MARA A. FREILICH

69 Brown St ◇ Providence, RI
mara_freilich@brown.edu ◇ mara-freilich.github.io

PROFESSIONAL APPOINTMENTS

Brown University
Thomas J. and Alice M. Tisch Assistant Professor of Earth, Environmental, and Planetary Sciences and Applied Mathematics *2025-present*
Affiliated Faculty, Institute at Brown for Environment and Society and Data Science Institute *2024-present*
Assistant Professor of Earth, Environmental, and Planetary Sciences and Applied Mathematics *2023-2025*
Scripps Institution of Oceanography, UCSD, Postdoctoral Fellow *2021-2023*
Pontificia Universidad Católica de Chile, Fulbright Fellow *2016*

EDUCATION

MIT-Woods Hole Oceanographic Institution Joint Program in Oceanography,
Doctor of Philosophy in Physical Oceanography *2015-2021*
Thesis: "Vertical Fluxes in the Upper Ocean" advised by Dr Amala Mahadevan

Brown University, Bachelor of Science in Applied Math with honors, *magna cum laude* *2011-2015*

PUBLICATIONS

Peer-reviewed book

1. **Freilich, M.**, Turan, I., Varner, J., Yarina, L., eds. (2025). Climate Changed: Models and the Built World. Columbia University Press.

Pre-prints
Group members are bold underlined. Community scientist co-authors are underlined.

9. Neto, M., Marquet, P., **Freilich, M.A.**, Martí, L., and Sanchez-Pi, N. (in review). *Beyond the Critical Depth: The Metabolic and Physical Drivers of Phytoplankton Persistence in a Changing Ocean.*

8. **Krinos, A.**, Mars Brisbin, M., Costa, A., Shapiro, S., Follows, M.J., **Freilich, M.A.**, Alexander, H. (in review). *Nutrient response strategies drive coastal range shifts of phytoplankton taxa.*

7. Lang, S., Omand, M.O., **Freilich, M.A.**, Shcherbina, A., Farrar, T., Middleton, L. (in review). *Estimating submesoscale-driven particulate organic carbon flux from remote sensing at a dynamic upwelling front*

6. **Beaudin, E.**, di Lorenzo, E., **Freilich, M.A.**, Miller, A. (in review) *Transport Pathways of Gulf of Alaska Coastal Waters and Implications for Ecosystem Response.*

5. **Beaudin, E.**, Capone, D.A., Lang, S.E., Omand, M.M., di Lorenzo, E., Décima, M., **Freilich, M.A.**. (submitted). *Submesoscale Eddy Trapping Supports Planktonic Activity Beyond the Coastal Upwelling Zone.*

4. **Gangrade, S.**, **Freilich, M.A.**, **Beaudin, E.**, Luis, K. Leyba, I., Omand, M.M., Lang, S.E., O'Neill, L., Capone, D.A. (in review). *Open ocean biogeochemical impacts of extreme precipitation.*

3. Kim, H.H., Wolfe, W.H., Lawrence, E., Doney, S.C., Moran, M.A., **Freilich, M.A.**, **Krinos, A.**, Yang, M.Y., Covert, M.W., Braakman, R., Scott, H.G., Segre, D., Litchman, E., Weissman, J.L., Agmon, E. (in review). *Scalable, substrate-explicit metabolic network modeling of heterotrophic bacteria for ocean biogeochemistry.*

2. **Dove, L.A.**, **Freilich, M.A.**, Siegelman, L., Fox-Kemper, B., Hall, P. (in review). *Pycnocline Stratification Shapes Submesoscale Vertical Tracer Transport.* Journal of Physical Oceanography.

1. Panaïotis, T., Irisson, J.-O., **Freilich, M.A.**, Cael, BB (in revision). *A closer look at plankton: potential interactions inferred from centimeter-scale in situ observations.*

Peer-reviewed journal publications

* - indicates authors contributed equally. Group members are bold underlined. Community scientist co-authors are underlined.

39. Dove, L.A., **Freilich, M.A.** (2026). *Biophysical Dynamics of Mesoscale Eddies: Coincident Observations from SWOT and PACE.* Oceanography.

