the UFS, *NOAA National Severe Storms Laboratory, Forecast Research and Development Division*, Norman, OK

2023 Toward Fully Non-Parametric State and Parameter Estimation for Earth-System Models, *IBM Research* (virtual)

2023 Bridging Basic and Applied Data Assimilation Research for Earth System Models, *Pennsylvania State University, Department of Meteorology and Atmospheric Science Colloquium*, University Park, PA

2023 The Mathematics, Science, and "Art" of Data Assimilation for Environmental Prediction, *Millersville University, Department of Meteorology*, Millersville, PA

2019 Big Data, Very Big Computers, and the Endless Pursuit for an "Honest" Weather Prediction System, *University of Delaware, Department of Geography*, Newark, DE

2019 Bayesian Data Assimilation Within a Regional Modeling Framework, *Environment and Climate Change Canada, Meteorological Research Division*, Dorval, QC, Canada

2019 Bayesian Data Assimilation Within a Regional Modeling Framework, *Deutscher Wetterdienst (German Meteorological Service)*, Offenbach, Germany

2019 From Toy Models to NWP: Leveraging HWRF for Data Assimilation Development, *NOAA Hurricane Weather Research and Forecasting Model Seminar*, College Park, MD

2019 Big Data, Very Big Computers, and the Endless Pursuit for an "Honest" Weather Prediction System, *Millersville University, Department of Meteorology*, Millersville, PA

2019 Progress in the Development of a Localized Particle Filter for Weather Prediction, *University of Maryland, Earth System Science Interdisciplinary Center*, College Park, MD

2018 Progress in the Development of a Localized Particle Filter for Regional Weather Prediction, *NASA Goddard Space Flight Center, Global Modeling and Assimilation Office*, Greenbelt, MD

2018 Progress in the Development of a Localized Particle Filter for Numerical Weather Prediction and Research, *Japan Meteorological Agency, Meteorological Research Institute*, Tokyo, Japan

2017 Nonlinear Data Assimilation for Geophysical Analysis, Prediction, and Research, *North Carolina State University, Department of Marine, Earth, and Atmospheric Sciences*, Raleigh, NC

2017 Progress in the Development of a Localized Particle Filter for Atmospheric Analysis, Prediction, and Research, *University of Maryland, Department of Atmospheric and Oceanic Science*, College Park, MD

2017 Nonparametric Data Assimilation for Weather Research and Forecasting, *University of Miami, Department of Computer Science*, Miami, FL

2016 Storm-Scale Weather Analysis and Prediction Using a Nonparametric Filter, *University of Arizona, Department of Mathematics*, Tucson, AZ

2016 Progress Toward the Development of a Nonlinear Filter for High-Dimensional Data Assimilation in Geoscience, *Pennsylvania State University, Center for Advanced Data Assimilation and Predictability Techniques*, University Park, PA

2016 Hybrid and Coupling of Ensemble and Variational Data Assimilation: An Informative Comparison of Adjoint- and Ensemble-Based Four-Dimensional Strategies, *Pennsylvania State University, Center for Advanced Data Assimilation and Predictability Techniques*, University Park, PA

2016 Probabilistic Storm-Scale Analysis and Prediction Using a Nonparametric Ensemble Filter: Implications for Tropical Cyclone Forecasting, *NOAA Atlantic Oceanographic and Meteorological Laboratory*, Miami, FL

2016 An Efficient Nonparametric Data Assimilation Method for Atmospheric Research and Ensemble Forecasting, *National Weather Center*, Norman, OK

2016 Efficient Nonparametric Data Assimilation for Atmospheric Research and Prediction, *Florida State University, Department of Earth, Ocean and Atmospheric Science*, Tallahassee, FL

2015 A Localized Particle Filter for Large Dimensional State Estimation, *12th CAS-TWAS-WMO Forum: Coupled Data Assimilation Symposium*, Beijing, China

2015 Can We Do Better Than the Kalman Filter? A Localized Particle Filter for Large Dimensional State Estimation, *Peking University, Department of Atmospheric and Oceanic Sciences*, Beijing, China

