Ash L. Gilbert

Email: ash.gilbert@colorado.edu, Website: https://gilbertcloud.github.io/
Dept. of Atmospheric & Oceanic Sciences, University of Colorado-Boulder, Boulder, CO 80309

EDUCATION

University of Colorado, Boulder — Boulder, CO
Ph.D., Atmospheric and Oceanic Sciences — Expected Spring 2027
Candidacy Exam — 2024
M.S., Atmospheric and Oceanic Sciences — 2025

University of Michigan — Ann Arbor, MI
B.S.E. with Honors, *summa cum laude* — 2022
Major: Climate & Meteorology, concentration in Meteorology
Minors: Computer Science & Latin

AWARDS & HONORS

NSF Graduate Research Fellowship — 2022
ESSS Conference – Best Poster in Aerosols, Clouds, and Precipitation Session — 2023
CIRES Graduate Student Research Award — 2025
ATOC Student Service Award — 2025

RESEARCH INTERESTS

- polar cloud processes
- Community Earth System Model (CESM)
- Arctic climate
- wind nudging
- climate model development
- internal climate variability
- climate change attribution
- atmosphere-sea ice interactions

RESEARCH EXPERIENCE

University of Colorado, Boulder — Boulder, CO
Graduate Research Assistant, Advisor: Jennifer E. Kay — 2022 – Present
Project 1:

- Evaluated the impact of supercooled liquid water optical properties on the Arctic climate via a hierarchy of climate models (CESM), ordered by level of dynamical constraint
- Identified a substantial effect from the optics in constrained dynamical models, but not in dynamically unconstrained models
- Proposed this model hierarchy as a method to assess the effect of model physics changes on a model climate
- First-author manuscript of this project has been published

Project 2:

- Assessed the contribution of winds to recent Arctic warming and sea ice loss using wind nudging in CESM and comparing to observations and the pre-industrial CESM control
- Evaluated the change in wind contribution for an increase and decrease in mean state sea ice thickness
- Developed a tuned version of CESM2 that has a pre-industrial climate and modern-day mean state sea ice
- First-author manuscript of this project has been accepted and is in press

University of Michigan Ann Arbor, MI
Research Assistant, Advisor: Jeremy N. Bassis 2019 – 2023

- Determined the controls on supraglacial lake formation through observational analysis and modeling to further knowledge of ice sheet ablation
- Identified the observed spatio-temporal patterns in supraglacial lake formation and air temperature with ArcGIS
- Modeled how supraglacial lakes drain to replicate observed patterns using Python software and ArcGIS
- Presented poster on work in 2020 and 2021 at national conference for American Geophysical Union
- Participated in weekly lab meetings discussing relevant research papers and professional development topics
- Wrote and submitted a research paper for publication from this project (rejected)

University of Michigan Ann Arbor, MI
Research Assistant, Advisor: Christiane Jablonowski 2021 – 2022

- Analyzed a case study of lake effect snow forecasting for the UFS-SRW model coupled to the FV3COM, a lake dynamics model
- Ran various configurations of the coupled UFS-FV3COM model on the NCAR Cheyenne supercomputer
- Compared model results to reanalysis data and snow accumulation observations to evaluate model skill
- Contributed to manuscript that included this case study, which is in review

NSF Oceanic Sciences (Virtual) REU, NorthWest Research Associates
Research Intern, Advisor: Penny Rowe 2020

- Worked under a mentor to find the influence of temperature dependence of cloud optical properties on simulated IR flux
- Received anti-discrimation, anti-harassment, DEI, and research ethics training through a series of professional development seminars provided by NSF
- Gave research talk as final part of the REU
- Presented poster on work in 2021 at national conference for American Meteorological Society

University of Michigan Kangerlussuaq, Greenland
Field Expedition Member, Lead: Perry Samson 2019

- Gained significant field research experience by working with team of students and professors to conduct multiple experiments involving stream flow, net solar radiation, PIBAL and rawinsonde launches, air quality, and 3D-scanning with drones
- Led and trained sub-team responsible for radiosonde launches

University of Michigan Ann Arbor, MI
Research Assistant, Advisor: Perry Samson 2018 – 2019

- Wrote Python program that accessed a data bank of HY-SPLIT trajectories and retrieved trajectories corresponding to high or low ^{18}O values, then ran trajectory coordinates through a probability distribution function to produce a map that described where air with a high or low ^{18}O likely originated in order to find moisture sources for the UMBS using Python
- Concluded project by writing a summary paper and giving a poster presentation

University of Michigan Ann Arbor, MI
Research Assistant, Advisor: Phoebe Aron 2018 – 2019

- Interpolated meteorological, hydrological, and isotopic data with ArcGIS tools

- Developed and evaluated multiple procedures for calculating statistics of watersheds with ArcGIS tools
- Maintained and updated database of meteorological and isotopic information with SQL for Southern Peru
- Performed linear regression analysis on reanalysis datasets and isotope data using MATLAB
- Assisted PhD student relating to their study of hydrology in the Peruvian Andes by completing a variety of small research projects

