

Xiaozhou Ruan

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Research Interests

Geophysical Fluid Dynamics, Southern Ocean Dynamics, Boundary Layer Turbulence, Ocean Mixing, Abyssal Ocean Circulation.

Employment

Postdoctoral Associate, Massachusetts Institute of Technology, Host: Raffaele Ferrari	2019 – present
Graduate Teaching/Research Assistant, California Institute of Technology	2013 – 2019

Education

Ph.D., California Institute of Technology, Pasadena, CA, US Major: Environmental Science and Engineering Dissertation Title: Oceanic Bottom Boundary Layers and Abyssal Ocean Circulation Minor: Applied and Computational Mathematics	2013 - 2019
B.S., Ocean University of China, Qingdao, China Major: Marine Meteorology	2009 - 2013

Honors and awards

- *Editors' Citation for Excellence in Refereeing for Geophysical Research Letters*, AGU, 2020
- *Richard Bruce Chapman Memorial Award*, California Institute of Technology, 2019
- *Chinese Government Award for Outstanding Self-Financed Students Abroad*, China Scholarship Council, 2018
- *Travel support for Southern Ocean Workshop*, NCAR Advanced Study Program, 2017
- *Travel grant for CLIVAR Open Science Conference*, US-CLIVAR, 2016
- *The 'Next Generation' Travel Award*, The Oceanography Society, 2016
- *Best Poster Student Presentation Award*, 20th Conference on Atmospheric and Oceanic Fluid Dynamics, American Meteorological Society, 2015
- *Foster and Coco Stanback Travel Grant*, California Institute of Technology, 2014

- *Foster and Coco Stanback Graduate Fellowship in Global Environmental Science*, California Institute of Technology, 2013-2014
- *National Scholarship*, Ministry of Education of the P.R. China, 2009-2010, 2011-2012
- *The First Prize Scholarship for Excellent Academic Performance*, Ocean University of China, 2009-2010, 2010-2011, 2011-2012
- *Outstanding student award*, Ocean University of China, 2009-2010, 2010-2011, 2011-2012

Publication

Submitted/In Preparation:

- **Ruan, X.**, K. Speer, A.F. Thompson & L.M. Chretien Schulze, 2021. Ice-Shelf Meltwater Overturning in the Bellingshausen Sea. In revision at *J. Geophys. Res.*,
- L.M. Schulze Chretien, et al. including **X. Ruan**, 2021. The Shelf Circulation of the Bellingshausen Sea. In revision at *J. Geophys. Res.*,
- **Ruan, X.**, & R. Ferrari, On the energy dissipation rate in the bottom boundary layer. In prep.
- **Ruan, X.**, J. Wenegrat & J. Gula, Kinetic Energy dissipation in the Atlantic Ocean. In prep.

Published:

- **Ruan, X.**, A.F. Thompson & J.R. Taylor, (2021). The evolution and arrest of a turbulent stratified oceanic bottom boundary layer over a slope: PV dynamics and Upslope regime. *J. Phys. Oceanogr.*, In press
- **Ruan, X.**, & R. Ferrari, (2021). Diagnosing diapycnal mixing from passive tracers. *J. Phys. Oceanogr.*, In press
- **Ruan, X.**, & J. Callies, (2020). Mixing-driven mean flows and submesoscale eddies over mid-ocean ridge flanks and fracture zone canyons. *J. Phys. Oceanogr.*, 50, 175–195
- **Ruan, X.**, A.F. Thompson & J.R. Taylor, (2019). The evolution and arrest of a turbulent stratified oceanic bottom boundary layer over a slope: Downslope regime. *J. Phys. Oceanogr.*, **49**, 469-487
- Tsai, V.C. & **X. Ruan**, (2018). A simple Physics-Based Improvement to the Positive Degree Day Model, *J. Glaciol.*, 1-8. doi:10.1017/jog.2018.55
- **Ruan, X.**, A.F. Thompson, M.M. Flexas & J. Sprintall, (2017). Contribution of topographically generated submesoscale turbulence to Southern Ocean overturning. *Nat. Geosci.*, **10**, 840-845.
- **Ruan, X.**, & A.F. Thompson, (2016). Bottom boundary potential vorticity injection from an oscillating flow: a PV pump. *J. Phys. Oceanogr.*, **46**, 3509-3526

Teaching experience

- Physical Oceanography (ESE131) -- Teaching Assistant, 2016, 2017, 2018
- Earth's Ocean (ESE102) – Guest Lecturer, 2017
- Ocean turbulence from space (Ge196) – Guest Lecturer, 2016
- Topics in Atmosphere and Ocean Dynamics (ESE135) – Teaching Assistant, Guest Lecturer, 2016

Scientific Cruises

- **Initiation of the ASF**, R/V Nathaniel B. Palmer, December 2018-January 2019, Glider deployment and hydrographic survey in the Bellingshausen Sea.
- **Satellites to Seafloor**, R/V Shana Rae, August 2016, Coordinated ROMS numerical forecasts and glider/AUV submesoscale survey in Monterey Bay.
- **ChinStrAP**, R/V Laurence M. Gould, December 2014, Deployment of two ocean gliders and hydrographic survey to sample across continental shelf and slope in Drake Passage.

Invited seminars

- Physical Oceanography Lunch Seminar, University of Washington, Jan 2021
- Peking University Department of Atmospheric and Oceanic Sciences seminar, Nov 2020
- Physical Oceanography Seminar series, GSO of University of Rhode Island, Nov 2019
- AOCD seminars, Yale University, Oct 2019
- AOS department seminar (AOS271), UCLA, Nov 2018
- ESE & Society Seminar, Caltech, October 2017
- ESE & Society Seminar, Caltech, October 2015
- GPS Yuk Lunch Seminar, Caltech, September 2014

Conference presentations

- Ocean Sciences 2020, San Diego, CA. Diagnosing diapycnal dispersion from tracer evolution and distribution. February 2020 **talk**
- BBL turbulence and the Ocean Overturning Circulation workshop, Cambridge, MA. The evolution and arrest of a turbulent stratified oceanic bottom boundary layer over a slope. Dec 2018 **talk**
- Gordon Research Conference on ocean mixing, Andover, NH. The evolution and arrest of a turbulent stratified oceanic bottom boundary layer over a slope. June 2018 **poster**
- Ocean Sciences 2018, Portland, OR. Contribution of topographically generated submesoscale turbulence to Southern Ocean overturning. Feb 2018 **talk**
- 21st Conference on Atmospheric and Oceanic Fluid Dynamics, Portland, OR. Ekman arrest in a turbulent bottom boundary layer. June 2017 **poster**
- NCAR Southern Ocean Workshop, Boulder, CO. Topographic closure of the overturning circulation in the Southern Ocean. April, 2017 **talk**
- CLIVAR Open Science Conference 2016, Qingdao, China. Frontal structure and transport in southern Drake Passage from ocean gliders. September 2016 **talk**
- Ocean Sciences 2016, New Orleans, LA. Frontal structure and transport in southern Drake Passage from ocean gliders. February 2016 **talk**
- 20th Conference on Atmospheric and Oceanic Fluid Dynamics, Minneapolis, MN. Boundary Control of Potential Vorticity Injection with oscillating flows. June 2015 **poster**