Dhruv Balwada

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Education

2010 – 2016 • **Ph.D. Geophysical Fluid Dynamics**
Advisor: Prof. Kevin Speer, Geophysical Fluid Dynamics Institute, Florida State University, USA

2010 – 2015 • **M.S. Applied and Computational Mathematics**
Florida State University, USA

2006 – 2010 • **B.E. Chemical Engineering**
Birla Institute of Technology and Science, India

Professional Research Appointments

Feb 2023 – current • **Lamont Assistant Research Professor**
Lamont-Doherty Earth Observatory, Columbia University, Palisades, NY

Oct 2021 – Jan 2023 • **Associate Research Scientist**
Lamont-Doherty Earth Observatory, Columbia University, Palisades, NY

Oct 2019 – Sept 2021 • **Postdoctoral Research Scholar**
School of Oceanography, University of Washington, Seattle, WA

Jan 2017 – Sept 2019 • **Postdoctoral Research Scholar**
Courant Institute of Mathematical Sciences, New York University, New York, NY

Aug 2010 – Dec 2016 • **Graduate Research Assistant**
Geophysical Fluid Dynamics Institute, Florida State University, Tallahassee, FL

May 2009 – Dec 2009 • **Undergraduate Research Fellow**
Center for Mathematical Modeling and Computer Simulations, Bangalore, India

Awards

2025 • **AMS The Nicholas P. Fofonoff Award - Early Career**
For fundamental work characterizing tracer transport and energy transfer between mesoscale and submesoscale ocean flows

2024 • **AGU Outstanding Reviewer Award**
Journal of Advances in Modeling Earth Systems (JAMES)

2006-2010 • **Merit-Cum-Need (MCN) Scholarship**
Birla Institute of Technology and Science

Teaching and Mentoring Experience

Instruction:

- **Geophysical Fluid Dynamics**, 2024, 2025
  Instructor for graduate course at Columbia University - DEES
  Links to course evaluation: 2024, 2025

Teaching and Mentoring Experience (continued)

- **Computing and Research Methods for Climate Data Science**, 2025
  Instructor for graduate course at Columbia University - Climate School
  Links to course evaluation: 2025
- **Statistics, Data Analysis, and Coding for Sustainability Science**, 2025 (1 lecture)
  Guest lecturer for masters level course at Columbia University - School of Professional Studies
- **Physics of Ocean Circulation**, 2019 (3 lectures)
  Guest lecturer for senior level undergraduate course at University of Washington
- **Introduction to Simple Models of Oceans and Climate**, 2014
  Instructor for graduate course at Florida State University University
- **Introduction to Oceanography**, 2010-2016 (5 semesters)
  Teaching assistant for undergraduate course at Florida State University University

Mentoring:

- **Postdoctoral Researchers** (direct supervisor)
  Feier Yan, May 2025-current, Columbia University
  Manuel O. Gutierrez-Villanueva, Feb 2025-current, Columbia University
- **Graduate Students** (as Ph.D. Advisor)
  Andrew Fagerheim, Fall 2024-current, DEES Columbia University
  Prani Nalluri, Summer 2023-current, APAM Columbia University
- **Graduate Level Students & RAs** (advisor on specific project, Total: 12)
  David Lee, Fall 2024 - current, Professional returning to academic research after working in government
  Ayantika Bhattacharjee, Spring 2024 - current, PhD Student, Texas A&M University
  Jingwen Lyu, Yue Wang, Spring 2024-Summer 2025, M.S. Students, APAM, Columbia University
  Niek Kusters, Spring 2023-Fall 2025, PhD Student, Royal Netherlands Institute for Sea Research
  Mohammad S. Erfani, Summer 2023, LEAP Momentum Fellow, Uni of South Carolina
  Mingge Zhao, Qingci Luo, Zhihan Luo, Spring 2023, M.S. Statistics Students, Columbia University
  Martin Brolly, Summer 2022, PhD Student, University of Edinburgh
  Qiyu Xiao, 2019 - 2022, PhD Student, New York University
  Takaya Uchida, 2017 - 2019, PhD Student, DEES Columbia University
- **Undergraduate Students** (advisor on specific project, Total: 11)
  Trisha Sharan, Fall 2025 - current, Columbia University
  Jack Pope, Summer 2025, LDEO REU, Cornell University
  Jack Alfandre, Summer 2024, LEAP REU, University of Michigan
  Tony Manriquez, Summer 2024, LEAP REU, Metropolitan State University of Denver
  David Venutto, Summer 2023, LDEO REU, Dutchess Community College
  Jianna Martinez, Summer 2023, LDEO REU, Barnard College
  Andrew Fagerheim, Summer 2022 - Spring 2024, started as LDEO REU, Columbia University
  Patricia Luc, Fall 2022-Spring 2024, Columbia University
  Zach Nachod, Fall 2019, Fall 2021, University of Washington
  William Chen (high school senior), Fall 2017, New York University
  Chelsea Dodge, Fall 2013, Florida State University