38. **Seitz, L.R.**, **Freilich, M.A.**, Pizzo, N.. (2026). *The role of Lagrangian drift in the generation of surface waves by wind.* Journal of Fluid Mechanics, 1032, A9.

37. **Freilich, M.A.**, **Dove, L.A.**, **Merk, K.** (2026). *Physical drivers of heterogeneous mesopelagic biogeochemistry.* Communication Earth and Environment, 7, 138. *(invited perspective)*

36. Testa, G., Dever, M., **Freilich, M.A.**, Mahadevan, A., Johnston, T. S., Pasculli, L., Falcieri, F. M. (2025). *Turbulent erosion of a subducting intrusion in the Western Mediterranean Sea.* Ocean Science, 21, 989–1002.

35. **Centeno, D.**, **Lopez, A.**, Palomino, A., Taboada, J., Sinclair, R., Montgomery, Q., Nereida Sanchez, M., Marquez, C., Arzeno-Soltero, I.B., **Freilich, M.A.** (2025). *Hypereutrophication, Hydrogen Sulfide, and Environmental Injustices: Mechanisms and Knowledge Gaps at the Salton Sea.* GeoHealth, e2024GH001327.

34. **Gonzalez, M.**, **Dove, L.A.**, **Freilich, M.A.** (2025). *Distribution and Transport of Antarctic Winter Water Biogeochemical Properties.* Geophysical Research Letters, e2025GL114950.

33. **Seitz, L.R.**, and **Freilich, M. A.** (2025). *Joint effects of submesoscale lateral dispersion and biological reactions on biogeochemical flux.* Geophysical Research Letters, e2024GL114112.

32. Farrar, J., D'Asaro, E., Rodríguez, E., Shcherbina, A., Lenain, L., Omand, M., Wineteer, A., Bhuyan, P., Bingham, F., Villas Boas, A., Czech, E., D'Addezio, J., **Freilich, M.**, Grare, L., Hypolite, D., Jacobs, G., Klein, P., Lang, S., Leyba, I., Li, Z., Mahadevan, A., McWilliams, J., Menemenlis, D., Middleton, L., Molemaker, J., O'Neill, L., Perkovic-Martin, D., Pizzo, N., Rainville, L., Rocha, C., Samelson, R., Simoes-Sousa, I., Statom, N., Thompson, A., Thompson, D., Torres, H., Uchoa, I., Wenegrat, J. and Westbrook, E. (2025). *S-MODE: The Sub-Mesoscale Ocean Dynamics Experiment.* Bulletin of the American Meteorological Society 106(4) pp. E657-E677.

31. Duffy, M.L., Barnes, L.Y., Wirz, C.D., Ranganathan, M., **Freilich, M.A.**, Freese, L.M., Lalk, E. and Wilcots, J., (2025). *Factors influencing underrepresented geoscientists' decisions to accept or decline faculty job offers.* Communications Earth and Environment, 6, 65.

30. Torres, H.S., Wineteer, A., Rodriguez, E., Klein, P., Thompson, A.F., Perkovic-Martin, D., Molemaker, J., Hypolite, D.J., Callies, J., Farrar, T., D'Asaro, E.A., **Freilich, M.A.** (2025) *Submesoscale eddy contribution to ocean vertical heat flux diagnosed from airborne observations.* Geophysical Research Letters, e2024GL112278.

29. Hung, C., Diamond, C., Sinclair, R., Lee, M. C., Stenstrom, M., **Freilich, M. A.**, Montgomery, Q., Marquez, C., Lyons, T. W. (2024). *Nutrient loading as a key cause of short-and long-term anthropogenic ecological degradation of the Salton Sea.* Scientific Reports, 14(1), 31247.