2015 A Localized Particle Filter for Large Dimensional State Estimation, *Chinese Academy of Meteorological Sciences*, Beijing, China

2015 A Localized Particle Filter for High-Dimensional Nonlinear Systems, *Colorado State University, Cooperative Institute for Research in the Atmosphere*, Fort Collins, CO

2014 Ensemble Filtering for Large-Dimensional Nonlinear Systems, *Pennsylvania State University, Department of Statistics*, University Park, PA

2014 Hybrid Data Assimilation for Tropical Cyclone Analysis and Prediction, *Stony Brook University, Department of Marine and Atmospheric Sciences*, Stony Brook, NY

Summer Schools and Training Workshops

2026 A Bayesian Introduction to Data Assimilation, *CADRE–EPIC Data Assimilation Training and Science Workshop*, National Weather Center, Norman, OK

2026 Particle Filters, *CADRE–EPIC Data Assimilation Training and Science Workshop*, National Weather Center, Norman, OK

2025 Introduction to Bayes' Theorem and Connections to Modern Data Assimilation, *CADRE–EPIC Data Assimilation Training Workshop*, Colorado State University, Fort Collins, CO

2025 Nonlinear Data Assimilation Methods: Particle Filters and Particle Flow Filters, *CADRE–EPIC Data Assimilation Training Workshop*, Colorado State University, Fort Collins, CO

2015 A Localized Particle Filter for Data Assimilation in High-Dimensional Nonlinear Systems, *STATMOS Summer School in Data Assimilation*, Boulder, CO

2015 Hybrid and Coupling of Ensemble and Variational Data Assimilation, *12th CAS-TWAS-WMO Forum: Data Assimilation Summer School*, Beijing, China

2015 Introduction to NCAR Data Assimilation Research Testbed (DART), *12th CAS-TWAS-WMO Forum: Data Assimilation Summer School*, Beijing, China

TEACHING

Instructor, AOSC 470/600: *Synoptic Meteorology* Fall 2019 – present
University of Maryland (cross-listed undergraduate/graduate course)

- Topics: numerical modeling and observational analysis, data assimilation, governing equations of the atmosphere, quasi-geostrophic theory, frontogenesis, extratropical waves and cyclones, and weather map discussions

Instructor, AOSC 472/602: *Mesoscale Meteorology* Spring 2020 – present
University of Maryland (cross-listed undergraduate/graduate course)

- Topics: mesoscale instabilities, semi-geostrophic approximations, the planetary boundary layer, mesoscale air-mass boundaries, convective initiation, convective organization, mesoscale convective systems, and tornadoes

Guest Lecturer, METR 6313: *Advanced Topics in Data Assimilation* Spring 2017
University of Oklahoma

- Lecture topics: introduction to particle filters and the local particle filter

Co-Instructor, METEO 597B: *Data Assimilation* Spring 2013
Pennsylvania State University

- Lecture topics: optimal interpolation, EnKF, 3DVar, 4DVar, adjoint sensitivity analysis, ensemble sensitivity analysis, observation impact, parameter estimation, and hybrid data assimilation
- Additional tasks: helped develop the course curriculum, and designed and graded programming lab assignments

Guest Lecturer, METEO 526: *Numerical Weather Prediction* Spring 2011
Pennsylvania State University

- Lecture topics: ensemble Kalman filters and a Lorenz (1963) model tutorial

MENTORING AND ADVISING

Postdoctoral Researchers

Nick Szapiro (ESSIC) 2022 – 2024
Deanna Easley (ESSIC) 2022 – 2023

Ph.D. Students

Current

Maria Nikolaitchik (AOSC) 2025 – present
Leah White (AMSC) 2025 – present
Quentin Simmons (AOSC) · co-advised with L. P. Riishøjgaard 2025 – present
Dylan Major (AOSC) 2024 – present
Hee-Sung Jung (AOSC) · co-advised with A. Petty 2024 – present
Raelynn Wonnacott (AMSC) · co-advised with M. Evans 2023 – present
Alvin Cheung (AOSC) 2023 – present
Gabrielle Linscott (AOSC) · committee chair; research advisors at NASA 2022 – present
Sarah Loughran (AOSC) · co-advised with C. Nixon 2021 – present
Henry Santer (AOSC) 2021 – present

