# Wenda Zhang

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## Education

**Doctor of Philosophy: Marine Science** *2017 - 2022*
Stony Brook University Stony Brook, NY, U.S.
Advisor: Prof. Christopher L. P. Wolfe

**Bachelor of Science: Marine Science** *2013 - 2017*
Ocean University of China Qingdao, China

## Research Interests

Ocean mesoscale eddies, and their impact on mixing, large-scale ocean circulations and climate; parameterization of mesoscale processes in ocean climate models, geophysical fluid dynamics; Lagrangian transport and mixing; idealized models.

## Appointments

**Postdoctoral Research Associate** *2022-present*
Host: Dr. Stephen M. Griffies Princeton University
- Studying the vertical structure of mesoscale and submesoscale ocean eddies in idealized models, and developing parameterizations of this structure for use in global climate and prediction models.
- Implementing and improving the mesoscale kinetic energy backscatter parameterization in climate simulations of GFDL Modular Ocean Model (MOM6).

**Research Assistant** *2018-2022*
Advisor: Prof. Christopher L. P. Wolfe Stony Brook University
- Quantified potential vorticity (PV) transport due to coherent eddies and identified the relation between the PV diffusivity and dispersion of coherent eddies in a two-layer quasigeostrophic model.
- Analyzed the vertical structure of the mesoscale tracer diffusivity in an idealized ocean configuration of the MITgcm.

**Undergraduate Researcher** *2016 - 2017*
Supervisor: Prof. Xueen Chen Ocean University of China
- Diagnosed the energy transfer between mesoscale eddies and mean flows through barotropic and baroclinic pathways in the South China Sea based on the Global Hybrid Coordinate Ocean Model (HYCOM) hindcasts.

## Publications

### In Preparation

[1] **Zhang, W.**, A. Adcroft, E. Yankovsky, S.M. Griffies, R.W. Hallberg, 2024: A scale-dependent vertical structure for mesoscale energy backscatter parameterizations. *In preparation* for *Journal of Advances in Modeling Earth Systems*

[2] **Zhang, W.**, J. Steinberg, S.M. Griffies, R.W. Hallberg, 2024: Stratification constrains the horizontal scale of ocean mesoscale eddies. *In preparation* for *Journal of Physical Oceanography*.

### Peer Reviewed

[1] **Zhang, W.**, S.M. Griffies, R.W. Hallberg, Y. Kuo, and C.L.P. Wolfe, 2024: The role of surface potential vorticity in the vertical structure of mesoscale eddies in wind-driven ocean circulations. *Journal of Physical Oceanography*, DOI: https://doi.org/10.1175/JPO-D-23-0203.1

[2] **Zhang, W.**, C.L.P Wolfe, 2024: Inferring tracer diffusivity from coherent mesoscale eddies. *Journal of Advances in Modeling Earth Systems*, 16, e2023MS004004. https://doi.org/10.1029/2023MS004004

[3] **Zhang, W.**, C.L.P. Wolfe, 2022: On the vertical structure of oceanic mesoscale tracer diffusivities. *Journal of Advances in Modeling Earth Systems*, 14, e2021MS002891. https://doi. org/10.1029/2021MS002891

[4] **Zhang, W.**, C.L.P. Wolfe, R. Abernathey, 2020: Role of surface-layer coherent eddies in potential vorticity transport in quasi-geostrophic turbulence driven by eastward shear. *Fluids*, 5(1), p.2, doi: 10.3390/fluids5010002

## Presentations

- "The role of surface potential vorticity in the vertical structure of mesoscale eddies", Ocean Sciences Meeting, New Orleans, LA, February 2024 (**oral presentation**)
- "A scale-dependent vertical structure for mesoscale energy backscatter parameterizations", CESM Ocean Model Working Group Meeting, Virtual, February 2024 (**oral presentation**)
- "Scale-dependent vertical structure of eddy kinetic energy in an adiabatic ocean model", Climate Process Team: Ocean Transport and Eddy Energy Annual Meeting, Woods Hole, MA, May 2023 (**oral presentation**)
- "Scale-dependent vertical structure of eddy kinetic energy in an idealized isopycnal ocean model", CESM Ocean Model Working Group Meeting, Virtual, February 2023 (**oral presentation**)
- "Inferring tracer diffusivity from coherent mesoscale eddies", 23rd Conference on Atmospheric and Oceanic Fluid Dynamics, Breckenridge, CO, June 2022 (**poster**)
- "On the vertical structure of oceanic mesoscale tracer diffusivities", Climate Process Team: Ocean Transport and Eddy Energy Annual Meeting, Boulder, CO, April 2022 (**oral presentation**)
- "What determines the vertical structure of mesoscale tracer diffusivity?", Ocean Sciences Meeting, Virtual, March 2022 (**oral presentation**)
- "Vertical structure of tracer diffusivity in an idealized basin circulation model", CESM Ocean Model Working Group Meeting, Virtual, February 2021 (**oral presentation**)
- "Diffusive versus nondiffusive properties of coherent ocean eddies", Ocean Sciences Meeting, San Diego, CA, February 2020 (**eLightning presentation**)
- "Role of coherent eddies in potential vorticity transport in two-layer quasigeostrophic turbulence", 22nd Conference on Atmospheric and Oceanic Fluid Dynamics, Portland, ME, June 2019 (**oral presentation**)

## Teaching Experience

**Teaching Assistant** — *Stony Brook University*
Oceanography (MAR 104) — Fall 2017 and Fall 2018
Physics for Environmental Studies (ENS 119) — Spring 2018 and Spring 2021

## Awards and Honors

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| 2020 | **Maze-Landeau Travel Award**, Stony Brook University |
| 2019 | **Distinguished Travel Award**, Stony Brook University |
| 2019 | **IACS Travel Award**, Stony Brook University |
| 2016 | **The Outstanding Student Award**, Ocean University of China |
| 2016 | **The Scholarship Award for Participation in Social Activities**, Ocean University of China |
| 2015 | **The First-Class Scholarship Award for Excellence in Academic Work**, Ocean University of China |
| 2015 | **Second Prize in Physics Competition of Chinese College Students (non-physics major)**, Chinese Physical Society |
| 2014 | **First Prize in Mathematics Competition of Chinese College Students (non-mathematics major)**, Chinese Mathematical Society |

## Volunteer Services

**Journal Reviewer**
Reviewer for Journal of Physical Oceanography, Journal of Advances in Modeling Earth Systems — 2022 - Present

**NJ Ocean Fun Days** — *Island Beach State Park*
Volunteer — May 2023

**Workshop for Boys and Girls Club** — *Mercer County, NJ*
Volunteer — March 2023

**Qingdao Red Cross Society** — *Qingdao, China*
Volunteer — June-July 2013

## Programming Skills

**Programming** Python, Matlab
**Computer Language** Fortran