28. Martin, A.P., Bahamondes Dominguez, A. Baker, C.A., Baumas, C., Bisson, K.M., Cavan, E., **Freilich, M.**, Galbraith, E., Galí, M., Henson, S., Kvale, K.F., Lemmen, C., Luo, J.Y., McMonagle, H., de Melo Viríssimo, F., Möller, K., Richon, C., Suresh, I., Wilson, J.D., Woodstock, M.S., Yool, A. (2024). *When to add a new process to a model – and when not: A marine biogeochemical perspective.* Ecological Modelling, 498, 110870.

27. Pillar, H., Hetherington, E., Levin, L.A., Cimoli, L., Lauderdale, J., Van Der Grient, J., Johannes, K., Heimbach, P., Smith, L., (19 additional authors including **Freilich, M.A.**) (2024). *Future Directions for Deep Ocean Climate Science and Evidence-Based Decision Making.* Frontiers in Climate

26. Hsu, T.-Y., Mazloff, M., Gille, S., **Freilich, M.**, Sun, R., Cornelle, B. (2024). *Response of Sea Surface Temperature to Atmospheric Rivers.* Nature Communications.

25. **Freilich, M.**, Poirier, C., Dever, M., Alou, E., Allen, J., Cabornero, A., Choi, C., Sudek, L., Ruiz, S., Pascual, A., Farrar, J.T., D'Asaro, E., Worden, A.Z., Mahadevan, A. (2024). *Microbially enriched intrusions from the deep chlorophyll maximum transport carbon to the mesopelagic ocean.* Proceedings of the National Academy of Sciences.

24. Arboleda-Baena, C, **Freilich, M**, Pareja, C, Logares, R, De la Iglesia, R, and Navarrete, S. (2024). *Microbial communities network structure across strong environmental gradients: How do they compare to macroorganisms?.* FEMS Microbiology Ecology, fiae017.

23. Cao, H., **Freilich, M.**, Song, X., Jing, Z., Fox-Kemper, B., Qiu, B., Hetland, R., Chai, F., Chen, D., Ruiz, S. (2024) *Isopycnal submesoscale stirring sustains subsurface chlorophyll maximum in ocean cyclonic eddies.* Geophysical Research Letters.

22. **Centeno, D.**, Arzeno-Soltero, I., Delgado, A., **Freilich, M.**, Marquez, C., Montgomery, Q., Palomino, A., Penalber, G., Sinclair, R. (2023). *Salton Sea Environmental Work and the Importance of Community Science.* Oceanography.

21. Youngs, M., **Freilich, M.**, Lovenduski, N. (2023). *Air-Sea CO_2 Fluxes Driven By Topography in a Southern Ocean Channel.* Geophysical Research Letters.

20. Plummer, A.*, **Freilich, M.***, Choi, C.J., Sudek, L., Benzi, R., Toschi, F., Worden, A.Z., Mahadevan, A. (2023). *Oceanic frontal divergence alters phytoplankton competition.* Journal of Geophysical Research: Oceans, e2023JC019902.

19. **Freilich, M.**, Lenain, L., Gille, S. (2023). *Characterizing the role of non-linear interactions in the transition to submesoscale dynamics at a dense filament.* Geophysical Research Letters, 50 (15), e2023GL103745.

18. Lenain, L., Smeltzer, B., Pizzo, N., **Freilich, M.**, Colosi, L, Ellingsen, S., Grare, L., Peyriere, H., Statom, N. (2023). *Airborne observations of surface winds, waves and currents from meso to submesoscales.* Geophysical Research Letters, 50 (8), e2022GL102468.

17. Esposito, G., Donnet, S., Berta, M., Shcherbina, A., **Freilich, M.**, Centurioni, L., D'Asaro, E., Farrar, J.T., Johnston, T.M.S., Mahadevan, A., Ozgokmen, T., Pascual, A., Poulain, P.-M., Ruiz, S., Tarry, D., Griffa, A. (2023). *Inertial oscillations and frontal instabilities at an Alboran Sea front: Effects on divergence and vertical transport.* Journal of Geophysical Research: Oceans, 128 (3), e2022JC019004.

16. Aravind, H.M., Verma, V., Sarkar, S., **Freilich, M.**, Mahadevan, A., Haley, P., Lermusiaux, P.F.J., and Allshouse, M.R. (2023). *Lagrangian surface signatures reveal upper-ocean subduction.* Ocean Modelling, 181, 102136.