TEACHING EXPERIENCE

University of Michigan
Instructional Aide, Earth and Space System Evolution — Fall 2021
Collaborator, Melting Ice Rising Seas Teach-Out — Fall 2019 – Spring 2020

SERVICE

University of Colorado, Boulder
Technology Committee — 2022 – 2024
- Made improvements to department website including removal of old links and addition of photos and personal website links to graduate student pages
- Advocated for committee to have department website access to make regular updates

Mentorship Committee — 2023 – Present
- Participated as a mentor in the Graduate Application Mentorship program in Fall 2022-25
    - Mentored several students each year applying to the department by giving advice and reviewing personal statements
- Co-led Graduate Application Mentorship program in Fall 2023-25
    - Matched mentor graduate students to mentee applying students

Prospective Student Committee — 2023 – Present
- Helped organized prospective student visits in the spring

ATOC REU — Summer 2024
- Mentored an undergraduate student for a summer research project
- Gave technical and career advice

RECCS Program — Summer 2023
- Co-mentored an undergraduate student for summer research project with another graduate student
- Gave technical help

University of Michigan
Engineering Honors Graduate School Panel — 2023 – 2025
- Served on five graduate school informational panels for seniors in the Engineering Honors program
- Answered questions about the graduate school application process and graduate school life

COMPUTER SKILLS

- Python
- Jupyter
- C++
- SQL
- MATLAB
- Fortran90
- Community Earth System Model (CESM)
- ArcGIS
- Unified Forecast System (UFS)
- Autodesk Inventor
- Adobe Illustrator

- Microsoft PowerPoint
- LaTeX
- GitHub
- Supercomputing

LANGUAGES

Latin (reading knowledge)

PROFESSIONAL ASSOCIATIONS

American Geophysical Union
American Meteorological Society
Out in STEM
International Society of Non-Binary Scientists

PUBLICATIONS

In review

Wright, D.M., Jablonowski, C., Fujisaki-Manome, A., Mroczka, B., **Gilbert, A.**, Titze, D., Mann, G.E., Anderson, E.J. The Sensitivity of Lake-Effect Snowfall to Changes in Lake Surface Conditions Across the Forecast Horizon in the Unified Forecast System's Short-Range Weather Application (UFS-SRW). *Monthly Weather Review.*

Published

Gilbert, A.L., Kay, J.E., Blanchard-Wrigglesworth, E., Bailey, D.A., Holland, M.M., Jahn, A., and Schneider, D.P. (2025). Observed winds alone cannot explain recent Arctic warming and sea ice loss. *Environmental Research: Climate* **4**(4), 045009. https://doi.org/10.1088/2752-5295/ae11cb.

Gilbert, A., Kay, J.E., and Rowe, P. (2025). A novel model hierarchy isolates the limited effect of supercooled liquid cloud optics on infrared radiation. *Geoscientific Model Development* **18**(19), 7185-7197. https://doi.org/10.5194/gmd-18-7185-2025.

Jonko, A., Oliveto, J., Beaty, T., Atchley, A., Battaglia, M.A., Dickinson, M.R., **Gilbert, A.**, Godwin, D., Kupfer, J.A., Hiers, J.K., Hoffman, C., North, M., Restaino, J., Sieg, C., and Skowronski, N. (2024). How will future climate change impact prescribed fire across the contiguous United States? *npj Climate and Atmospheric Science* **7**(1), 1-10. https://doi.org/10.1038/s41612-024-00649-7.

Snide, C.E., **Gilbert, L.**, Meyer, A., Samson, P., Flanner, M., and Bassis, J. (2020). Seeing the Greenland Ice Sheet through students' eyes. *Eos, 101*. https://doi.org/10.1029/2020EO139739.

CONFERENCE PRESENTATIONS

Gilbert, A., Kay, J., Blanchard-Wrigglesworth, E., Bailey, D.A., Holland, M.M., Jahn, A., and Schneider, D. Observed Winds Alone Cannot Explain Recent Arctic Warming and Sea Ice Loss. Atmospheric and Oceanic Sciences Colloquium. Talk delivered at the ATOC Colloquium, Boulder, CO, September, 2025.

Gilbert, A., Kay, J., Blanchard-Wrigglesworth, E., Bailey, D.A., Holland, M.M., Jahn, A., and Schneider, D. Isolating the Contribution of Observed Winds to Recent Arctic Warming and Sea Ice Loss. Community Earth System Model (CESM) Workshop. Submitted talk delivered at the CESM Workshop, UCAR, Boulder, CO, June, 2025.

Gilbert, A., Kay, J., Blanchard-Wrigglesworth, E., Schneider, D. Isolating the Contribution of Observed Winds to Recent Arctic Warming and Sea Ice Loss. AMS Denver Summit 2025. Submitted talk delivered at the AMS Denver Summit, Denver, CO, May, 2025.

Gilbert, A., Kay, J., Blanchard-Wrigglesworth, E., Schneider, D. What controls the rapid Arctic warming since 1980? International Conference on Arctic Research Planning (ICARP IV) at Arctic Science Summit Week 2025. Submitted talk delivered at ICARP IV, Boulder, March, 2025.

