

Education

- Apr 2016–Dec 2021 **PhD in Atmospheric and Oceanic Sciences**, *The University of California, Los Angeles*.
- Sep 2011–May 2013 **MS in Applied Mathematics**, *Columbia University*.
- Sep 2007–May 2011 **BS in Mathematics**, *New York University*.
- Sep 2007–May 2011 **BE in Mechanical Engineering**, *Stevens Institute of Technology*.

PhD Thesis

Title *Dynamics of Ocean Circulation near Fjords and Ice-Shelf Cavities*
Supervisors James C. McWilliams and Andrew L. Stewart
Committee Eric J. Rignot and Marcelo Chamecki

Experience

Research

- Jan 2022–Current **NSF Office of Polar Programs Postdoctoral Research Fellow**, *College of Earth, Ocean, and Atmos. Sci., Oregon State University, Corvallis, OR*.
- Use models and observations to understand submesoscale fjord variability, its interaction with fine-scale ice-ocean boundary layer processes, and their combined effect on glacial melt.
- Apr 2016–Dec 2021 **NASA FINESST Fellow, Graduate Researcher**, *Dept. of Atmos. and Oceanic Sci., UCLA, Los Angeles*.
- Contributed to shallow-water isopycnal model development (BEOM; see nordet.net/beom.html).
 - Implemented idealized numerical simulations (BEOM) and developed theories for bathymetry-influenced oceanic circulation in ice-shelf cavities.
 - Implemented idealized and realistic numerical simulations (MITgcm) and developed theories for Greenland fjord circulation.
- Jul 2011–Aug 2013 **Graduate Researcher**, *Dept. of Applied Physics and Applied Mathematics, Columbia University, New York*.
- Developed and implemented cyclonic tracking algorithms for CMIP models.
 - Optimized filtering for tropical cyclone detection conducted model comparison using hurricane tracking algorithms to study cyclogenesis.
- May 2008–May 2011 **Undergraduate Researcher**, *Courant Institute of Mathematical Sciences, New York University, New York*.
- Developed theories and a QG model setup to investigate the role of Rossby wave instability in the formation of barotropic oceanic jets.

Teaching and Mentorship

- Jan 2017–Apr 2020 **Graduate Teaching Assistant**, *Dept. of Atmos. and Oceanic Sci., UCLA, Los Angeles*.
- Courses taught: Physical Oceanography (Jan 2018–Apr 2018), Chemical Oceanography (Jan 2019–Apr 2019, Jan 2020–Apr 2020), Air Pollution (Jan 2017–Apr 2017).

Apr 2018–current **Research Advisor.**

- Advised Jennifer Kosty (undergraduate student researcher) at UCLA on eddy detection near Antarctica using MEOP and Argo data.
- Advised Kaylie Cohanin (undergraduate student researcher and postbac. researcher) at UCLA on the modeling of sea ice lead-generated eddies using MITgcm.
- Advised Sarah Villhauer (undergraduate student researcher) at Oregon State NSF REU program on modeling of ice-ocean interactions in ice shelf basal channels and crevasses.

Publications

Published or In Review

1. **K. X. Zhao**, A. L. Stewart, and J. C. McWilliams. Linking Overturning, Recirculation, and Melt in Glacial Fjords. *Submitted to Geophysical Research Letters*.
2. **K. X. Zhao**, A. L. Stewart, J. C. McWilliams, I. Fenty, and E. Rignot. Roles of Geometry and Standing Eddies in Mediating Fjord-Shelf Exchange. *Submitted to Journal of Physical Oceanography*.
3. K. Cohanin*, **K. X. Zhao**, and A. L. Stewart. Dynamics of Eddies Generated by Sea Ice Leads. *Journal of Physical Oceanography*, Aug. 2021.
4. **K. X. Zhao**, A. L. Stewart, and J. C. McWilliams. Dynamical Controls of Fjord Circulation. *Journal of Physical Oceanography*, Apr. 2021.
5. **K. X. Zhao**, A. L. Stewart, and J. C. McWilliams. Sill-Controlled Circulation in Ice Shelf Cavities. *Journal of Physical Oceanography*, Jan. 2019.

*student advisee

In Preparation

1. **K. X. Zhao**, E. D. Skillingstad, and J. D. Nash. Parameterizations of Vertical Ice-Ocean Interfaces. *In Preparation*.
2. I. Fenty, **K. X. Zhao**, M. Wood, J. Willis, A. L. Stewart, J. C. McWilliams, and E. Rignot. Existence and Role of Standing Eddies in Greenland's Fjords. *In Preparation*.
3. **K. X. Zhao**, A. L. Stewart, and J. C. McWilliams. The Greenland Regional Intra-Fjord Flux and Interaction Numerics (GRIFFIN) project version 1: Melt and Circulation in Greenland's Deep-water Fjords. *In preparation*.
4. J. Kosty*, **K. X. Zhao**, D. McCoy, and A. L. Stewart. Observations and Properties of Eddies Beneath Antarctic Sea Ice. *In preparation*.

