

RESEARCH INTERESTS AND EXPERIENCE

interests: ocean heat content, sea level (open-ocean to coastal sea level connectivity), mesoscale turbulence, eddy vertical structure, scale-dependent energy cascades, deep-ocean dynamics, remote sensing, AUVs

N.O.A.A. Geophysical Fluid Dynamics Laboratory [current] Princeton, NJ
Research Physical Scientist 2023 – present

- Ocean and Cryosphere Division: develop and carry out simulations to better understand the patterns and drivers of sea level variability.

Woods Hole Oceanographic Institution Woods Hole, MA
Postdoctoral Investigator 2020 – 2023

- Characterized distributions of eddy kinetic and potential energy to improve mesoscale eddy parameterizations in global climate models. (Ocean Transport and Eddy Energy Climate Process Team w/ S. Cole)
- Investigated the regional patterns and drivers of sea level variability with a focus on dynamical relationships among ocean warming, coastal sea level, and ocean bottom pressure trends. (NASA-OSTST w/ C. Piecuch)

University of Washington Seattle, WA
Graduate Research Assistant 2013–2020

- Focus: ocean mesoscale eddy radial-vertical structure, eddy evolution, eddy decay, geostrophic turbulence, energy cascades, and surface expression of interior motions. Development, deployment, piloting, and extensive use of Seaglider and Deepglider autonomous underwater vehicles.

EDUCATION

University of Washington Seattle, WA
Ph.D. in Physical Oceanography, Advisor: Charles Eriksen 2020

- Thesis: “Eddy Vertical Structure and Variability: vortex evolution and the geography of geostrophic turbulence”

University of Washington Seattle, WA
M.S. in Applied Mathematics 2016

University of Washington Seattle, WA
M.S. in Physical Oceanography 2016

University of Maryland College Park, MD
B.S. in Civil and Environmental Engineering, Magna Cum Laude (minor: project management) 2013

MANUSCRIPTS IN PREPARATION AND SUBMITTED

“A Landscape of Eddy Vertical Structure: methods of characterization and the role of bathymetric slope and roughness”. **J.M. Steinberg**, E. Yankovsky, S. Cole, L. Zanna. To be submitted to the *Journal of Physical Oceanography*.

“Deep Ocean Steric Sea level Change in the Northwest Atlantic Ocean”. N. Zilberman, W. Llovel, **J.M. Steinberg**, B. Meyssignac, M. Ablain, R. Fraundea. To be submitted to the *Geophysical Research Letters*.

“The GFDL-CM4X climate model hierarchy, Part I: model description and thermal properties, Part II: case studies”. S. Griffies, A. Adcroft, M. Alberty, R. Beadling, M. Bushuk, H. Drake, R. Dussin, R. Hallberg, M. Harrison, W. Hurlin, H. Khatri, J. Krasting, S. Legg, M. Lobo, G. MacGilchrist, T. Morrison, B. Reichl, A. Sane, O. Sergienko, M. Sonnewald, **J.M. Steinberg**, J.E. Tesdal, M. Thomas, K. Turner, M. Ward, M. Winton, N. Zadeh, R. Zhang, W. Zhang, M. Zhao. Submitted to the *Journal of Advances in Modeling Earth Systems*, Nov. 2024.

“Understanding the role for internal variability in driving past and future ocean dynamic sea-level trends in CMIP6 simulations”. S. Coats, P.R. Thompson, C.G. Piecuch, J.T. Fasullo, B.D. Hamlington, K.B. Karnauskas, R.S. Nerem, A.R. Rodriguez, and **J.M. Steinberg**. Submitted to the *Journal of Climate*, June 2024.