Gilbert, A., Kay, J., Blanchard-Wrigglesworth, E., Schneider, D. Isolating the Contribution of Observed Winds to Recent Arctic Warming and Sea Ice Loss. Land Ice and Polar Climate Working Group Meeting 2025. Submitted talk delivered at the Polar Climate Working Group meeting, NCAR, Boulder, CO, March, 2025.

Gilbert, A., Kay, J., Blanchard-Wrigglesworth, E., Schneider, D. What controls the rapid Arctic warming since 1980? American Geophysical Union (AGU) Abstracts. A33B-1975. Poster presentation delivered at the AGU meeting, Washington, DC, December, 2024.

Gilbert, A., Kay, J., Blanchard-Wrigglesworth, E., Schneider, D. Isolating the Contribution of Observed Winds to Recent Arctic Warming and Sea Ice Loss. Earth System and Space Science (ESSS) Conference. Poster presentation delivered at the ESSS Conference, Boulder, CO, December, 2024.

Gilbert, A., Kay, J., Blanchard-Wrigglesworth, E., Schneider, D. Isolating the Contribution of Observed Winds to Recent Arctic Warming and Sea Ice Loss. Graduate Climate Conference (GCC). Poster presentation delivered at the GCC, Pack Forest, Eatonville, WA, November, 2024.

Gilbert, A., Kay, J., and Rowe, P. Isolating the Influence of Temperature-dependent Cloud Optics on Infrared Radiation within a Model Hierarchy. Polar Radiant Energy in the Far InfraRed Experiment (PREFIRE) Science Team Meeting. Submitted talk delivered at the PREFIRE Science Team Meeting, Boulder, CO, August, 2024.

Gilbert, A., Kay, J., and Rowe, P. Isolating the Influence of Temperature-dependent Cloud Optics on Infrared Radiation within a Model Hierarchy. Community Earth System Model (CESM) Workshop. Submitted talk delivered at the CESM Workshop, UCAR, Boulder, CO, June, 2024.

Gilbert, A., Kay, J., and Rowe, P. Isolating the Influence of Temperature-dependent Cloud Optics on Infrared Radiation within a Model Hierarchy. Cloud Feedback Modeling Intercomparison Project (CFMIP) Meeting. Poster presentation delivered at the CFMIP Meeting, Boston College, Boston, MA, June, 2024.

Gilbert, A. and Kay, J., A Breakdown of Arctic Warming. Land Ice and Polar Climate Working Group Meeting 2024. Submitted talk delivered at the Polar Climate Working Group meeting, NCAR, Boulder, CO, February, 2024.

Gilbert, A., Kay, J., and Rowe, P. Isolating the Influence of Temperature-dependent Cloud Optics on Infrared Radiation within a Model Hierarchy. Polar Amplification of Climate Change Across Hemispheres and Seasons: Causes and Constraints Workshop. Poster presentation delivered at the Polar Amplification workshop, UCAR, Boulder, CO, January, 2024.

Gilbert, A., Kay, J., and Rowe, P. Isolating the Influence of Temperature-dependent Cloud Optics on Infrared Radiation within a Model Hierarchy. Earth System and Space Science (ESSS) Conference. Poster presentation delivered at the ESSS Conference, Boulder, CO, December, 2023.

Gilbert, A. and Kay, J. Impact of Temperature Dependent Cloud Optical Properties on Modeled Infrared Radiation. Gordon Research Conferences (GRC) 2023 Radiation and Climate. Poster presentation delivered at the GRC Radiation and Climate meeting, Bates College, Lewiston, ME, July, 2023.

Gilbert, L. and Bassis, J. Observing and Modeling Drainage Networks from Supraglacial Lakes on Russell Glacier, West Greenland. American Geophysical Union (AGU) Abstracts. C151C-0809. Poster presentation delivered virtually at the AGU meeting, December, 2021.

Gilbert, L., Rowe, P., Fergoda, M., Neshyba, S. Influence of Temperature Dependence of Cloud Optical Properties on Simulated IR Flux at South Pole, Antarctica. American Meteorological Society (AMS) Abstracts. 136. Poster presentation delivered virtually at the AMS meeting, January, 2021.

Gilbert, L. and Bassis, J. Observing and Modeling Drainage Networks from Supraglacial Lakes on Russell Glacier, West Greenland. American Geophysical Union (AGU) Abstracts. C061-0011. Poster presentation delivered virtually at the AGU meeting, December, 2020.

Gilbert, L., Aron, P., Samson, P., Poulsen, C. Ensemble Probability Program for Backward Trajectories from the University of Michigan Biological Station (UMBS) based on the Relative Abundance of $\delta^{18}O$. Michigan Geophysical Union (MGU) Symposium. Poster presentation delivered at the MGU Symposium, Ann Arbor, MI, April, 2019.

REFERENCES

Jennifer E. Kay, PhD
Associate Professor
Department of Atmospheric & Oceanic Sciences
University of Colorado, Boulder
(303) 492-6289
jennifer.e.kay@colorado.edu