Skylar (Sky) Gale

Seattle, WA | skycgale@uw.edu | GitHub | Google Scholar | Website

Education

University of Washington, *Seattle, WA* Expected Jun 2028
PhD, Atmospheric and Climate Science
University of Washington, *Seattle, WA* Jun 2025
MS, Atmospheric and Climate Science | GPA 3.88
University of Colorado Boulder, *Boulder, CO* May 2023
BS, Engineering Physics | Summa Cum Laude
Double Minor in Applied Math & Atmospheric and Oceanic Sciences

Awards

HiLAT-RASM Honorable Mention 2026
CICOES Graduate Student Fellowship 2025

Professional Experience

PhD Student, Atmospheric and Climate Science, University of Washington, *Seattle, WA* Jul 2025 – Present
- Developing EngressNet deep-learning downscaling of daily, high-resolution sea ice thickness ensembles for coastal Alaska communities such as Point Hope and Kivalina (manuscript in preparation)

Visiting Graduate Researcher, NSF NCAR, *Boulder, CO* Jun – Aug 2026
- Developed EngressNet, a stochastic residual U-Net for statistical downscaling of Arctic sea ice thickness, with land-mask conditioning and coastal-band loss upweighting
- Ran systematic ablation experiments (cosine weighting, architectural depth, stochastic refinement) to isolate the contribution of individual model components under limited CMIP6 training data
- Built reproducible PBS-based training pipelines on NCAR's Casper HPC system, with version-controlled conda environments for training and evaluation
- Mentored an incoming student on NCAR HPC infrastructure and the Python geoscience/ML stack

Assistant Climate Data Scientist, Polar Bears International, *Remote* Jun – Sep 2025
- Built a data pipeline to acquire and process four satellite passive-microwave sea ice concentration products (NOAA/NSIDC G02202, G10016, NSIDC-0803, AMSR2) spanning 1978–2025
- Calculated sea ice breakup, freeze-up, and ice-free-day metrics for the Southern and Western Hudson Bay polar bear subpopulations, cross-validating results across sensor platforms and spatial resolutions (12.5 km, 25 km)
- Produced sea ice trend maps and time series for habitat assessment of Hudson Bay polar bear populations

MS Student, Atmospheric and Climate Science, University of Washington, *Seattle, WA* Sep 2023 – Jun 2025
- Quantified the contribution of internal climate variability to springtime Arctic amplification, combining observations, reanalyses, and large-ensemble climate model simulations
- Trained convolutional neural networks on sea level pressure and surface air temperature fields from a CMIP6 multi-model ensemble to predict internally driven Arctic SAT trends separately for March, April, and May, isolating month-specific drivers of amplification
- Diagnosed Arctic temperature and circulation trends for two peer-reviewed studies resolving discrepancies between observed and modeled Arctic amplification

Undergraduate Research Assistant, Department of Geophysics, CU Boulder, *Boulder, CO* Jul 2022 – May 2023
- Quantified mantle viscosity misfits across ice-model outputs as a function of ice load distribution
- Compared ICE-6G and ANU ice history models via near-field and far-field viscosity and relative sea level misfits

Glaciology Research Student, School for International Training, *Reykjavík, Iceland* Jun – Jul 2022
- Synthesized research on the Vatnajökull ice cap, analyzing how climate change will alter ice dynamics, melt mechanisms, and downstream hydrology
- Assessed long-term water storage implications for Iceland's hydropower sector under projected ice cap change

Publications

Why April Stands Out: Monthly Impacts of Internal Variability on Arctic Amplification, Oct 2026
Journal of Geophysical Research: Atmospheres, 131(19), e2026JD047413 (link)
Skylar Gale, Qiang Fu, Hailong Wang, Ed Blanchard-Wrigglesworth, Muyin Wang, Ash Gilbert, Aodhan Sweeney, Stephen Po-Chedley

The Role of Internal Variability in Springtime Arctic Amplification from 1980 to 2022, May 2026
Journal of Climate, 39(12), 3221–3237 (link)
Skylar Gale, Qiang Fu, Aodhan Sweeney, Hailong Wang, Muyin Wang

Investigating ANU and ICE-6G Ice Model Relative Sea Level Misfits to Determine Viscosity Constraints since the Last Glacial Maximum, *University of Colorado Honors Journal* (link) 2024
Skylar Gale

Presentations

Talk | **Internal Variability Explains Nearly Half the Observed–Model Discrepancy in Spring Arctic Amplification** | CESM Workshop, Harnessing Machine Learning for CESM Jun 2026

Talk | **The Role of Internal Variability in Springtime Arctic Amplification** | PAMIP Seminar May 2026

Talk | **The Role of Internal Variability in Springtime Arctic Amplification** | UW Atmospheric and Climate Science Seminar Feb 2026

Talk | **Internal Variability Explains Much of the Observed–Model Discrepancy in Spring Arctic Amplification** | CESM Polar Climate Working Group Winter Workshop Feb 2026

Poster | **The Role of Internal Variability in Observed Arctic Spring Warming and the Underlying Coupling Mechanisms** | AGU Fall Meeting Dec 2025

Talk | **Springtime Arctic Amplification from 1980–2022: The Role of Internal Variability based on Machine Learning** | Arctic Science Summit Week (ICARP IV) Mar 2025

Poster | **Transforming Snow and Sea Ice Data for Machine Learning: Developing an AI-Ready Process** | Arctic Science Summit Week (ICARP IV) Mar 2025

Poster | **Seasonality of Arctic Amplification from 1980–2022: The Role of Internal Variability based on Machine Learning** | AGU Fall Meeting Dec 2024

Talk | **Seasonality of Arctic Amplification from 1980–2022: The Role of Internal Variability based on Machine Learning** | PAMIP2 Workshop Oct 2024

Talk | **Springtime AA in Observations and CMIP6 Models: Using Machine Learning to Estimate the Role of Internal Variability** | HiLAT-RASM All-Hands Meeting Oct 2024

Service and Leadership

Graduate K-12 Outreach Committee Co-Chair Sep 2024 – Present

Graduate-Undergraduate Mentoring Program Mentor Sep 2023 – Present

Graduate Climate Conference Organizing Committee Jan 2023 – Nov 2026

College of the Environment Student Advisory Committee Representative Sep 2024 – Jun 2026

Department Teaching Award Committee Co-Chair Sep 2024 – Aug 2025

Graduate Student Distinguished Visiting Lecture Co-Chair Sep 2024 – Aug 2025

Additional Information

Expertise: Polar climate | Climate variability | Atmospheric dynamics | Machine learning | Climate modeling
Memberships: AGU, APECS, IARPC, IASC, IGS, PSECCO
Coding: Python, PyTorch, TensorFlow, Fortran, C, C++, Java, MATLAB