PEER REVIEWED PUBLICATIONS

- Steinberg, J.M.**, Griffies, S., Krasting, J., Piecuch, C., & Ross, A. (2024). A Link Between U.S. East Coast Sea Level and North Atlantic Subtropical Ocean Heat Content. *Journal of Geophysical Research: Oceans* (accepted Nov. 2024). <https://doi.org/10.1029/2024JC021425>
- Steinberg, J.M.**, Piecuch, C., Hamlington, B., Thompson, P., & Coats, S. (2024). Influence of Deep Ocean Warming on Coastal Sea Level Trends in the Gulf of Mexico. *Journal of Geophysical Research: Oceans*. <https://doi.org/10.1029/2023JC019681>
- Toole, J., Musgrave, R., Fine, E., **Steinberg, J.M.**, & Krishfield, R. (2023). On the Vertical Structure of Deep Ocean Subinertial Variability. *Journal of Physical Oceanography*. <https://doi.org/10.1175/JPO-D-23-0011.1>
- Loose, N., Abernathey, R., Grooms, I., Busecke, J., Guillaumin, A., Yankovsky, E., Marques, G., **Steinberg, J.M.**, Ross, A., Khatri, H., Bachman, S., Zanna, L., & Martin, P. (2022). GCM-Filters: A Python Package for Diffusion-based Spatial Filtering of Gridded Data. *Journal of Open Source Software*. <https://doi.org/10.21105/joss.03947>
- Marques, G., Loose, N., Yankovsky, E., **Steinberg, J.M.**, Chang, C.-Y., Bhamidipati, N., Adcroft, A., Fox-Kemper, B., Griffies, S., Hallberg, R., Jansen, M., Khatri, H., & Zanna, L. (2022). NeverWorld2: An idealized model hierarchy to investigate ocean mesoscale eddies across resolutions. *Geoscientific Model Development*, 15. <https://doi.org/10.5194/gmd-15-6567-2022>
- Steinberg, J.M.**, Cole, S., Drushka, K., & Abernathey, R. (2022). Seasonality of the Mesoscale Inverse Cascade as Inferred from Global Scale-Dependent Eddy Energy Observations. *Journal of Physical Oceanography*. <https://doi.org/10.1175/JPO-D-21-0269.1>
- Steinberg, J.M.**, & Eriksen, C. (2022). Eddy Vertical Structure and Variability: Deepglider Observations in the North Atlantic. *Journal of Physical Oceanography*, 52, 1091–1110. <https://doi.org/10.1175/JPO-D-21-0068.1>
- Grooms, I., Loose, N., Abernathey, R., **Steinberg, J.M.**, Bachman, S., Marques, G., Guillaumin, A., Yankovsky, E., & Zanna, L. (2021). Diffusion-based smoothers for spatial filtering of gridded geophysical data. *Journal of Advances in Modeling Earth Systems*. <https://doi.org/10.1029/2021MS002552>
- Steinberg, J.M.**, & Eriksen, C. (2020). Glider Sampling Simulations in High-Resolution Ocean Models. *Journal of Atmospheric and Oceanic Technology*, 37, 975–992. <https://doi.org/10.1175/JTECH-D-19-0200.1>
- Steinberg, J.M.**, & Eriksen, C. (2019). Observed Evolution of a California Undercurrent Eddy. *Journal of Physical Oceanography*, 49, 649–674. <https://doi.org/10.1175/JPO-D-18-0033.1>
- Pelland, N., Bennett, J., **Steinberg, J.M.**, & Eriksen, C. (2018). Automated Glider Tracking of a California Undercurrent Eddy Using the Extended Kalman Filter. *Journal of Atmospheric and Oceanic Technology*, 35, 2241–2264. <https://doi.org/10.1175/JTECH-D-18-0126.1>

Prior Work

“Bioextractive Removal of Nitrogen by Oysters in Great Bay Piscataqua River Estuary, New Hampshire, USA”. S. Bricker, R. Grizzle, P. Trowbridge, J. Rose, J. Ferreira, K. Wellman, C. Zhu, E. Galimany, C. Saurel, R. Landeck-Miller, J. Wands, R. Rheault, **J.M. Steinberg**, A. Jacob, E. Davenport, S. Ayvazian, M. Chintala, and M. Tedesco. *Estuaries and Coasts*. 2020.

“Role of Shellfish Aquaculture in the Reduction of Eutrophication in an Urban Estuary”. S. Bricker, J. Ferreira, C. Zhu, J. Rose, E. Galimany, G. Wikfors, C. Saurel, R. Landeck-Miller, J. Wands, P. Trowbridge, R. Grizzle, K. Wellman, R. Rheault, **J.M. Steinberg**, A. Jacob, E. Davenport, S. Ayvazian, M. Chintala, and M. Tedesco. *Environmental Science and Technology*. 2018.

FIELDWORK

Seaglider and Deepglider Operations

UW

Graduate Research Assistant

2013–2020

- Participated in the preparation, deployment, piloting, and recovery of Seaglider and Deepglider autonomous underwater vehicles.

Ocean Inquiry Project

Seattle, WA

field and classroom instructor and diver

2014–2019

ACADEMIC TEACHING EXPERIENCE

- **Guest Lecturer** at Princeton University Fall 2024
Chemical and Biological Engineering (CBE341)
- **Teaching Assistant** at the University Washington Winter 2018-2019, 2019-2020
Geophysical Fluid Dynamics (OCN 512)
Lectured as well as organized and carried out demonstrations in the UW GFD lab.
- **Teaching Assistant** at the University Washington Fall 2017
Physics Across Oceanography: Fluid Mechanics and Waves (OCN 285)
- **Teaching Assistant** at the University Washington Fall 2015
Introduction to Fluid Mechanics (OCN 511)

PROFESSIONAL ACTIVITIES

- U.S. CLIVAR - Phenomena, Observations, and Synthesis Panel Member 2024-2028
- Ocean Sciences Meeting: Session Convener, Co-Chair Feb. 2024
RH001 Advances in Understanding, Monitoring, and Simulating Sea Level
- NOAA GFDL: Diversity, Equity, Inclusion, and Accessibility Committee member 2023-2024
- National Academies: Gulf Research Program Fellowship Reviewer June 2023
- NASA Physical Oceanography: ROSES PO-22 Proposal Review Panel Member Sept. 2022
- Climate Process Team renewal proposal - drafting and revision funded - summer 2022
- Ocean Sciences Meeting: Session Convener, Co-Chair Feb. 2022
PL06 Mesoscale Eddy Energy and Ocean Transport
- Member of the OceanGliders community 2021–2022
Contributed to glider best practice procedure document (specifically depth average current considerations)
- Postdoctoral Association: At-Large Member 2020–2021
Elected member of the WHOI postdoctoral association. Organized and engaged with WHOI postdoc community.
- UW College of the Environment: Student Advisory Committee Member 2017–2018