Completed

Joseph Knisely (AOSC) 2026
"Towards a Self-Contained Analysis and Reanalysis System for Hurricanes"

Joshua McCurry (AOSC) 2025
"Implications of New Observing and Data Assimilation Strategies for Moist Convection in the Atmosphere"

Kenta Kurosawa (AOSC) 2023
"Bridging Gaussian and non-Gaussian Data Assimilation for High-Dimensional Geophysical Models"

Craig Schwartz (AOSC/NCAR) 2021
"An Evaluation of Convection-Allowing Ensemble Forecast Sensitivity to Initial Conditions"

M.S. Students

Completed

Alisha Wellington (AOSC) 2024
"Analyzing Ensemble Uncertainty Using Contour Band Depth: Atlantic Hurricane Season 2022"

Gillian Felton (AOSC) · academic advisor; research advisor M. Gerst 2024
"Recommendations on Forecast Verification Methodology and Communication for the DAWN Project"

Benjamin Sheppard (AOSC) 2023
"Implications of Non-Gaussian Data Assimilation for Probabilistic Prediction Using Ensembles"

Andrew Walsworth (AOSC) 2022
"Challenges for Online Observation Error Estimation Revealed from Idealized Numerical Experiments"

Undergraduate Research

Malcolm Maas (AOSC), Honors thesis 2025
"Using Diffusion Maps to Quantify Data Assimilation and Microphysical Errors in Convective Clouds"

Sean Engler (AOSC), Senior thesis · co-advised with Ph.D. student J. McCurry 2024
"Evaluating the Accuracy of an Experimental Hurricane Model During Hurricane Marco and Hurricane Laura"

Randall Bowers (AOSC), Senior thesis · co-advised with Ph.D. student H. Santer 2023
"Probabilistic Predictions for Tropical Cyclones Explored Using Contour Band Depth"

Henry Santer (AOSC), Summer internship (CISESS) 2021
"Visualizing Ensemble Uncertainty With Contour Boxplots"

Charles Kropiewnicki (AOSC), Senior thesis · co-advised with J. Henrikson 2021
"Impact of Forecast Error Covariance on Ensemble Model Accuracy"

Gavin Harrison (AOSC), Senior thesis 2021
"Hurricane Nowcasting With Particle Filters"

Katriella Tenembaum (AOSC), Senior thesis 2020
"Exploring Imbalance Introduced by EnKFs in Tropical Cyclone Analyses"

Audrey Nash (AOSC), Senior thesis 2020
"Forecast Challenges Posed by Convective Outbreaks Associated With Landfalling Hurricanes"

Ph.D. Dissertation Committees

Current

Benjamin Woods (AOSC)
Jiaxin Chen (AOSC)
Igor Uchôa Farias (AOSC)
Max Johncox (University of Utah)

Completed

Alireza Moghaddasi (CEE)	2026	Samuel DiPasqua (AMSC)	2026
Jhayron Pérez Carrasquilla (AOSC)	2026	Junjie Dong (AOSC)	2026
Marissa Dattler (AOSC)	2026	Vitaly Kholodovsky (AOSC)	2023
Emmanuel Dibia (AOSC)	2023	Chu-Chun Chang (AOSC)	2023
Donald Lippi (AOSC)	2023	Cheng Da (AOSC)	2022
David Groff (AOSC)	2022	Eli Dennis (AOSC)	2021
Benjamin Johnson (AOSC)	2020	William Miller (AOSC)	2019

