Jonah Shaw

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Education

- **University of Colorado at Boulder** — Boulder, CO
  PhD in Atmospheric and Oceanic Sciences, expected Aug. 2025; GPA: 3.97 — *Aug. 2020 – Present*
  - Advisor: Prof. Jen Kay
  - Research: Using global climate models and satellite observations to enhance the detection of Arctic and regional climate changes
- **Carleton College** — Northfield, MN
  Bachelor of Arts in Physics; GPA: 3.94; Honors in Physics, Magna Cum Laude — *Sep. 2014 – June 2018*
  - Thesis: Radiative transfer in the earth-atmosphere-space system

Research Experience

- **University of Oslo, Section for Meteorology and Oceanography** — Oslo, Norway
  US Fulbright Student Scholar working with Prof. Trude Storelvmo — *Aug. 2019 - May 2020*
  - Operated the NorESM2 and CESM2 global climate models. Modified of the model's parametrization of ice nucleation in mixed-phase clouds and in-model satellite simulator (COSP).
  - Processed and synthesized model predictions with observational datasets from the CALIOP and CloudSat satellite missions.
- **National Institute of Standards and Technology** — Boulder, CO
  Post-Baccalaureate Researcher working with Prof. Scott Diddams — *July 2018 - July 2019*
  - Implemented a flexible and robust digital phase-lock loop to stabilize laser frequency combs.
  - Used free-space and fiber optics to produce and characterize femtosecond near-infrared pulses.
  - Wrote programs in Python and MATLAB to model pulse evolution in optical fiber.
- **Analog Devices** — Golden, CO
  Electro-Optical Engineering Intern — *Summer 2017*
  - Characterized behavior of liquid crystal waveguide technology for use in automotive LiDAR.
- **Carleton College, Department of Physics** — Northfield, MN
  Research Assistant working with Prof. Eric Hazlett — *Dec. 2015 - Nov. 2017*
  - Designed and constructed an apparatus to measure the divergence and waist of gaussian laser beams.

Publications

J.K. Shaw, D.P. Larson, and D.D. Turner, "Evaluating NOAA's HRRR v4 and RRFS v1 models as forecasters of day-ahead solar irradiance: Skill, spread, and steps forward," (in prep.).

A. Borowiak et al., (including **J.K. Shaw**), "Methods to Identify Time of Emergence," (in prep.).

O Bruno, **J.K. Shaw**, T. Storelvmo, and C. Hoose, "Evaluation of global climate and storm-resolving models for the representation of mixed-phase clouds and their hemispheric contrasts," (in prep.).

J.K. Shaw, D. Swales, S. Desouza-Machado, D.D. Turner, J.E. Kay, and D.P. Schneider, "COSP-RTTOV: Flexible radiation diagnostics to enable new science applications in satellite mission design, climate change detection, and model evaluation," (submitted, preprint at https://doi.org/10.22541/essoar.173869544.41368370/v1).

J.K. Shaw and N. Lenssen, "Early and Widespread Emergence of Regional Warming is Robust to Observational and Model Uncertainty," (submitted, preprint at https://doi.org/10.22541/essoar.173456537.76717174/v1).

Hofer, S., Hahn, L.C., **Shaw, J.K.** et al. "Realistic Representation of Mixed-phase Clouds Increases Projected Climate Warming," (2024). Communications Earth & Environment, 5, 390. https://doi.org/10.1038/s43247-024-01524-2

J.K. Shaw and J.E. Kay, "Processes Controlling the Seasonally Varying Emergence of Forced Arctic Longwave Radiation Changes," (2023). J. Climate, 36, 7337–7354. https://doi.org/10.1175/JCLI-D-23-0020.1

McGraw, Z., Storelvmo, T., Polvani, L. M., Hofer, S., **Shaw, J. K.**, Gettelman, A.,"On the Links Between Ice Nucleation, Cloud Phase, and Climate Sensitivity in CESM2," (2023). Geophysical Research Letters, 50, e2023GL105053. https://doi.org/10.1029/2023GL105053

B. Medeiros, **J. Shaw**, J.E. Kay, and I. Davis, "Assessing Clouds Using Satellite Observations Through Three Generations of Global Atmosphere Models," (2023). Earth and Space Science, 10, e2023EA002918. https://doi.org/10.1029/2023EA002918

