

Yidongfang Si

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EMPLOYMENT

Department of Earth, Atmospheric & Planetary Sciences, Massachusetts Institute of Technology

- 07/2025 – Present Postdoctoral Associate (Host: Prof. Abigail Bodner)
- 06/2023 – 06/2025 Houghton Postdoctoral Fellow (Host: Prof. Raffaele Ferrari)

RESEARCH INTERESTS

• *Geophysical fluid dynamics* • *Mesoscale and submesoscale eddies* • *Tide–topography interactions* • *Abyssal mixing and water mass transformation* • *Coupled sea ice–ocean 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 Atmospheric and Oceanic Sciences (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. *In prep.*

Submitted:

1. **Y. Si**, R. Ferrari, and G. Voet. Tidally Induced Turbulence in the Abyssal Ocean. *In revision.*
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. *In revision.*

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](#), [code](#)]
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. [[online](#)]

RESEARCH SUPPORT & FELLOWSHIPS

08/2023–07/2026	NCAR Large Allocation: Tidally Induced Turbulence over Sloping Topography. Project Lead: Y. Si. (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 (<i>Talk</i>)
06/2024	Ocean Mixing Gordon Research Conference (<i>Poster</i>)
06/2023	2nd US Antarctic Science Meeting (<i>Talk</i>)
12/2022	AGU Fall Meeting (<i>Posters</i>)
08/2022	Scientific Committee on Antarctic Research Meeting (<i>Talk</i>)
06/2022	23rd Conference on Atmospheric and Oceanic Fluid Dynamics (<i>Talk</i>)
03/2022	AGU Ocean Sciences Meeting (<i>Talk</i>)
09/2021	2nd California Geophysical Fluid Dynamics Meeting (<i>Talk</i>)
07/2021	US Antarctic Science Meeting (<i>Talk</i>)
08/2020	California Geophysical Fluid Dynamics Meeting (<i>Talk</i>)

02/2020	AGU Ocean Sciences Meeting (<i>Poster</i>)
07/2018	5th Conference on Earth System Science, Shanghai (<i>Poster</i>)
12/2017	AGU Fall Meeting (<i>Poster</i>)
09/2017	Chinese Meteorological Society Annual Meeting (<i>Talk</i>)

Other presentations:

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

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