Yidongfang Si

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EMPLOYMENT

06/2023 – Present Houghton Postdoctoral Fellow (Host: Prof. Raffaele Ferrari)
Department of Earth, Atmospheric & Planetary Sciences, Massachusetts Institute of Technology

RESEARCH INTERESTS

• Geophysical fluid dynamics • Mesoscale and submesoscale eddies • Tide–topography interactions • Abyssal mixing and water mass transformation • Coupled ocean–sea ice dynamics • Ocean–induced ice shelf melt

EDUCATION

09/2018–06/2023 Department of Atmospheric and Oceanic Sciences, University of California, Los Angeles
Ph.D. in Physical Oceanography (*June 2023*)
M.S. in Atmospheric and Oceanic Sciences (*Dec. 2020*)
Advisor: Prof. Andrew L. Stewart

09/2014–07/2018 School of Physics, Peking University
B.S. in Astronomy (*with honors, July 2018*)

PUBLICATIONS

In prep:

- **Y. Si** and R. Ferrari. Parametric Instability of a Tidal Flow in a Submarine Canyon. *To be submitted to JPO (preprint available upon request)*

Submitted:

1. **Y. Si** and R. Ferrari. Tidally Induced Turbulence in the Abyssal Ocean. *In revision at PNAS.*
2. M. K. Youngs, A. L. Stewart, **Y. Si**, A. F. Thompson, and M. P. Schodlock. Quantifying climatic forcing versus meltwater feedbacks on the Antarctic Ice Shelf melt. *Under review at Nature Geoscience*.

Peer-reviewed (†*Student advisees*)

3. S. Spungin†, **Y. Si**, A. L. Stewart, and C. J. Prend. Observed Seasonality of Mixed-Layer Eddies and Vertical Heat Transport over the Antarctic Continental Shelf. *Journal of Geophysical Research: Oceans*, 2025. [doi]
4. X. Ruan, **Y. Si**, and R. Ferrari. Diapycnal upwelling driven by tidally-induced mixing over steep topography. *Journal of Physical Oceanography*, 2025. [doi, pdf]
5. **Y. Si**, A. L. Stewart, A. Silvano, and A. C. Naveira Garabato. Antarctic slope undercurrent and onshore heat transport driven by ice shelf melting. *Science Advances*, 2024. [doi, pdf, code, data]
6. C. R. Schmidgall†, **Y. Si**, A. L. Stewart, A. F. Thompson, and A. McC. Hogg. Dynamical controls on bottom water transport and transformation across the Antarctic Circumpolar Current. *Journal of Physical Oceanography*, 2023. [doi, pdf]
7. **Y. Si**, A. L. Stewart, and I. Eisenman. Heat transport across the Antarctic Slope Front controlled by cross-slope salinity gradients. *Science Advances*, 2023. [doi, pdf, code, data]
8. A. Silvano, P. Holland, K. Naughten, O. Dragomir, P. Dutrieux, A. Jenkins, **Y. Si**, A. L. Stewart, B. Pena-Molino, G. Janzing, T. Dotto, and A. C. Naveira Garabato. Baroclinic ocean response to climate forcing regulates decadal variability of ice-shelf melting in the Amundsen Sea. *Geophysical Research Letters*, 2022. [doi]

9. **Y. Si**, A. L. Stewart, and I. Eisenman. Coupled ocean/sea ice dynamics of the Antarctic Slope Current driven by topographic eddy suppression and sea ice momentum redistribution. *Journal of Physical Oceanography*, 2022. [doi, pdf, code, data]

10. **Y. Si**, J. Yang, and Y. Liu. Planetary climate under extremely high vertical diffusivity. *Astronomy & Astrophysics*, 2022. [doi, pdf, code]

Thesis:

- Y. Si. Ice-Ocean Interactions in the Antarctic Slope Current. *PhD Dissertation*, 2023. [url, pdf]

RESEARCH SUPPORT & FELLOWSHIPS

08/2023–07/2025	National Center for Atmospheric Research Large Allocation: Tidally-Induced Turbulence over Sloping Topography (*19.3 million CPU hours + 17,500 GPU hours + 70 TB storage*)
06/2023–06/2025	MIT Distinguished Postdoctoral Fellowship in Earth, Atmospheric & Planetary Sciences (*$168,000*)
10/2022–06/2023	UCLA Dissertation Year Fellowship (*$38,000*)
09/2018–08/2022	China Scholarship Council Fellowship (*$90,000*)
12/2017	AGU Fall Meeting Student Travel Grant
04/2016–10/2017	President's Research Grant for Undergraduate Students, Peking University