Service and Outreach

- **Scientific Working Groups**
  ○ *US CLIVAR, 2024-current, Small-scale processes in the upper ocean and their interaction with the Earth's climate system*
  ○ *NASA, 2024-current, AI for Satellite Oceanography*

Service and Outreach (continued)

- **University and Department Committees**
  - *Columbia University - DEES – Graduate Program Committee, Fall 2024-Spring 2025*
  - *Columbia University - LDEO – Campus Life Committee, Fall 2023-current*
  - *Columbia University - LDEO – Langseth Replacement Vessel task Force, Spring 2023-current*
  - *University of Washington – School of Oceanography – Postdoc rep on hiring improvement ommittee, 2020*
- **Ph.D. Committees**
  - *Abby Shaum, Fall 2025-current, DEES Columbia University*
  - *Alessandra Quigley, Fall 2024-current, DEES Columbia University*
  - *Lauren Moseley, Summer 2023-Fall 2024, DEES Columbia University*
  - *Isabelle Elise Bunge, Summer-Fall 2024, APAM Columbia University*
- **External Examiner**
  - *Lauryn Talbot, MS, Summer 2025, School of Earth and Ocean Sciences, University of Victoria*
- **Conference Session Chair**
  - *Ocean Sciences, 2024, Harnessing data to improve ocean models and prediction*
  - *Ocean Sciences, 2022, Vertical Transport – Connecting the Surface to the Deep*
  - *Ocean Sciences, 2022, Inter-scale connections and transfers in mesoscale, submesoscale, and boundary layer turbulence*
  - *Ocean Sciences, 2020, Vertical Transport - Pathways from the Surface to the Interior*
- **Scientific Panels**
  - *VAIBHAV Summit, 2020, Panel to discuss future directions for Indian science organized by Indian government*
- **Proposal Review Panels**
  - *National Science Foundation, 2025*
  - *National Science Foundation, 2024*
  - *National Oceanographic and Atmospheric Administration - Climate Program Office, 2017*
- **Expert Reviewer**
  - *National Science Foundation, 2020, 2024, 2025*
  - *Israel Science Foundation , 2023*
  - *Dutch Research Council (NWO), 2021*
  - *IPCC Reviewer, 2020, Reviewed sections of the Sixth Assessment Report*
- **Journal Reviewer**
  Journal of Physical Oceanography, Geophysical Research Letters, Ocean Modeling, Journal of Geophysical Research: Oceans, Quarterly Journal of Royal Meteorological Society, Journal of Advances in Modeling Earth Systems, Journal of Open Source Software, Nature Communications
- **Educational Outreach**
  - *OceanHackWeek project mentor, 2020, 2021*
  - *Classroom demonstrations for 7th graders, 2015, Talk, presentation and demos about general oceanography and rotating fluids.*
  - *Science fair judge at Celebration Baptist Church for homeschooled 8th graders, 2015.*
  - *9 educational videos (each 5 minutes in length) created in collaboration with CPALMS for K-12 educators to use in mathematics/physics/oceanography/environment curriculum, 2013*