J. Zhu, B.L. Otto-Bliesner, E.C. Brady, A. Gettelman, J.T. Bacmeister, R.B. Neale, C.J. Poulsen, **J.K. Shaw**, Z.M. McGraw, J.E. Kay, "LGM paleoclimate constraints inform cloud parameterizations and equilibrium climate sensitivity in CESM2," (2022). Journal of Advances in Modeling Earth Systems, 14, e2021MS002776. https://doi.org/10.1029/2021MS002776

J. Shaw, Z. McGraw, O. Bruno, T. Storelvmo, and S. Hofer, "Using satellite observations to evaluate model microphysical representation of Arctic mixed-phase clouds," (2022). Geophysical Research Letters, 49, e2021GL096191. https://doi.org/10.1029/2021GL096191

J.K. Shaw, C. Fredrick, and S.A. Diddams, "Versatile digital approach to laser frequency comb stabilization," OSA Continuum 2, 3262-3271 (2019). https://doi.org/10.1364/OSAC.2.003262

Selected Posters and Presentations

105th AMS Annual Meeting, *Evaluating NOAA's HRRR v4 and RRFS v1 models as forecasters of day-ahead solar irradiance: Skill, spread, and steps forward* (presentation), *Atmospheric, Oceanic, and Cryospheric Sciences REU at the University of Colorado Boulder* (poster co-author)

2024 AGU Annual Meeting, *Apples-to-apples radiation comparisons speed the detection of Arctic climate change* (poster)

104th AMS Annual Meeting, *The Atmospheric, Oceanic, and Cryospheric Sciences REU at the University of Colorado Boulder* (poster co-author)

2023 AGU Fall Meeting, *New Spectral Radiation Diagnostics for Climate Change Detection, Model Evaluation, and Satellite Mission Design* (presentation), *Observational Uncertainty is Necessary for Assessing Time-of-Emergence* (presentation)

2023 Gordon Research Conference on Climate and Radiation, *Enhancing Climate Change Detection with Spectral Radiation* (poster)

AMS Collective Madison Meeting 2022, *Emerging seasonal changes in Arctic Longwave Radiation* (presentation)

International Radiation Symposium 2022, *Emerging seasonal changes in Arctic Longwave Radiation* (presentation)

Graduate Climate Conference 2021, *Observations of Seasonal Changes in the Arctic Energy Budget* (poster)

CESM 2021 Annual Workshop, *Evaluation of clouds in three generations of CAM using satellite simulators and observations* (poster)

Honors and Awards

3rd Place, CU Boulder ESSS Poster Conference

ATOC Student Service Award (Spring 2024)

Outstanding Student Presentation Award (OSPA), AGU 2023 Fall Meeting

ATOC Student Service Award (Spring 2023)

ATOC Student Teaching Award (Spring 2023)

Future Investigators in NASA Earth and Space Science and Technology (FINESST) Grant recipient with Professor Jennifer Kay (2022).

International Radiation Symposium Student Travel Award (2022)

CIRES Graduate Student Travel Grant (2022)

ATOC Student Service Award (Spring 2022)

Honorable Mention, 2020 National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP)

Shaw et al. (2019) named an Editor's Pick in OSA Continuum

Fulbright Student Research Grant Recipient (2019-2020), Norway

Distinction in Senior Thesis, Carleton College

Campus Nominee, Barry Goldwater Scholarship 2017, Carleton College

Dean's List 2014, 2015, 2016 (Carleton College)

Carleton Distinguished Scholar

National Merit Scholar

Service

Peer Reviewer: Atmospheric Chemistry and Physics, Earth System Science Data, Global Planetary Change, Journal of Climate, Journal of Geophysical Research: Atmospheres, Journal of Hydrometeorology

ATOC REU Planning Committee, CU Boulder	January 2021 - Present
ATOC Justice, Equity, Diversity, and Inclusivity Committee, CU Boulder	August 2020 - Present
ATOC Graduate Application Program Mentor, CU Boulder	August 2020 - Present
ATOC First-Year Graduate Student Mentor, CU Boulder	August 2021 - August 2023
ATOC REU Graduate Student Mentor, CU Boulder	Summers 2021, 2022, and 2023
ATOC Curriculum Committee, CU Boulder	September 2022 - May 2023
Student Departmental Advisor, Physics, Carleton College	Sep. 2017 - June 2018
Physics Department Curriculum Committee, Carleton College	Sep. 2017 - June 2018
Project Friendship Mentor, Northfield, Minnesota	March 2015 - June 2018