Seminars and Conferences

1. 'Mixing at Vertical Ice-Ocean Interfaces', Gordon Research Seminar Invited Speaker, South Hadley MA, Jun 2022.
2. 'Melt-Circulation Feedbacks and Standing Eddies in Glacial Fjords', AGU Ocean Sciences, Virtual Meeting, Feb 2022.
3. 'Why do models underpredict ocean-driven melting of glaciers?', Oregon State University Physics of Oceans and Atmospheres Seminar, Corvallis OR, Jan 2022.
4. 'Circulation-Melt Interactions within Glacial Fjords', West Antarctic Ice Sheet Workshop, Sterling VA, Sep 2021.
5. 'Linking Overturning, Recirculation, and Melt in Glacial Fjords', California GFD, Virtual, Sep 2021.
6. 'Dynamical Controls of Fjord Circulation', AGU Fall Meeting, Virtual, Dec 2020.
7. 'Dynamical Controls of Fjord and Ice-Shelf Cavity Circulation', Scripps Polar Seminar, Virtual, May 2020.
8. 'Awakening the Sleeping Ice Giants: Ocean-Driven Glacial Melting via Fjord and Ice-Shelf Cavity Circulation', UCLA AOS departmental seminar, Los Angeles CA, Mar 2020.
9. 'Geometric Controls on Access of Warm Ocean waters to Greenland's fjords', AGU Ocean Sciences, San Diego CA, Feb 2020.

500 Landfair Ave. – Los Angeles, CA 90024

☎ (857) 636 9241 • ✉ kzhao@atmos.ucla.edu

🌐 dept.atmos.ucla.edu/kenzhao

10. 'The Role of Submesoscale Variability in Fjord Circulation and Renewal?', UC Irvine Earth Systems Science Cryosphere Seminar, Irvine CA, Nov 2019.
11. 'Dynamical Constraints on Fjord-Shelf Exchange', California GFD, Pasadena CA, Sep 2019.
12. 'Geometric Controls on Access of Warm Ocean waters to Greenland's fjords', AMS Atmosphere and Ocean Fluid Dynamics, Portland ME, Jun 2019.
13. 'Access of Warm Ocean waters to Greenland's fjords', NASA Oceans Melting Greenland Science Team Meeting, Irvine CA, Jun 2019.
14. 'Dynamic and Thermodynamic Renewal Processes in Greenland's Fjords', AGU Fall Meeting, Washington D.C., Dec 2018.
15. 'Sill-Controlled Circulation in Ice-Shelf Cavities', AGU Ocean Sciences, Portland OR, Feb 2018.
16. 'Sill-Controlled Circulation in Ice-Shelf Cavities', AMS Atmosphere and Ocean Fluid Dynamics, Portland OR, Jun 2017.

Research and Computational Support

- Jan 2022-Dec 2023 'Submesoscale Fjord Variability and Its Influence on Glacial Melt', NSF Office of Polar Research Postdoctoral Research Fellowship \$282,979, PI Ken Zhao
- Sep 2020-Dec 2021 'Improving Glacial Melt Rate Estimates Using ECCO and NASA OMG', NASA 19-EARTH20-0153 (FINESST Earth Sciences Program) \$90,000, PI Ken Zhao, PI Andrew Stewart, Co-I James McWilliams
- Sep 2020-Sep 2021 'Improving Glacial Melt Rate Estimates Using ECCO and NASA OMG', NASA HEC Allocation, \$18,142 in compute resources (38,600 SBUs), PI Ken Zhao
- Sep 2021-Sep 2022 'Improving Glacial Melt Rate Estimates Using ECCO and NASA OMG', NASA HEC Allocation, \$141,000 in compute resources (300,000 SBUs), PI Ken Zhao

Academic Service

Journal Reviewer

(see <https://publons.com/researcher/3633558/ken-zhao/peer-review/>)

- Ocean Science
- Journal of Geophysical Research - Oceans
- Journal of Advances in Modeling Earth Systems

Department Service

- Jun 2021–Sept 2021 **Summer Seminar Series.**
- Established and led bi-weekly student-organized departmental summer seminar series.
- Oct 2020–Nov 2020 **Department Awards Committee.**
- Worked with faculty panel as the student chair to decide on student awardees for the Fall 2021 department awards.
- May 2020–Sep 2020, July 2021–Sep 2021 **Summer Welcome Program Instructor.**
- Helped establish and develop group projects for 3-week departmental summer welcome program for incoming graduate students in the UCLA AOS department.
- May 2020–Aug 2021 **Graduate and Academic Curriculum Committee.**
- Worked with faculty to develop a new PhD/MS curriculum for the UCLA AOS department.
- May 2018–Sep 2019 **Student Seminar Chair.**
- Established and served as the inaugural student organizer for department seminar series.
 - Invited and organized seminar speakers events based on graduate student consensus.
- May 2017–May 2018 **Student Recruitment Chair.**
- Organized and planned recruitment efforts and events for incoming graduate students.

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Apr 2018–Jan 2019 **California Ocean Health Monitoring Program Student Lead.**

- Organized and co-wrote California Ocean Health Monitoring Program MRPI proposal with scientists from 5 UC campuses to bring the first Biogeochemical ARGO float array to the California Current System.

Awards

- Sep 2021 Student Travel Grant | West Antarctic Ice Sheet Workshop.
- Dec 2020 Jakob Bjerknes Memorial Research Award | Dept. of Atmospheric and Oceanic Sciences, UCLA "Graduate student award for academic excellence and outstanding dissertation research."
- Dec 2020 Brian Bosart Graduate Student Award | Dept. of Atmospheric and Oceanic Sciences, UCLA "For unselfish service to fellow students and positive contributions to department life while demonstrating a firm commitment to academics."
- Dec 2020 Morris Neiburger Memorial Teaching Award Honorable Mention | Dept. of Atmospheric and Oceanic Sciences, UCLA "In recognition of excellence in the teaching of Atmospheric and Oceanic Sciences."
- Nov 2019 Richard P. and Linda S. Turco Exceptional Research Publication Award | Dept. of Atmospheric and Oceanic Sciences, UCLA "Outstanding paper led by a PhD student, a postdoctoral researcher, or a junior researcher in AOS."