Research Proposals

Active:

- **NASA Award (PI)**: *Leveraging machine learning, realistic simulations, and in-situ observations to infer submesoscale transport from SWOT, 2024 - 2028*

Research Proposals (continued)

- **NSF Collaborative Research Award (PI)**, Division of Ocean Science (GEO/OCE), Physical Oceanography: *A global census of submesoscale energetics using in-situ drifter observations and a high-resolution ocean model, 2023 - 2026 (NCE expected to 2027)*
- **Sub-award via NSF-STC (PI)**, Learning Earth with Artificial Intelligence and Physics (LEAP): *Parameterizing impacts of heterogeneity at the air-sea interface, 2024 - 2026*
- **LDEO Climate Center seed award (PI)**: *Climate Sense: Artificial Intelligence and Compressed Sensing for High-Resolution, High-Accuracy Ocean State Estimation, 2025*
- **Schmidt Sciences Award (Lead Scientist)** (with Dr. Pierre Gentine as Columbia University PI): *M2LInES - Multiscale Machine Learning In coupled Earth System Modeling, 2021 - 2026 (NCE to 2027)*
- **NASA Award (transferred from Dr. Ryan Abernathey)**: *Inferring ocean transport from SWOT, 2020 - 2024 (NCE to 2026)*

Submitted (in-review):

- **NSF Collaborative Research Proposal (PI)**, Division of Ocean Science (GEO/OCE), Physical Oceanography: *Unraveling Global Patterns of Mesoscale-Submesoscale Kinetic Energy Transfers from Shipboard Acoustic Doppler Current Profilers, requested 2026 - 2028*
- **NSF STC Learning the Earth with Artificial Intelligence and Physics (Non-Executive Committee Senior Personnel)**, *requested 2026 - 2030*

Completed:

- **NSF Award (transferred from Dr. Ryan Abernathey)**: *EarthCube Data Capabilities: A Cloud-Native Data Repository for the Geoscience Community, 2020 - 2025*
- **LDEO Climate Center seed award (PI)**: *Downscaling satellite observations to improve estimates of Ocean Ventilation, 2024*

Planned:

- **NSF Collaborative Research Proposal (PI)**, Office of Polar Programs (GEO/OPP): *Direct Observational Estimation of the Southern Ocean Meridional Overturning Circulation, expected submission in late 2025*
- **NSF Collaborative Research Proposal (PI)**, Collaborations in Artificial Intelligence and Geosciences (CAIG): *Combining Float and Satellite Observations with Machine Learning to Investigate Interior Eddy-Driven Ocean Circulation, expected submission in early 2026*

Research Publications

h-index: 17, # of citations: 971 (10/19/25 on google scholar)

†*indicates equal contribution*

* *indicates contribution as current or ex-mentee*

Published Journal Articles (peer-reviewed)

1. A. Bodner, **D. Balwada**, and L. Zanna, "A data-driven approach for parameterizing submesoscale vertical buoyancy fluxes in the ocean mixed layer," *Journal of Advances in Modeling Earth Systems*, 2025.
2. J. J. Busecke†, **D. Balwada**†, P. E. Martin, T. E. Nicholas, Z. C. Johnson, P. Nalluri, C. I. Stern, and R. P. Abernathey, "The impact of sub-grid heterogeneity on air-sea turbulent heat flux in coupled climate models," *Geophysical Research Letters*, vol. 52, no. 13, e2025GL114951, 2025.
3. N. Kusters*, **D. Balwada**, and S. Groeskamp, "Global observational estimates of mesoscale eddy-driven quasi-stokes velocity and buoyancy diffusivity," *Geophysical Research Letters*, vol. 52, no. 12, e2025GL115802, 2025.

4 R. Liu, Y. Wang, X. Zhai, **D. Balwada**, and J. Mak, "Improved theoretical estimates of the zonal propagation of global nonlinear mesoscale eddies," *Journal of Geophysical Research: Oceans*, vol. 130, no. 6, e2025JC022518, 2025.