- peer reviewer for: National Science Foundation, Journal of Physical Oceanography, Journal of Geophysical Research: Oceans, Geophysical Research Letters, Journal of Advances in Modeling of Earth Systems, Journal of Climate, Quarterly Journal of the Royal Meteorological Society, Continental Shelf Research, Advances in Space Research, Limnology and Oceanography, Earth's Future, Journal of Marine Systems

MENTORING, OUTREACH & VOLUNTEERING

- NOAA GFDL: Hollings Scholar, Lapenta Program, and CIMES advisor 2023,2024
Advisor to three undergraduate research scholars.
- University of Washington: Student Seaglider Center 2022–2023
Advisor and mentor to undergraduates participating in a hands-on course to build, deploy, and pilot Seaglider autonomous underwater vehicles.
- MIT: EAPS Mentoring Program 2020–2021
Mentor to graduate students in the Joint MIT-WHOI Program

RECENT INVITED PRESENTATIONS

- University of Maryland: Center for Environmental Science Oct. 2024
A link between U.S. east coast sea level rise and offshore subsurface ocean warming
- Understanding Gulf Ocean Systems Seminar Series (NAS Gulf Research Program) Apr. 2024
Influence of Deep-Ocean Warming of Coastal Sea Level Rise in the Gulf of Mexico
- Institute of Science and Technology Austria Vienna, May 2022
Ocean Energetics: Interesting and Outstanding Problems in Observational Physical Oceanography
- NCAR Boulder, Aug. 2022
Exploring Mesoscale Eddy Vertical Structure Regimes in the Global Ocean

RECENT CONFERENCE PRESENTATIONS AND SEMINARS

- Ocean Sciences Meeting New Orleans, Feb. 2024
A Mechanistic Link between U.S. East Coast Sea Level and Offshore Ocean Heat Content
- American Meteorological Society Annual Meeting Baltimore, Jan. 2024
A Mechanistic Link between U.S. East Coast Sea Level and Offshore Ocean Heat Content
- NOAA GFDL Lunchtime Seminar Princeton, Nov. 2023
Regional Patterns and Drivers of Sea Level Change
- Climate Process Team Annual Meeting: Ocean Transport and Eddy Energy Woods Hole, May 2023
A Landscape of Eddy Vertical Structure - controls on the vertical distribution of mesoscale eddy kinetic energy
- University of Washington: Physical Oceanography Seminar Seattle, Feb. 2023
Influence of Deep-Ocean Warming of Coastal Sea Level Rise in the Gulf of Mexico
- ECCO Annual Meeting Pasadena, Jan. 2023
Influence of Deep-Ocean Warming of Coastal Sea Level Rise in the Gulf of Mexico
- Caltech Special Seminar Pasadena, Jan. 2023
A Landscape of Eddy Vertical Structure
- Ocean Surface Topography Science Team Meeting Venice, Oct. 2022
Influence of Deep-Ocean Warming of Coastal Sea Level Rise in the Gulf of Mexico
- GRACE Science Team Meeting Oct. 2022
Influence of Deep-Ocean Warming of Coastal Sea Level Rise in the Gulf of Mexico
- EGU Annual Meeting Vienna, May 2022
Seasonality of the Mesoscale Inverse Cascade
- Climate Process Team Annual Meeting: Ocean Transport and Eddy Energy Boulder, Apr. 2022
A Landscape of Eddy Vertical Structure
- Ocean Sciences Meeting Feb. 2022
Observed Seasonality of the Mesoscale Inverse Cascade in the Global Ocean
- NOAA Monster Jam Seminar: Invited Talk May 2021

Using Deepglider AUVs to explore the structure of large ocean eddies and the role they play in the redistribution of energy and tracers

- UCLA: Biogeochemistry Group: Invited Talk Mar. 2021
Eddy Vertical Structure and Variability: Deepglider Observations of Geostrophic Turbulence in the North Atlantic
- NCAR-CESM: Ocn. Model Working Group / CPT: Ocn. Transport and Eddy Energy Annual Meeting Feb. 2021
Scale Aware Eddy Kinetic Energy from Along-Track Sea Surface Height Measurements
- Woods Hole Oceanographic Institution: Department Seminar July 2020
Eddy Vertical Structure and Variability: Deepglider Observations of Geostrophic Turbulence in the N. Atlantic

RECENT SELECTED WORKSHOPS

- USCLIVAR Workshop: Optimizing Ocean Observing Networks for Detecting the Coastal Climate Signal Sept. 2024
Invited Talk: A link between U.S. east coast sea level rise and offshore subsurface ocean warming
- Aspen Center for Physics: Transport and Mixing of Tracers in Geophysics and Astrophysics June 2021
- USCLIVAR Workshop: Sources and Sinks of Ocean Mesoscale Eddy Energy Mar. 2019