

Zhihua Zheng

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EDUCATION

- University of Washington** (Seattle, WA) 2017 - 2023
Ph.D. in Physical Oceanography. Advisors: Ramsey Harcourt & Eric D'Asaro
- University of Washington** (Seattle, WA) 2017 - 2020
M.S. in Physical Oceanography
- Xiamen University** (Xiamen, P.R.C.) 2013 - 2017
B.S. in Marine Science. Advisor: Zhiyu Liu
Thesis: Mixing and circulation in the North Pacific estimated from a tracer-contour inverse method
Study Abroad at the University of Maine, Orono (2015)

APPOINTMENTS

- Postdoctoral Researcher**, University of Maryland College Park 2023 - present
Department of Atmospheric and Oceanic Science. Advisor: Jacob Wenegrat

RESEARCH

- Tracing the physics of submesoscale entrainment and subduction** 2023 - present
advised by Jacob Wenegrat Postdoc Project
- Large Eddy Simulations. Submesoscale-Langmuir turbulence interaction. Tracer mixing.
- The effects of surface waves on ocean surface boundary layer vertical structure** 2020 - 2023
advised by Ramsey Harcourt, Eric D'Asaro & Andrey Shcherbina PhD project
- Lagrangian floats. Vertical kinetic energy. Surface layer shear scaling. Stokes-Ekman layer dynamics.
- Temperature gradient scaling in convective ocean surface layers** 2019 - 2020
advised by Ramsey Harcourt & Eric D'Asaro Master project
- Significant deviations from the Monin-Obukhov scaling were found by analyzing temperature gradients from mooring observations. Model-observation comparisons show a major impact of Langmuir turbulence.
- Sensitivity of climate to large-scale atmospheric heat transport efficiency** 2021 - Present
with Litai Kang, et al., mentoring undergrad. research
- Effects of magnitude and spatial pattern of diffusivity on zonal-mean climate state and climate change are explored in a moist energy balance model.
- Comparison of vertical mixing schemes including Langmuir turbulence** 2017 - 2019
with Qing Li, et al.
- In a unified 1D model framework (GOTM), the improvements of Langmuir schemes over no-Langmuir ones, and the discrepancies among themselves were evaluated in a broad range of forcing regimes.

PUBLICATIONS

- Zheng, Z.**, Harcourt, R., D'Asaro, E. and Shcherbina A., Vertical scaling of turbulent vertical velocities in ocean surface boundary layers. Part II: boundary layer. *In prep.*
- Zheng, Z.**, Harcourt, R., D'Asaro, E. and Shcherbina A., Vertical scaling of turbulent vertical velocities in ocean surface boundary layers. Part I: surface layer. *Journal of Physical Oceanography. In review*

Zheng, Z., Wenegrat, J.O., Fox-Kemper, B. and Brett G.J., Wind-catalyzed energy exchanges between fronts and boundary layer turbulence. *Journal of Physical Oceanography*. *In review*

Ge, Q., **Zheng, Z.**, Kang, L., Donohoe, A., Roe, G. and Armour, K., 2023. The sensitivity of climate and climate change to the efficiency of atmospheric heat transport. *Climate Dynamics*. doi:[10.1007/s00382-023-07010-3](https://doi.org/10.1007/s00382-023-07010-3)

Zheng, Z., Harcourt, R. and D'Asaro, E., 2021. Evaluating Monin–Obukhov Scaling in the Unstable Oceanic Surface Layer. *Journal of Physical Oceanography*. doi:[10.1175/JPO-D-20-0201.1](https://doi.org/10.1175/JPO-D-20-0201.1)

Li, Q., et al. and **Zheng, Z.**, 2019. Comparing Ocean Surface Boundary Vertical Mixing Schemes Including Langmuir Turbulence. *Journal of Advances in Modeling Earth Systems*. doi:[10.1029/2019MS001810](https://doi.org/10.1029/2019MS001810)

PRESENTATIONS

Zheng, Z., Harcourt, R., D'Asaro, E. and Shcherbina A., Scaling Profiles of Turbulent Vertical Velocities in Ocean Surface Boundary Layers. Presented at: Ocean Sciences Meeting 2022 Feb. 28-Mar. 4; virtual.

Zheng, Z., Harcourt, R. and D'Asaro, E., Evaluating Monin–Obukhov Scaling for the Turbulent Ocean Surface Layer. Poster presented at: Ocean Sciences Meeting 2020 Feb. 17-21; San Diego, CA. doi:[10.1002/essoar.10502413.1](https://doi.org/10.1002/essoar.10502413.1)

TEACHING

Teaching Assistant (University of Washington)

Ocean 285, Physics Across Oceanography: Fluid Mechanics and Waves (Virtual) 2020

Ocean 200, Introduction to Oceanography 2019

FIELDWORK

Washington Shelf Oceanography-Acoustics Joint Experiment *Jul. - Aug. 2022*
with John Mickett & Ramsey Harcourt

- Assisted with the deployment/recovery of Shallow Water Integrated Mapping System (SWIMS), moorings; CTD data acquisition and ADCP data analysis.

Isopycnal Spectra and Stirring in the Upper Ocean *Jul. 2018*
with Ren-Chieh Lien & Eric Kunze

- Assisted with the deployment/recovery of surface drifters, EM-APEX floats, and towed CTD chain; ADCP data analysis.

OUTREACH

Aquatic Sciences Open House (University of Washington, Seattle) *May. 2022*

Sammamish High School STEM Fair (Sammamish, WA) *May. 2019*

Polar Science Weekend (Pacific Science Center, Seattle) *Feb. 2018*

Xiamen University-COSEE Ocean Science Open House (Xiamen, P.R.C.) *Nov. 2014*

SKILLS

Programming Language Python, MATLAB, Bash, Fortran, Julia, R.