5 T. Zhou, J.-H. Xie, and **D. Balwada**, "On the horizontal divergence asymmetry in the Gulf of Mexico," *Symmetry*, vol. 17, no. 1, p. 136, 2025.

6 **D. Balwada**, R. Abernathey, S. Acharya, A. Adcroft, J. Brener, V. Balaji, M. A. Bhouri, J. Bruna, M. Bushuk, W. Chapman, *et al.*, "Learning machine learning with Lorenz-96," *Journal of Open Source Education*, vol. 7, no. 82, p. 241, 2024.

7 **D. Balwada**, A. R. Gray, L. A. Dove, and A. F. Thompson, "Tracer stirring and variability in the Antarctic Circumpolar Current near the Southwest Indian Ridge," *Journal of Geophysical Research: Oceans*, vol. 129, no. 1, e2023JC019811, 2024.

8 R. Liu, G. Wang, and **D. Balwada**, "The multi-scale response of the eddy kinetic energy and transport to strengthened westerlies in an idealized Antarctic circumpolar current," *Geophysical Research Letters*, vol. 51, no. 8, e2023GL106747, 2024.

9 E. A. Wilson, L. A. Dove, A. R. Gray, G. MacGilchrist, S. Purkey, A. F. Thompson, M. Youngs, S. Diggs, **D. Balwada**, *et al.*, "Future priorities for observing the dynamics of the Southern Ocean," *Bulletin of the American Meteorological Society*, vol. 105, no. 12, E2316–E2323, 2024.

10 T. Uchida, **D. Balwada**, Q. Jamet, W. K. Dewar, B. Deremble, T. Penduff, and J. Le Sommer, "Cautionary tales from the mesoscale eddy transport tensor," *Ocean Modelling*, vol. 182, p. 102 172, 2023.

11 Q. Xiao*, **D. Balwada**, C. S. Jones, M. Herrero-González, K. S. Smith, and R. Abernathey, "Reconstruction of surface kinematics from sea surface height using neural networks," *Journal of Advances in Modeling Earth Systems*, vol. 15, no. 10, e2023MS003709, 2023.

12 **D. Balwada**, J.-H. Xie, R. Marino, and F. Feraco, "Direct observational evidence of an oceanic dual kinetic energy cascade and its seasonality," *Science Advances*, vol. 8, no. 41, eabq2566, 2022.

13 L. A. Dove, **D. Balwada**, A. F. Thompson, and A. R. Gray, "Enhanced ventilation in energetic regions of the Antarctic Circumpolar Current," *Geophysical Research Letters*, vol. 49, no. 13, e2021GL097574, 2022.

14 N. L. Geyer†, **D. Balwada**†, E. Simons, K. Speer, and M. Huettel, "Drifter and dye tracks reveal dispersal processes that can affect phytoplankton distributions in shallow estuarine environments," *Estuarine, Coastal and Shelf Science*, vol. 269, p. 107 811, 2022.

15 T. Uchida, Q. Jamet, W. K. Dewar, J. Le Sommer, T. Penduff, and **D. Balwada**, "Diagnosing the thickness-weighted averaged eddy-mean flow interaction from an eddying North Atlantic ensemble: The eliassen-palm flux," *Journal of Advances in Modeling Earth Systems*, vol. 14, no. 5, e2021MS002866, 2022.

16 **D. Balwada**, J. H. LaCasce, K. G. Speer, and R. Ferrari, "Relative dispersion in the Antarctic circumpolar current," *Journal of Physical Oceanography*, vol. 51, no. 2, pp. 553–574, 2021.

17 **D. Balwada**†, Q. Xiao†*, S. Smith, R. Abernathey, and A. R. Gray, "Vertical fluxes conditioned on vorticity and strain reveal submesoscale ventilation," *Journal of Physical Oceanography*, vol. 51, no. 9, pp. 2883–2901, 2021.

