Samantha M. Turbeville, PhD

Atmospheric and Climate Scientist
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Work Experience

Sandia National Laboratory Postdoctoral Fellow — Oct 2024 – Present

Design, set up, and run experiments using E3SM's new storm-resolving atmosphere model (SCREAM) to improve representation of ice microphysics and cirrus clouds. Analyze and interpret model output to quantify the impact of cirrus cloud seeding on cirrus cloud properties, the radiative budget, and potential downstream impacts on the hydrological cycle.
Mentor: Ben Hillman; *Manager:* Tom Lowry

Education

Ph.D., Atmospheric Sciences with a Data Science concentration — Aug 2024
University of Washington | Seattle, WA
Thesis: Tropical cirrus clouds in high-resolution models
Advisors: Thomas Ackerman and Chris Bretherton

M.S., Atmospheric Sciences — Jun 2021
University of Washington | Seattle, WA
Thesis: The life cycle of TTL cirrus: a model evaluation using the DYAMOND simulations
Advisors: Thomas Ackerman and Chris Bretherton

B.A., Mathematical Sciences with minors in Physics and Art — May 2018
Colby College | Waterville, ME

Research Projects

- **Cirrus cloud thinning** 2024 – Present
  First, we update the simple cloud resolving E3SM atmosphere model (SCREAM) ice microphysics to improve representation of cirrus cloud processes using more physical-based parameterizations. Second, we quantify the impact of cirrus cloud seeding on cloud properties focusing on dynamics, the radiative budget, and precipitation.
- **Quantify model biases from ice cloud microphysics** 2023 – 2024
  Using a small domain doubly-period simple cloud resolving E3SM atmosphere model (SCREAM) with P3 microphysics to quantify the sensitivity of modeled clouds to ice sedimentation, vapor deposition, large scale ascent, and changing SSTs.
  Publications:
  - Turbeville, S. M., Blossey, P. N., Ackerman, T. P., Hillman, B., Gasparini, B. (in prep).
- **Tropical convection and tropopause layer cirrus in global storm-resolving models** 2022 – 2024
  Tropical analysis of convection and cirrus clouds in models that participated in the second phase of the DYAMOND project. Regional comparison of models that participated in both phases of DYAMOND.
  Publications:
  - **Turbeville, S. M.**, Ackerman, T. P., Blossey, P. N. (in review). Tropical cirrus in Global Storm-Resolving Models. *Earth and Space Science*.
- **Model intercomparison of global storm-resolving models** 2019 – 2022
  Diagnosing model biases in regions of active tropical convection by analyzing of top of atmosphere radiative fluxes and vertical cloud structure in models that participated in the first phase of DYAMOND.
  Publications:

- **Turbeville, S. M.**, Nugent, J. M., Ackerman, T. P., Bretherton, C. S., & Blossey, P. N. (2022). Tropical cirrus in global storm-resolving models: 2. Cirrus life cycle and top-of-atmosphere radiative fluxes. *Earth and Space Science*, 9, e2021EA001978. DOI: 10.1029/2021EA001978
- Nugent, J. M., **Turbeville**, **S. M.**, Bretherton, C. S., Blossey, P. N., & Ackerman, T. P. (2022). Tropical cirrus in global storm-resolving models: 1. Role of deep convection. *Earth and Space Science*, 9, e2021EA001965. DOI:10.1029/2021EA001965

Fellowships & Awards

AMS Annual Meeting 2024 Student Poster Presentation Award 2024
ARCS Foundation Fellow, University of Washington 2018 – 2021
GSEE formerly GO-MAP Fellow, University of Washington 2018 – 2020
Sigma Pi Sigma, Colby College 2018
Ralph Bunche Scholar, Colby College 2014 – 2018

Service

Regular Member AMS Cloud Physics Committee 2025 – Present
- Organize AMS Cloud Physics sessions, edit and approve AMS glossary terms related to cloud physics

Student Member AMS Cloud Physics Committee 2022 – 2024
- Organized and co-led a session at the 2023 AMS Cloud Physics conference

Mentorship | Department of Atmospheric Sciences, University of Washington
- Graduate Peer Mentorship Group 2022 – 2024
- Graduate-Undergraduate Mentorship Program Mentor 2019 – 2021
- Summer Intern Mentor 2020

Student leader | NSF-PIRE Cirrus Journal Club 2020 – 2024
- Helped organize annual meetings and monthly seminars for early career scientists and students
- Hosted a seminar speaker at University of Washington Sep 2023

Student organizer | Department of Atmospheric Sciences, University of Washington
- Department intramural coordinator 2019 – 2023
- Python club organizer 2019 – 2022

Teaching Experience

Teaching Assistant | Department of Atmospheric Sciences, University of Washington
- Global Warming (100-level class) 2020 & 2024
  - Taught four discussion sections per week with the goals of enhancing students' knowledge of climate change concepts and guiding students towards an excellent final project
  - Held weekly office hours and helped grade final projects/exams

Teaching Assistant | Department of Mathematics, Colby College
- Mathematical Reasoning (200-level class) 2016 – 2017
  - Graded homework problem sets and hosted exam prep sessions
- Ordinary Differential Equations (300-level class) 2017 – 2018
  - Graded homework problem sets and held office hours

Conferences

Talks & presentations:
- AMS Annual Meeting 2024, 2025
- University of Washington seminar 2021 (MS defense), 2024 (PhD defense)
- PIRE Cirrus Annual Workshop 2018, 2019, 2020, 2021, 2023
- Cloud Feedback Model Intercomparison Project (CFMIP) 2023