

Una Kim Miller

Cornell University
Department of Earth and
Atmospheric Sciences
Assistant Professor

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Education

Ph.D. Columbia University, Earth and Environmental Sciences 2023
Advisor: Christopher J. Zappa
B.S. University of Washington, Oceanography 2015

Professional Appointments

Assistant Professor Cornell University 2025 – present
Postdoctoral Fellow University of Rhode Island 2023 – 2025
Graduate Research Fellow Columbia University 2016 - 2023
Research Assistant University of Washington 2012 - 2016

Research Interests

- Air-sea interaction physics
- Upper ocean turbulence
- High-latitude environments
- Ocean carbon and oxygen
- Moorings and uncrewed systems
- Model parameterizations

Peer-Reviewed Publications

2024

1. **Miller, U. K.**, K. E. Fogaren, D. Atamanchuk, C. Johnson, J. Koelling, I. Le Bras, M. Lindeman, H. Nagao, D. P. Nicholson, H. Palevsky, E. Park, M. Yoder, J. Palter, 2024; Oxygen optodes on oceanographic moorings: recommendations for deployment and in-situ calibration. *Frontiers in Marine Science*. [doi: 10.3389/fmars.2024.1441976](https://doi.org/10.3389/fmars.2024.1441976)
2. **Miller, U. K.**, C.J. Zappa, A.L. Gordon, S.T. Yoon, C. Stevens, L. Cornelissen, S.K. Yun, W.S. Lee, 2024; The coupling of winds, ocean turbulence, and High Salinity Shelf Water in the Terra Nova Bay Polynya. *Deep Sea Res. Part II*. [doi:10.1016/j.dsr2.2024.105412](https://doi.org/10.1016/j.dsr2.2024.105412)
3. Stevens, C., S.T. Yoon, C.J. Zappa, **U.K. Miller**, X. Wang, F. Elliot, L. Cornelissen, C.K. Lee, S.K. Yun, W.S. Lee, 2024; Ocean processes south of the Drygalski Ice Tongue, western Ross Sea. *Deep Sea Res. Part II*. [doi:10.1016/j.dsr2.2024.105411](https://doi.org/10.1016/j.dsr2.2024.105411)
4. **Miller, U. K.**, C.J. Zappa, A.L. Gordon, S.T. Yoon, C. Stevens, W.S. Lee; High Salinity Shelf Water production rates in Terra Nova Bay, Ross Sea from high-resolution salinity observations, 2024; *Nat. Commun.* [doi:10.1038/s41467-023-43880-1](https://doi.org/10.1038/s41467-023-43880-1)

2023

5. **Miller, U. K.**, C. J. Zappa, S. Zippel, J. T. Farrar, R. A. Weller; Scaling of moored surface ocean turbulence measurements in the Southeast Pacific Ocean, 2023; *J. Geophys. Res. Oceans*, [doi:10.1029/2022JC018901](https://doi.org/10.1029/2022JC018901)

2021

6. Zippel, S., J. T. Farrar, C. J. Zappa; **U. K. Miller**, L. St. Laurent, T. Ijichi, R. A. Weller, L. McRaven, D. Le Bel, 2021; TKE Dissipation Rate Estimates from Pulse-Coherent ADCPs on Moorings. *J. of Atmos. Ocean. Technol.*, [doi:10.1175/JTECH-D-21-0005.1](https://doi.org/10.1175/JTECH-D-21-0005.1)

2014 – 2018

7. Wurl, O., K. Bird, M. Cunliffe, W.M. Landing, **U. K. Miller**, N. I. H. Mustaffa, et al., 2018. Warming and inhibition of salinization at the ocean's surface by cyanobacteria. *Geophys. Res. Lett.*, [doi:10.1029/2018GL077946](https://doi.org/10.1029/2018GL077946)
8. Johnson, H. P., **U. K. Miller**, M. S. Salmi, and E. A. Solomon, 2015; Analysis of bubble plume distributions to evaluate methane hydrate decomposition on the continental slope. *Geochem. Geophys. Geosyst.*, [doi:10.1002/2015GC005955](https://doi.org/10.1002/2015GC005955).
9. Hautala, S. L., E. A. Solomon, H. P. Johnson, R. N. Harris, **U. K. Miller**, 2014; Dissociation of Cascadia margin gas hydrates in response to contemporary ocean warming. *Geophys. Res. Lett.*, [doi:10.1002/2014GL061606](https://doi.org/10.1002/2014GL061606)