18 L. A. Dove, A. F. Thompson, **D. Balwada**, and A. R. Gray, "Observational evidence of ventilation hotspots in the Southern Ocean," *Journal of Geophysical Research: Oceans*, vol. 126, no. 7, e2021JC017178, 2021.

19 J. M. Klymak, **D. Balwada**, A. N. Garabato, and R. Abernathey, "Parameterizing nonpropagating form drag over rough bathymetry," *Journal of Physical Oceanography*, vol. 51, no. 5, pp. 1489–1501, 2021.

20 T. Uchida*, **D. Balwada**, R. P. Abernathey, G. A. McKinley, S. K. Smith, and M. Lévy, "Vertical eddy iron fluxes support primary production in the open Southern Ocean," *Nature Communications*, vol. 11, no. 1, p. 1125, 2020.

21 A. Sinha, **D. Balwada**, N. Tarshish, and R. Abernathey, "Modulation of lateral transport by submesoscale flows and inertia-gravity waves," *Journal of Advances in Modeling Earth Systems*, vol. 11, no. 4, pp. 1039–1065, 2019.

22 T. Uchida*, **D. Balwada**, R. Abernathey, G. McKinley, S. Smith, and M. Levy, "The contribution of submesoscale over mesoscale eddy iron transport in the open Southern Ocean," *Journal of Advances in Modeling Earth Systems*, vol. 11, no. 12, pp. 3934–3958, 2019.

23 T. Uchida*, **D. Balwada**, R. Abernathey, C. J. Prend, E. Boss, and S. T. Gille, "Southern Ocean phytoplankton blooms observed by biogeochemical floats," *Journal of Geophysical Research: Oceans*, vol. 124, no. 11, pp. 7328–7343, 2019.

24 **D. Balwada**, K. S. Smith, and R. Abernathey, "Submesoscale vertical velocities enhance tracer subduction in an idealized Antarctic Circumpolar Current," *Geophysical Research Letters*, vol. 45, no. 18, pp. 9790–9802, 2018.

25 C. J. Roach, **D. Balwada**, and K. Speer, "Global observations of horizontal mixing from Argo float and surface drifter trajectories," *Journal of Geophysical Research: Oceans*, vol. 123, no. 7, pp. 4560–4575, 2018.

26 **D. Balwada**, J. H. LaCasce, and K. G. Speer, "Scale-dependent distribution of kinetic energy from surface drifters in the gulf of mexico," *Geophysical Research Letters*, vol. 43, no. 20, pp. 10–856, 2016.

27 C. J. Roach, **D. Balwada**, and K. Speer, "Horizontal mixing in the Southern Ocean from Argo float trajectories," *Journal of Geophysical Research: Oceans*, vol. 121, no. 8, pp. 5570–5586, 2016.

28 J. LaCasce, R. Ferrari, J. Marshall, R. Tulloch, **D. Balwada**, and K. Speer, "Float-derived isopycnal diffusivities in the dimes experiment," *Journal of Physical Oceanography*, vol. 44, no. 2, pp. 764–780, 2014.

Journal Articles In Review

1 **D. Balwada**, P. Perezhogin, A. Adcroft, and L. Zanna, "Design and implementation of a data-driven parameterization for mesoscale thickness fluxes," Submitted to *Journal of Advances in Modeling Earth Systems*, 2025.

2 M. O. Gutierrez-Villanueva*, B. Cornuelle, S. T. Gille, M. Mazloff, and **D. Balwada**, "An improved methodology to estimate cross-scale kinetic energy transfers from third-order structure functions using regularized least-squares," Submitted to *Journal of Atmospheric and Oceanic Technology*, 2025.

3 Y. Wang†*, J. Lyu†*, S. Jones, C. Pedersen, T. Monkman, and **D. Balwada**, "A multi-scale probabilistic machine learning model for decomposition of sea surface height snapshots," Submitted to *JGR: Machine Learning and Computation*, 2025.

