

# Jacqueline M. Nugent

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📍 Laramie, WY

## EDUCATION

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### University of Washington, Seattle, WA

2023                    **Ph.D. in atmospheric sciences**, data science option  
Dissertation: Overshooting Convection, Cirrus, and the Cold Point  
Tropopause in Global Storm-Resolving Models and Satellite Observations  
Advisor: Dr. Chris Bretherton

2021                    **M.S. in atmospheric sciences**

### University of Oklahoma, Norman, OK

2018                    **B.S. in meteorology**, *summa cum laude*  
2018                    **B.A. in mathematics**, with special distinction

## RESEARCH EXPERIENCE

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2026 – Present            **University of Wyoming Dept. of Atmospheric Science**, Laramie, WY  
**Associate Research Scientist**

2024 – 2026              **University of Wyoming Dept. of Atmospheric Science**, Laramie, WY  
**Postdoctoral Research Associate**  
Advisor: Dr. Daniel McCoy

2023                      **University of Washington Dept. of Atmospheric Sciences**, Seattle, WA  
**Interim Postdoctoral Scholar**  
Advisor: Dr. Peter Blossey

2018 – 2023              **University of Washington Dept. of Atmospheric Sciences**, Seattle, WA  
**Research Assistant**  
Advisor: Dr. Chris Bretherton

2021                      **Vulcan, Inc.** (now at Allen Institute for AI), Seattle, WA  
**Machine Learning Intern**  
Advisors: Dr. Andre Perkins and Dr. Anna Kwa

2017 – 2018              **University of Oklahoma School of Meteorology**, Norman, OK  
**Student Research Assistant**  
Advisor: Dr. Michael Biggerstaff

2016                      **NOAA Earth System Research Laboratory**, Boulder, CO  
**Hollings Scholar**  
Advisor: Dr. Michael Fiorino

## PUBLICATIONS

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Underlined names indicate student-led papers.

### Submitted

1. Brown, H. Y., McCoy, D. T., **Nugent, J. M.**, Wang, H., Wu, M., Zhang, K. & Burrows, S. M. (2026). Sensitivity of anthropogenic cloud droplet number change to preindustrial emission inventories and physics parameterizations. *ESS Open Archive*. doi:10.22541/essoar.176860194.44608635/v1 (Revised manuscript under review at *Geophysical Research Letters*)
2. **Nugent, J. M.**, Brown, H., McCoy, D. T., Regayre, L., Ghosh, K., Elsaesser, G. S., Bhatti, Y., Mülmentstädt, J., Song, C., Burrows, S. M., Watson-Parris, D., Grosvenor, D. P., Carslaw, K., Gettelman, A., & Eidhammer, T. (2026). Constraints on aerosol-cloud interactions from Earth system models suggest a warmer future. (Revised manuscript under review at *Science*)

### Peer-Reviewed

3. Jones, D. B., Brown, H. Y., **Nugent, J. M.**, Mikkelsen, A., Song, C., Zhang, D., Burrows, S. M., Gordon, H., Kirby, A., McCoy, D. T. (2026). Surface observations from Atmospheric Radiation Measurement sites constrain the anthropogenic contribution to cloud droplet number. *Geophysical Research Letters*, 53, e2025GL121383. doi:10.1029/2025GL121383
4. **Nugent, J. M.**, Brown, H., Kirby, A., McCoy, D. T., Allen, G., Aeronson, T., et al. (2026). Overview of the Nephela Perturbed Parameter Ensemble for aerosol-cloud interactions in E3SMv3. *Journal of Advances in Modeling Earth Systems*, 18, e2025MS004989. doi:10.1029/2025MS004989
5. Aeronson, T., McCoy, D., Elsaesser, G., Wu, J., **Nugent, J. M.**, Brown, H., Mikkelsen, A., Zelinka, M. (2025). Global models predict clouds at the wrong time of day: Does it matter for radiation and climate? *Science Advances*, 11, eady3236. doi:10.1126/sciadv.ady3236
6. Wu, E., Rebassoo, F. O., Paul, P., Proistosescu, C., **Nugent, J. M.**, McCoy, D. T., Caldwell, P. M., Bretherton, C. S. (2025). Applying the ACE2 Emulator to SST Green's Functions for the E3SMv3 Global Atmosphere Model. *JGR: Machine Learning and Computation*, 2, e2025JH000774. doi:10.1029/2025JH000774
7. **Nugent, J. M.**, Bretherton, C. S., & Blossey, P. N. (2025). What sets the tropical cold point in GSRMs during boreal winter? Overshooting convection vs. cirrus lofting. *Earth and Space Science*, 12, e2024EA003887. doi:10.1029/2024EA003887
8. Perkins, W. A., Brenowitz, N. D., Bretherton, C. S., & **Nugent, J. M.** (2024). Emulation of Cloud Microphysics in a Climate Model. *Journal of Advances in Modeling Earth Systems*, 16(4), e2023MS003851. doi:10.1029/2023MS003851
9. **Nugent, J. M.**, & Bretherton, C. S. (2023). Tropical Convection Overshoots the Cold Point Tropopause Nearly as Often Over Warm Oceans as Over Land. *Geophysical Research Letters*, 50(21), e2023GL105083. doi:10.1029/2023GL105083
10. **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