AWARDS

01/2024	Jacob A. Bjerknes Award, Department of Atmospheric and Oceanic Sciences, UCLA
07/2018	Outstanding Student Research Award, the 5th Conference on Earth System Science
07/2018	Beijing Outstanding Graduate Award
07/2018	Peking University Outstanding Graduate Award
06/2018	Outstanding Bachelor's Thesis, School of Physics, Peking University
11/2017	Wei-Ming Scholarship, School of Physics, Peking University
10/2017	May 4th Scholarship, Peking University
10/2017	Outstanding Student Award, Peking University
09/2017	Outstanding Oral Presentation Award, Chinese Meteorological Society
10/2015	Social Work Award, Peking University

PRESENTATIONS

Conferences:

12/2024	AGU Annual Meeting (*Talk*)
06/2024	Ocean Mixing Gordon Research Conference (*Poster*)
06/2023	2nd US Antarctic Science Meeting (*Talk*)
12/2022	AGU Fall Meeting (*Posters*)
08/2022	Scientific Committee on Antarctic Research Meeting (*Talk*)
06/2022	23rd Conference on Atmospheric and Oceanic Fluid Dynamics (*Talk*)
03/2022	AGU Ocean Sciences Meeting (*Talk*)
09/2021	2nd California Geophysical Fluid Dynamics Meeting (*Talk*)
07/2021	US Antarctic Science Meeting (*Talk*)
08/2020	California Geophysical Fluid Dynamics Meeting (*Talk*)
02/2020	AGU Ocean Sciences Meeting (*Poster*)
07/2018	5th Conference on Earth System Science, Shanghai (*Poster*)
12/2017	AGU Fall Meeting (*Poster*)

09/2017 Chinese Meteorological Society Annual Meeting (*Talk*)

Other presentations:

01/2025 Department of Atmospheric and Oceanic Sciences, School of Physics, Peking University (*Seminar*)
01/2025 School of Oceanography, Shanghai Jiao Tong University (*Seminar*)
12/2024 Department of Atmospheric and Oceanic Sciences, Fudan University (*Talk*)
12/2024 School of Geography and Ocean Science, Nanjing University (*Talk*)
12/2024 School of Earth Sciences and Engineering, Nanjing University (*Talk*)
01/2024 Department of Atmospheric and Oceanic Sciences, School of Physics, Peking University (*Seminar*)
06/2023 Climate Dynamics Group (*Seminar*)
04/2023 Department of Atmospheric & Oceanic Sciences, UCLA (*Seminar*)
01/2022 Peking University-Fudan University AOS Symposium (*Talk*)
11/2021 Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (*Seminar*)
04/2021 Climate Dynamics Group (*Seminar*)
03/2021 Antarctic Margins Meeting at ANU, UNSW, and CSIRO (*Seminar*)

TEACHING

Fall 2021 Teaching Associate of AOS 103, Physical Oceanography
Fall 2020 Teaching Assistant of AOS 103, Physical Oceanography
Fall 2019 Teaching Assistant of AOS 103, Physical Oceanography
Spring 2019 Teaching Assistant of AOS 2, Air Pollution

MENTORSHIP

03/2022–06/2023 Sophia Spungin, post-undergraduate researcher (Co-advised by Prof. Andrew Stewart)
01/2020–03/2022 Carlyn Schmidgall, post-undergraduate researcher (Co-advised by Prof. Andrew Stewart)

VOLUNTEER & OUTREACH

Winter 2021 Co-host, Ocean Study Group for first-year graduate students
Winter 2021 AOS lightning talk for prospective students
Fall 2019 Project Scientist Volunteer: Assisted 30 girls, ages 4-12, in gaining hands-on coding experience in 2D turbulence
Fall 2016 Co-organizer, Peking University Undergraduate Astronomy Symposium
Summer 2016 Volunteer, Asia Oceania Geosciences Society (AOGS) Annual Meeting
Spring 2015 Astronomy Education and Outreach: Delivered 12 astronomy lectures at Beijing No.1 Middle School and assisted organizing astronomy observations

SERVICE

2024 Co-convener for the AGU Annual Meeting Session: *Ice-Ocean interactions along Antarctica's Continental Shelf*
Since 2022 Reviewer for the *Journal of Physical Oceanography*, *Journal of Climate*, and *Journal of Geophysical Research: Oceans*.
2021 UCLA AOS Computer Committee

REFERENCES

Raffaele Ferrari — Cecil & Ida Green Professor of Oceanography
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Massachusetts Institute of Technology
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Andrew L. Stewart — Professor
Department of Atmospheric and Oceanic Sciences
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Alberto C. Naveira Garabato — Professor
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