4 L. Zanna, W. Gregory, P. Perezhogin, A. Sane, C. Zhang, A. Adcroft, M. Bushuk, C. Fernandez-Granda, B. Reichl, **D. Balwada**, *et al.*, "A Framework for Hybrid Physics-AI Coupled Ocean Models," Submitted to *Science Advances*, 2025.

5 S. Song, P. D. Lavin, A. R. Gray, Z. Nachod, **D. Balwada**, L. A. Dove, and A. F. Thompson, "Random forest regression on multi-platform in-situ ocean observations: Investigating high-frequency nutrient dynamics in the Southern Ocean," Submitted to *Artificial Intelligence for the Earth System*, 2024.

Conference Proceedings (peer-reviewed)

1 J. Lyu*, Y. Wang*, C. Pedersen, S. Jones, and **D. Balwada**, "Multi-scale decomposition of sea surface height snapshots using machine learning," in *NeurIPS Workshop on Tackling Climate Change with Machine Learning*, 2024.

2. **D. Balwada**, S. Henderson, and A. R. Gray, "Interactive visualization tools for ocean glider data," in *EarthCube Annual Meeting*, 2021.
3. T. Li, H. H. Pareek, P. Ravikumar, **D. Balwada**, and K. Speer, "Tracking with ranked signals.," in *UAI*, 2015, pp. 474–483.

Gray Literature

1. **D. Balwada** and L. Zanna, "Machine learning for multiscale systems: From turbulence to climate prediction," SIAM NEWS, 2022.
2. **D. Balwada**, "Circulation and stirring by ocean turbulence," Ph.D. Thesis, Florida State University, 2016.
3. S. T. Gille, J. Ledwell, A. Naveira-Garabato, K. Speer, **D. Balwada**, A. Brearley, J. B. Girton, A. Griesel, R. Ferrari, A. Klocker, *et al.*, "The diapycnal and isopycnal mixing experiment: A first assessment," Clivar Exchanges, 2012.

Journal Articles In Preparation

1. **D. Balwada**, S. Smith, T. Uchida, and R. Abernathey, "Eddy transport tensor in an inhomogeneous ocean channel," In preparation for *Journal of Advances in Modeling Earth Systems*.
2. A. Bhattacharjee, S. Jones, **D. Balwada**, and S. Elipot, "Reconstructing the ocean's kinetic energy spectrum from the second-order structure function using a regularized fitting approach," In preparation for *Journal of Atmospheric and Oceanic Technology*.
3. K. Everard, P. Perezhogin, **D. Balwada**, A. Adcroft, and L. Zanna, "A data-driven parameterization of mesoscale potential vorticity fluxes in an idealized two layer model," In preparation for *JGR: Machine Learning and Computation*.
4. A. Fagerheim* and **D. Balwada**, "Global estimates of mesoscale and microscale variance production, and corresponding eddy diffusivity and heat fluxes from Argo floats," In preparation for *Journal of Physical Oceanography*.
5. M. O. Gutierrez-Villanueva* and **D. Balwada**, "The observed seasonal cycle and depth structure of the kinetic energy cascade in the Gulf Stream," In preparation for *Journal of Physical Oceanography*.
6. M. O. Gutierrez-Villanueva*, B. Cornuelle, S. T. Gille, M. Mazloff, and **D. Balwada**, "The seasonal cycle of near-surface kinetic energy cascade in the california current system," In preparation for *Journal of Physical Oceanography*.
7. Y. Hou, J.-H. Xie, **D. Balwada**, X. Yu, and A. C. Naveira Garabato, "Structure function based kinetic and potential energy transfer analysis in the Northeast Atlantic," In preparation for *Journal of Physical Oceanography*.
8. S. Jones, T. Nicholas, **D. Balwada**, S. Smith, and R. Abernathey, "Signatures of fronts and waves in divergence-vorticity-strain joint probability density functions," In preparation for *Geophysical Research Letters*.
9. G. Manucharyan, S. Martin, **D. Balwada**, and J. Wang, "Deep learning ocean dynamics," In preparation for *Annual Review of Marine Science*.
10. T. Monkman, S. Jones, **D. Balwada**, and S. Smith, "Mapping swot sea surface height observations with the help of diffusion models," In preparation for *JGR: Machine Learning and Computation*.
11. H. Wang, **D. Balwada**, and J.-H. Xie, "Dynamical insights from lagrangian-filtered 2nd order structure functions applied to drifter observations," In preparation for *Geophysical Research Letters*.