Awards and Grants

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| Early Career Poster Award, International Symposium on Polar Sciences | 2021 |
| Future Investigators in NASA Earth and Space Science and Technology (FINESST) grant | 2019 |

Professional Service

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| Early career member Ocean Carbon & Biogeochemistry (OCB) Ocean-Atmosphere Interaction Steering Committee | 2024 - present |
| Invited Reviewer Nature Communications, Journal of Remote Sensing | 2021 - present |
| Seminar Coordinator Ocean and Climate Physics Seminar Series <i>Invited speakers and managed logistics for a divisional seminar series at the Lamont-Doherty Earth Observatory</i> | 2019 - 2020 |
| Seminar Coordinator Earth Science Colloquium <i>Invited speakers and managed logistics for an institution-wide seminar series at the Lamont-Doherty Earth Observatory</i> | 2018 – 2020 |
| Student Representative Executive Committee <i>Advocated for graduate student matters in monthly meetings with the Lamont-Doherty Earth Observatory directorate</i> | 2019 - 2020 |

Teaching Experience

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| Climate and Oceans University of Rhode Island | Fall 2024 |
| <i>Guest lecturer; created and taught two 80-minute lectures on paleoclimate and IPCC model simulations to an undergraduate-level introductory climate course</i> | |
| Physical Oceanography University of Rhode Island | Fall 2023 |
| <i>Guest lecturer; created and taught two 80-minute lectures on gravity and internal waves to a graduate-level introductory physical oceanography class</i> | |
| PyClub Online | Spring 2021 |
| <i>Teacher; Co-created and co-taught lessons introducing the use of the Pandas package in Python to a group of high school students</i> | |
| Introduction to Physical Oceanography Columbia University | Fall 2018 |
| <i>Teaching Assistant; led weekly office hour sessions, graded homework</i> | |
| Dynamics of Climate Variability and Change Columbia University | Fall 2017 |
| <i>Teaching Assistant; led weekly office hour sessions, graded homework</i> | |
| Oceanography of the Pacific Northwest University of Washington | Fall 2015 |
| <i>Teaching Assistant; assisted in lab demonstrations, graded homework</i> | |

Mentoring

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| The Summer Undergraduate Research Fellowship in Oceanography (SURFO) program | Summer 2024 |
| <i>Worked closely with undergraduate student Nathaniel Nowel on his project entitled, "Exploring the Role of the Gulf Stream in Wintertime Surface Wind Convergence Using Saildrone Vehicles"</i> | |

Professional Membership

Mentoring Physical Oceanography Women to Increase Retention (MPOWIR)
Ocean Carbon and Biogeochemistry (OCB)
American Geophysical Union (AGU)

Invited Talks

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| Oceanography Seminar Series | 24 April 2025 |
| University of Hawaii at Manoi, Online | |
| <i>Using high-resolution Saildrone data to explore the link between the Gulf Stream and the North Atlantic storm track</i> | |
| Ocean & Climate Seminar Series | 7 February 2025 |
| Lamont-Doherty Earth Observatory of Columbia University, Palisades, NY | |
| <i>The central role of the Labrador Sea in ventilating the North Atlantic</i> | |
| Marine Chemistry & Geochemistry Seminar Series | 21 January 2025 |
| Woods Hole Oceanographic Institution, Falmouth, MA | |
| <i>The central role of the Labrador Sea in ventilating the North Atlantic</i> | |
| Climate & Environment Lunch Bunch Series | 23 September 2024 |
| Brown University, Providence, RI | |

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| <i>Boundary Layer Scaling of Upper Ocean Turbulence</i> | |
| Physical Oceanography Seminar Series | 2 February 2024 |
| University of Rhode Island, Kingston, RI | |
| <i>High Salinity Shelf Water production and turbulent mixing in an Antarctic polynya</i> | |
| Physical Oceanography Seminar Series | 30 April 2021 |
| University of Rhode Island, Online | |
| <i>A high-resolution process study of High Salinity Shelf Water formation in the Terra Nova Bay Polynya, Ross Sea, Antarctica</i> | |
| Antarctic Sea Ice and Southern Ocean Discussions Seminar | 7 December 2022 |
| University of Texas at San Antonio, Online | |
| <i>High Salinity Shelf Water production in Terra Nova Bay, Ross Sea from high-resolution near-surface salinity observations</i> | |
| Antarctic Sea Ice and Southern Ocean Discussions Seminar | 17 February 2021 |
| University of Texas at San Antonio, Online | |
| <i>The Lamont-Doherty Earth Observatory Mooring</i> | |

