

Joseph Knisely

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🌐 LinkedIn

Education

PhD, University of Maryland, College Park

Atmospheric and Oceanic Science

Expected Winter 2025

BS, Pennsylvania State University, University Park

Physics, Minor in Mathematics

2016

Academic Research Experience

Doctoral Dissertation

Atmospheric and Oceanic Sciences, University of Maryland

Aug 2019 – Present

- **Tentative Title:** Exploring Satellite Radiance Assimilation and Ensemble Methodologies for Numerical Weather Prediction within Theoretical and Operational Frameworks
- **Mentors:** Jonathan Poterjoy (academic advisor), Daryl Kleist, Elizabeth Satterfield, Bill Campbell
- Incorporated new workflow and source code developments for the NOAA Hurricane Analysis and Forecast System (HAFS) numerical weather model
- Analyzed and verified model forecasts for physical and TC-specific error statistics, including comparisons against reanalysis data
- Conducted research on different bias correction techniques for satellite radiance data assimilation in UFS applications
- Committed code developments for the official HAFS workflow and data assimilation system within community code repositories

Graduate Intern

Naval Research Laboratory, Monterey, CA

June – Sept 2022; June – Aug 2023

- Performed idealized data assimilation research using the low-dimensional chaotic Lorenz (2005) model for the purpose of advancing bias correction methodologies
- Simulated atmospheric conditions and observation networks designed to resemble satellite radiance measurement systems
- Developed model and observation bias correction techniques that are scalable and therefore easily transferable to high-dimensional operational NWP models
- Completed federal background investigation (SF-86)

Fellowships and Awards

WINGS Dissertation Fellowship

University of Maryland, College Park

2023 – Present

- Weather Program Office (WPO) Innovation for Next Generation Scientists (WINGS) Dissertation Fellowship
- Supported by NOAA WPO and administered by UCAR's Cooperative Programs for the Advancement of Earth System Science
- Mentored by Daryl Kleist, head of the Data Assimilation and Quality Control Group at the Environmental Modeling Center

Outstanding Publication in the Graduate Program

University of Maryland, College Park

2023

Outstanding Graduate Assistant

University of Maryland, College Park

2021

Ferdinand Baer Fellowship for Graduate Accomplishments

University of Maryland, College Park

2021

Outstanding Teaching Assistant Award

University of Maryland, College Park

2020

Specialized Skills

Programming Languages: Python (expert), Shell Scripting (proficient), High Performance Computing (proficient), Git (proficient), MATLAB (proficient), Fortran (basic)

Numerical Models and Software: HAFS, UFS, GSI

Datasets: NWP data (GRIB, NetCDF, BUFR), Reanalysis (ERA5, MIMIC-TPW2)

Publications and Articles

Knisely, J. : "WINGS Fellow Joseph Knisely's Research Hopes to Advance Tropical Cyclone Predictions" *NOAA Weather Program Office, Featured News*, 2024 July 18

Knisely, J. and J. Poterjoy: "Implications of Self-Contained Online Radiance Bias Correction within the Hurricane Analysis and Forecasting System (HAFS)" *Weather and Forecasting*, 2023 Sep 1

Knisely, J., J. Poterjoy, E. Satterfield, W. Campbell: "Scalable Bias Correction Techniques Investigated with a Low-dimensional Dynamical Model" *Manuscript in Prep.*

Knisely, J. and J. Poterjoy: "Obstacles for High-Resolution HAFS over the Entire Atlantic Basin" *Manuscript in Prep.*

Knisely, J. and J. Poterjoy: "Advancing Methodologies for Uninterrupted, Basin-Wide Data Assimilation in the Hurricane Analysis and Forecast System (HAFS)" *Manuscript in Prep.*

Research Presentations

- **Talk:** "Obstacles for High-Resolution HAFS over the Entire Atlantic Basin", *Unifying Innovations in Forecasting Capabilities Workshop 2025*, Boulder CO, 2025
- **Talks:** "Advancing Methodologies for Uninterrupted, Basin-Wide Data Assimilation in the Hurricane Analysis and Forecast System (HAFS)", *AGU Annual Meeting*, Washington DC, 2024; *AMS Annual Meeting*, New Orleans LA, 2025
- **Talks:** "Scalable Bias Correction Techniques Investigated with a Low-dimensional Dynamical Model", *Unifying Innovations in Forecasting Capabilities Workshop 2023*, Boulder CO, 2023; *AMS Annual Meeting*, Baltimore MD, 2023
- **Talk:** "Implications of Self-Contained Online Radiance Bias Correction within the Hurricane Analysis and Forecasting System (HAFS)", *35th AMS Conference on Hurricanes and Tropical Meteorology*, New Orleans LA, 2022
- **Poster:** "Advancing Methodologies for Uninterrupted, Basin-Wide Data Assimilation in the Hurricane Analysis and Forecast System (HAFS)", *Unifying Innovations in Forecasting Capabilities Workshop 2024*, Jackson MS, 2024

Teaching and Service

Teaching Assistant

University of Maryland, College Park

Aug 2019 – Dec 2020

- Taught AOSC 200 and 201, an undergraduate course averaging 240 students per semester and its complementary laboratory component
- Topics included: atmospheric dynamics, weather forecasting, climate and paleo-climate, observation systems, atmospheric composition

Department Seminar Student Coordinator

University of Maryland, College Park

Aug 2020 – April 2022

- Organized and facilitated our department's weekly seminar series
- Managed seminar administration, topics, announcements, and one-on-one meetings between seminar speakers and department members