11. 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

## FUNDING

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2025 – 2027

**U.S. Department of Energy Established Program to Stimulate Competitive Research (DOE EPSCoR)**, DE-SC0024161

Title: Creating the framework for the next generation Energy Exascale Earth System Model (E3SM) at PROCEED (Perturbed physics ensemble Regression Optimization Center for ESM Evaluation and Development)

Role: **Co-investigator** (PI: Daniel McCoy, University of Wyoming)

Amount: **\$2,992,412.00**

## SOFTWARE AND DATASETS

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### Software

Nugent, J. M. **“PROCEED-ESM/PROCEED-PPE: Version 0.”** Zenodo, October 2024. Available from <https://github.com/PROCEED-ESM/PROCEED-PPE>. doi:10.5281/zenodo.13887194

(Software to develop perturbed parameter ensembles (PPEs) in version 3 of the DOE E3SM model using an adaptable framework. Parameters can be varied across multiple components of the model physics to design a PPE suited to a particular research question.)

### Datasets

Nugent, J. M. **E3SMv3 ‘Nephele’ Perturbed Parameter Ensemble Value-Added Product for ENA, SGP, NSA, and Global Means.** ARM Data Discovery, January 2026. doi:10.5439/3012143

(Output of cloud and aerosol quantities for preindustrial and present-day simulations from the E3SMv3 Nephele PPE. Data is available hourly at SGP, ENA, and NSA ARM sites and daily for global means.)

## HONORS AND AWARDS

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2020	NSF Graduate Research Fellowship Program Honorable Mention
2018	James Holton Endowed Graduate Support Fund, University of Washington
2018	Phi Beta Kappa, Alpha of Oklahoma Chapter
2017	American Meteorological Society Senior Named Scholarship: Liv and Walt Lyons Scholarship
2017	Kelvin and Lisa Droegemeier Endowed Scholarship for Excellence in Meteorology, University of Oklahoma
2016	Ernest F. Hollings Undergraduate Scholarship Program, National Oceanic and Atmospheric Administration
2014	American Meteorological Society Freshman Undergraduate Scholarship

## TEACHING EXPERIENCE

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**University of Wyoming** Department of Atmospheric Science

Atmospheric Science Problems: Cirrus Clouds and Ice Microphysics, **Instructor of Record** (Fall 2025)

**University of Washington** Department of Atmospheric Sciences

Current Weather Analysis, **Instructor of Record** (Spring 2021, online; Fall 2022, in-person)

Weather, **Teaching Assistant** (Winter 2020)

## PRESENTATIONS

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### Department Seminars

- 2025 **University of Wyoming, Laramie, WY**  
The Nephela PPE and friends: exploring parametric uncertainty in aerosol-cloud interactions using perturbed parameter ensembles