Experience at Sea

2015 • **Field work for Marine Field Methods Course**
1 week of day trips in Apalachicola Bay, FL

2013 • **US-5 DIMES Cruise**
3 weeks in Drake Passage

2012 • **UK-3 DIMES Cruise**
6 weeks in Scotia Sea

Selected Talks and Presentations (*Only showing talks since 2017*)

- **Invited Seminars and Talks**
  - *2026 (scheduled) – Inverse and Forward Cascades in the Ocean, Gordon Research Conference on Ocean Mixing, June*
  - *2025 – Machine Learning for Physical Oceanography, Gordon Research Conference on Machine Learning for Actionable Climate Science, Providence, June*
  - *2024 – A Changing Southern Ocean Overturning, Observing the Dynamics of the Southern Ocean: Present Challenges and Future Strategies, San Diego, April*
  - *2022 – Observing energy cascades in the ocean, McGill University, Montreal, Canada, October*
  - *2022 – Direct observational evidence of an oceanic dual kinetic energy cascade and its seasonality, Woods Hole Oceanographic Institution, Woods Hole, MA, May*
  - *2022 – Direct observational evidence of an oceanic dual kinetic energy cascade and its seasonality, Planetary Science Institute, February*
  - *2022 – Direct observational evidence of an oceanic dual kinetic energy cascade and its seasonality, Scripps Institution of Oceanography, UC San Diego, La Jolla, CA, February*
  - *2021 – Quantifying ocean turbulence using two-point statistics, Physical Oceanography Lunch Seminar, University of Washington, Seattle, WA, May*
  - *2019 – Studies of mesoscale eddy diffusivity, Physical Oceanography Lunch Seminar, University of Washington, Seattle, WA, November*
  - *2017 – A Lagrangian view of oceanic turbulence, AOS Colloquium, Courant Institute of Mathematical Sciences, New York University, New York, NY, February*

- **Conference and Workshop Oral Presentations**
  - *2025 – Parameterizing mesoscale eddy buoyancy fluxes using small neural networks, AMS Annual Meeting, New Orleans, January*
  - *2024 – Parameterizing mesoscale eddy buoyancy fluxes using small neural networks, CLIVAR Ocean Model Development Panel and COMMODORE Workshop, NSF NCAR, September*
  - *2023 – Parameterizing mesoscale eddy buoyancy fluxes using small local neural networks, 54th International Liège Colloquium on Ocean Dynamics, Liège, Belgium, May*
  - *2021 – Submesoscale ocean ventilation, CESM Ocean Model Working Group Meeting, February*
  - *2019 – Measuring eddy driven transport in a zonally inhomogeneous flow, 22nd Conference on Atmospheric and Oceanic Fluid Dynamics, June*
  - *2019 – Exploring the dynamical connections between GM and Redi mixing coefficients, Sources and Sinks of Ocean Mesoscale Eddy Energy Workshop, March*
  - *2018 – Global Redi and Gent-McWilliams diffusivities from surface drifters, Argo floats and RAFOS floats, AGU Fall Meeting, Washington, DC, December*
  - *2017 – Submesoscale subduction and ventilation in an idealized Southern Ocean model, Ocean Sciences Meeting, February*
  - *2017 – Scale dependent distribution of kinetic energy from surface drifters in the Gulf of Mexico, Atmospheric and Oceanic Fluid Dynamics Conference, June*

References

Primary References:

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Prof. K. Shafer Smith
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Additional References (if needed):

Prof. Kevin Speer
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Tallahassee, FL.
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