

# Yidongfang Si

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## EMPLOYMENT

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

## RESEARCH INTERESTS

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• *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

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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

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*In prep:*

1. **Y. Si** and R. Ferrari. Instability of Oscillatory Shear Flow along Submarine Canyons. (*Preprint available upon request*)
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 prep.*

*Submitted:*

1. **Y. Si** and R. Ferrari. Tidally Induced Turbulence in the Abyssal Ocean. *Submitted.*

*Peer-reviewed (<sup>†</sup>Student advisees)*

2. S. Spungin<sup>†</sup>, **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](#)]
3. X. Ruan, **Y. Si**, and R. Ferrari. Diapycnal upwelling driven by tidally-induced mixing over steep topography. *Journal of Physical Oceanography*, 2025. [[doi](#), [pdf](#)]
4. **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](#)]
5. C. R. Schmidgall<sup>†</sup>, **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](#)]
6. **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](#)]
7. 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](#)]

8. **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](#)]
9. **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

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|                 |                                                                                                                                                                                    |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 08/2023–07/2025 | National Center for Atmospheric Research Large Allocation: Tidally-Induced Turbulence over Sloping Topography ( <i>19.3 million CPU hours + 17,500 GPU hours + 70 TB storage</i> ) |
| 06/2023–06/2025 | MIT Distinguished Postdoctoral Fellowship in Earth, Atmospheric & Planetary Sciences ( <i>\$168,000</i> )                                                                          |
| 10/2022–06/2023 | UCLA Dissertation Year Fellowship ( <i>\$38,000</i> )                                                                                                                              |
| 09/2018–08/2022 | China Scholarship Council Fellowship ( <i>\$90,000</i> )                                                                                                                           |
| 12/201          | AGU Fall Meeting Student Travel Grant                                                                                                                                              |
| 04/2016–10/2017 | President’s Research Grant for Undergraduate Students, Peking University                                                                                                           |

## AWARDS

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|---------|--------------------------------------------------------------------------------|
| 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

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*Conferences:*

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| 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 (*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**

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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**

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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**

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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**

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2024 Co-convenor 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