PROFESSIONAL ACTIVITIES

Editorial Service

Editor, *Monthly Weather Review* (AMS) 2026 – present
Associate Editor, *Quarterly Journal of the Royal Meteorological Society* 2024 – present
Associate Editor, *Journal of Advances in Modeling Earth Systems* (AGU) 2021 – present
Associate Editor, *Monthly Weather Review* (AMS) 2016 – 2025

Meeting Organization

Lead Organizer, CADRE–EPIC Data Assimilation Training and Science Workshop, University of Maryland, College Park, MD 2027
Co-Organizer, Sea Ice DALooza Workshop, NSF NCAR Mesa Lab, Boulder, CO 2026
Organizing Committee Member, CADRE–EPIC Data Assimilation Training and Science Workshop, National Weather Center, Norman, OK 2026
Program Committee Member, 35th AMS Conference on Hurricanes and Tropical Meteorology, New Orleans, LA 2022
Program Committee Member, 8th EnKF Data Assimilation Workshop, Sainte-Adèle, QC, Canada 2018
Program Committee Member, 7th EnKF Data Assimilation Workshop, State College, PA 2016

Committees, Boards, and Panels

Member, AGU Nonlinear Geophysics Section Fellows Committee 2025 – present
Member, Panel Review Team for the Cooperative Institute for Severe and High-Impact Weather Research and Operations (CIWRO) 2025

Member, NSF NCAR CISL HPC Allocation Panel (CHAP) 2024 – present
Working Group Member, AMS Weather Enterprise Study (Phase 1: NWP Development; Phase 2: Research Advances and Technology Transfer) 2024 – present
Member, AMS Committee on Weather Analysis and Forecasting 2022 – present
Science Advisory Board Member, NOAA/NCAR/USAF Developmental Testbed Center (DTC) 2022 – present
Member, University of Maryland Burgers Program for Fluid Dynamics 2020 – present
Co-author, Topic 4.3 report (Structure Change Forecasting), 8th WMO International Workshop on Tropical Cyclones (IWTC-8) 2014

Research Software

Primary developer of the local particle filter, a Bayesian data assimilation technique available freely through the open-source NSF-NCAR Data Assimilation Research Testbed (DART) software package

Co-developer of CADRE–JEDI-Edu, open-source tutorials that introduce data assimilation methods in the Joint Effort for Data assimilation Integration (JEDI) system using a two-layer quasi-geostrophic model; developed the JEDI local particle filter (LPF) tutorial with Y. Choi (https://github.com/NicholasGasperoni/cadre-jedi-edu)

Journal Reviewing

Reviewer for numerous scientific journals, including *Advances in Atmospheric Sciences*; *Advances in Meteorology*; *Applied Mathematics and Computation*; *Atmospheric Research*; *Bulletin of the American Meteorological Society*; *Journal of Advances in Modeling Earth Systems*; *Journal of Applied Meteorology and Climatology*; *Journal of Climate*; *Journal of Computational Science*; *Journal of Geophysical Research: Atmospheres*; *Journal of the Atmospheric Sciences*; *Journal of the Meteorological Society of Japan*; *Monthly Weather Review*; *Natural Hazards*; *Ocean Dynamics*; *Physica D: Nonlinear Phenomena*; *Quarterly Journal of the Royal Meteorological Society*; *SIAM/ASA Journal on Uncertainty Quantification*; *Tellus A: Dynamic Meteorology and Oceanography*; *Weather and Forecasting*

Professional Memberships

American Meteorological Society (AMS); American Geophysical Union (AGU); Society for Industrial and Applied Mathematics (SIAM)

UNIVERSITY AND DEPARTMENT SERVICE

Director, AOSC Graduate Program 2024 – present
Member, UMD Graduate Council 2024 – present
Member, AOSC Graduate Curriculum Committee 2024 – present
Member, AOSC Undergraduate Curriculum Committee 2021 – present
Co-chair, AOSC Graduate Admissions Committee 2019 – 2024
UMD Member Representative, University Corporation for Atmospheric Research (UCAR) 2019 – present
Co-author, UMD application to join the AGU Bridge Program 2020