Conference and Workshop Presentations

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| 2024 AGU Fall Meeting | 9-13 December 2024 |
| American Geophysical Union, Washington D.C. | |
| TALK: (Abstract - OS41B-02): <i>The central role of the Labrador Sea in ventilating the North Atlantic</i> | |
| 2024 OCB Summer Workshop | 10 – 13 June 2024 |
| Ocean Carbon and Biogeochemistry, Woods Hole, MA | |
| LIGHTNING TALK and POSTER: <i>Oxygen uptake and transport in the Labrador Sea, as told by the OSNAP array</i> | |
| 2024 Gordon Research Seminar on Ocean Mixing | 8 – 9 June 2024 |
| Gordon Research Conferences, Mount Holyoke, MA | |
| POSTER: <i>Upper ocean turbulence scaling: Year-long ϵ time series in two very different wind-forced settings</i> | |
| 2024 Ocean Sciences Meeting | 19 - 23 February 2024 |
| American Geophysical Union, New Orleans, LA | |
| TALK: (Abstract - PL13A-05): <i>Oxygen transport and variability in the Labrador Sea: First insights from the new sensors on the OSNAP array</i> | |
| 2022 Ocean Sciences Meeting | 24 February – 4 March 2022 |
| American Geophysical Union, Online | |
| TALK (Abstract - 2181-A): <i>High Salinity Shelf Water production rates from near-surface mooring data</i> | |
| 26th International Symposium on Polar Sciences | 27-29 September 2021 |
| Korea Polar Research Institute, Online, | |
| POSTER: <i>A high-resolution process study of High Salinity Shelf Water formation in the Terra Nova Bay Polynya, Ross Sea, Antarctica</i> | |
| 2020 AGU Fall Meeting | 1-17 December 2021 |
| American Geophysical Union, Online | |
| POSTER (Abstract GC116-0001): <i>A high-resolution process study of High Salinity Shelf Water formation in the Terra Nova Bay Polynya, Ross Sea,</i> | |

Antarctica

Land-Ice-Ocean Network Exploration with Semiautonomous Systems

(LIONESS) Workshop

13-15 May 2020

Korea Polar Research Institute, Online,

TALK: *Investigation of High Salinity Shelf Water in the Terra Nova Bay*

Polynya, Ross Sea

2020 Ocean Sciences Meeting

16-20 February 2020

American Geophysical Union, San Diego, CA

TALK (Abstract PS11A-03): *Scaling turbulence in the ocean boundary layer of the Southeast Pacific Ocean stratus region*

2015 AGU Fall Meeting

14-18 December 2015

American Geophysical Union, San Francisco, CA

POSTER (Abstract OS23B-1990): *Analysis of Bubble Plume Distributions to Evaluate Methane Hydrate Decomposition on the Continental Slope*

Outreach Activities

PyClub

2020-2021

Co-created and co-taught lessons introducing the use of the Pandas package in Python to a group of students from underserved high schools

Girls Who Code at Columbia University

2016 – 2019, 2021

Managed and participated in weekly coding classes for local high school girls, contributed to weekly organizational meetings, and supervised field trips.

Developed a lesson on the NumPy, Pandas, and Matplotlib packages

Girls' Science Day at Columbia University

2016 – 2018

Assisted with science demonstrations in an annual science fair that engages local middle and high school girls in scientific research occurring at Columbia University

Lamont-Doherty Earth Observatory Open House

2016, 2017, 2018, 2020

Assisted annually in the development and demonstration of various oceanography-related exhibits for the general public

Research Cruise Experience

Southwest Pacific Ocean 6 weeks, 2019, R/V Falkor

Observations of biological and physical processes occurring in the sea surface microlayer

Ross Sea, Antarctica 6 weeks, 2018, R/V Araon

Retrieval and deployment of various physical oceanographic moorings

Nootka Sound, British Columbia 10 days, 2014, R/V Thompson

Thesis data collection for senior undergraduates in the University of Washington Department of Oceanography

Washington and Oregon coasts 10 days, 2014, R/V Thompson

Geochemical and geophysical observation of methane plumes on the continental margin

Washington and Oregon coasts 2 weeks, 2014, R/V Thompson

Retrieval of Ocean Bottom Seismometers monitoring seismic activity on the Cascadia Subduction Zone

Washington and Oregon coasts 4 weeks, 2013, R/V Atlantis

Investigation of the thermal and fluid environment of the Cascadia Subduction Zone