### Selected Conference Presentations

- 2025 **American Geophysical Union Fall Meeting, New Orleans, LA**  
(Poster) A Multi-Model PPE: Bridging Structural and Parametric Uncertainty to Constrain Aerosol-Cloud Interactions  
(Poster) Isolating the Impacts of Anthropogenic Aerosols on Convection in a Perturbed Parameter Ensemble
- 2025 **Joint CFMIP-CloudSense Meeting, Exeter, UK**  
(Talk) Convective Invigoration vs. Enervation by Anthropogenic Aerosols in a Perturbed Parameter Ensemble
- 2025 **Joint Atmospheric Radiation Measurement (ARM) User Facility and Atmospheric System Research (ASR) Principal Investigators Meeting, Rockville, MD**  
(Poster) PROCEEDing from the surface to the climate
- 2025 **American Meteorological Society Annual Meeting, New Orleans, LA**  
(Talk) Constraining aerosol-cloud interactions in an E3SMv3 perturbed parameter ensemble using ARM observations  
(Talk) Changes to the Brewer-Dobson Circulation and cold point tropopause in perturbed-climate global storm-resolving model simulations
- 2024 **Composition Air Quality Climate inTeractions Initiative (CACTI) Workshop, San Diego, CA**  
(Talk) Evaluating Aerosol-Cloud Interactions in E3SMv3 Using a Perturbed Parameter Ensemble
- 2024 **DOE Earth and Environmental Systems Modeling (EESM) Principal Investigators Meeting, Rockville, MD**  
(Talk) Evaluating Aerosol-Cloud Interactions in E3SMv3 Using a Perturbed Parameter Ensemble
- 2023 **American Geophysical Union Fall Meeting, San Francisco, CA**  
(Talk) Can Global Storm-Resolving Models Reproduce Observed Cold Point-Overshooting Convection?

- 2023            **Joint CFMIP-GASS Meeting**, Paris, France  
(Poster) Tropical tropopause-penetrating convection and cold point cirrus: satellite observations vs. global storm-resolving models
- 2022            **American Geophysical Union Fall Meeting**, Chicago, IL  
(Talk) Evaluating Overshooting Convection in the DYAMOND Global Storm-Resolving Models Using Outgoing Longwave Radiation  
(Poster) The Cold Point Tropopause in DYAMOND GSRMs: Overshooting Convection vs. Cirrus Lofting
- 2022            **Cloud Feedback Model Intercomparison Project (CFMIP) Meeting**, Seattle, WA  
(Talk) Overshooting Convection and Tropical Cirrus in the DYAMOND Global Storm-Resolving Models
- 2020            **6th ENES High Performance Computing Workshop**, Virtual  
(Talk) Evaluating Convection and Tropical Tropopause Layer Cirrus in the DYAMOND Simulations

## EXTERNAL SERVICE

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- 2023 – Present        **Referee** for the following journals:  
*Nature Communications*  
*Geophysical Research Letters*  
*npj Climate & Atmospheric Science*  
*Journal of Advances in Modeling Earth Systems*  
*JGR: Atmospheres*  
*Advances in Space Research*  
*Earth and Space Science*  
*Scientific Online Letters on the Atmosphere*
- 2024 – 2025        **Program Co-Chair**, American Meteorological Society Second Symposium on Cloud Physics

## MENTORING EXPERIENCE

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- 2025            **Research Mentor**, University of Wyoming Dept. of Atmospheric Science
- 2018 – 2023        **Mentor, Graduate-Undergraduate Mentoring Program**, University of Washington Dept. of Atmospheric Sciences
- 2020            **Co-Supervisor, Cooperative Institute for Climate, Ocean, and Ecosystem Studies (CICOES) Undergraduate Research Internship**, Virtual

## COMMUNITY AND DEPARTMENT INVOLVEMENT

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- 2024 – Present        Member, Wyomingites in Math, Science and Engineering (WiMSE), University of Wyoming

2022 – 2023	Member, Diversity and Inclusion Group, University of Washington (UW) Atmospheric Sciences
2020 – 2023	Coordinator, Coding Club, UW Atmospheric Sciences
2020 – 2023	Volunteer, Outreach Program, UW Atmospheric Sciences
2018 – 2023	Coordinator, Atmos Women’s Group, UW Atmospheric Sciences
2021	Assistant Event Supervisor, Science Olympiad National Tournament

## HACKATHON PARTICIPATION

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2024	<b>Pythia Cook-off 2024</b> , Virtual Created a Python Cookbook for regridding and visualizing geoscientific data ( <a href="https://projectpythia.org/esgf-cookbook/notebooks/ex-regrid-plot.html">projectpythia.org/esgf-cookbook/notebooks/ex-regrid-plot.html</a> ).
2019	<b>Coupled Model Intercomparison Project Phase 6 (CMIP6) Hackathon</b> , University of Washington Branch, Seattle, WA Created a publicly available outreach tool to allow policymakers and other researchers to easily access and visualize CMIP6 data for a specified location ( <a href="https://github.com/czarakas/local_climate_change_tool">github.com/czarakas/local_climate_change_tool</a> ).
2019	<b>Second Annual DYAMOND-ESiWACE Hackathon</b> , Mainz, Germany

## PROFESSIONAL MEMBERSHIP

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American Geophysical Union  
American Meteorological Society  
Earth Science Women’s Network