15. Cutolo, E., Pascual, A., Ruiz, S., Johnston, T.M.S., **Freilich, M.**, Mahadevan, A., Shcherbina, A., Poulain, P-M., Ozgokmen, T., Centuroni, L.R., Rudnick, D., D'Asaro, E. (2022). *Diagnosing Frontal Dynamics from Observations using a Variational Approach.* Journal of Geophysical Research: Oceans, 127 (11), e2021JC018336.

14. Hall, C. A., Illingworth, S., Mohadjer, S., Koll Roxy, M., Poku, C., Otu-Larbio, F., Reano, D., **Freilich, M.**, Veisaga, M-L, Valencia, M., Morales, J. (2022). *GC Insights: Diversifying the Geosciences in Higher Education: a Manifesto for Change.* Geoscience Communication, 5, 275–280.

13. **Freilich, M.**, Flierl, G., Mahadevan, A. (2022). *Diversity of growth rates maximizes phytoplankton productivity in an eddying ocean.* Geophysical Research Letters, e2021GL096180.

12. **Freilich, M.**, Mignot, A., Flierl, G., and Ferrari, R. (2021). *An investigation of grazing behaviors that result in winter phytoplankton biomass accumulation.* Biogeosciences, 18, 5595–5607.

11. Ranganathan, M., Lalk, E., Freese, L., **Freilich, M.**, Wilcots, J., Duffy, M., and Shivamoggi, R (2021). *Trends in the representation of women among US geoscience faculty from 1999-2020: the long road towards gender parity.* AGU Advances, 2 (3), e2021AV000436.

10. **Freilich, M.** and Mahadevan, A. (2021). *Coherent pathways for subduction from the surface mixed layer at ocean fronts.* Journal of Geophysical Research: Oceans, 126 (5), e2020JC017042.

9. **Freilich, M.**, Rebolledo, R., Corcoran, D., and Marquet, P. (2020). *Reconstructing ecological networks with noisy data.* Proceedings of the Royal Society A, 476 (2237), 20190739.

8. Dever, M., **Freilich, M.**, Farrar, J.T., Hodges, B., Lanagan, T., Baron, A., Mahadevan, A., (2020). *EcoCTD for profiling oceanic physical-biological properties from an underway ship.* Journal of Atmospheric and Oceanic Technology, 37 (5), 825-840.

7. Shroyer, E., Gordon, A., Spiro Jaeger, G., **Freilich, M.** Waterhouse, A., Farrar, J.T., Sarma, V.V.S.S., Venkatesan, R., Weller, R., Moum, J., and Mahadevan, A. (2019) *Upper Layer Thermohaline Structure of the Bay of Bengal during the 2013 Northeast Monsoon.* Deep Sea Research II, 104630.

6. **Freilich, M.** and Mahadevan, A. (2019). *Decomposition of vertical velocity for nutrient transport in the upper ocean.* Journal of Physical Oceanography, 49 (6), 1561-1575.
Awarded Fye Award for Excellence in Oceanographic Research Graduate Student Best Paper Award

5. **Freilich, M.**, Weiters, E., Broitman, B., Navarrete, S. (2018) *Species co-occurrence networks: can they reveal trophic and non-trophic interactions in ecological communities?.* Ecology, 99 (3), 690-699.

4. Mahadevan, A., Spiro-Jaeger, G., **Freilich, M**. Omand, M., Shroyer, E., Sengupta, D., Sharma, R. (2016) *Freshwater in the Bay of Bengal: Its fate and role in air-sea heat exchange.* Oceanography, 29 (2), 72-81.

3. Lucas, AJ., Nash, J.D., Pinkel, R., MacKinnon, J.A., Tandon, A., Mahadevan, A., Omand, M., **Freilich, M.**, Sengupta, D., Ravichandran, M., Le Boyer, A., and Moum, J. (2016) *Adrift upon a salinity-stratified sea: a view of upper ocean processes in the Bay of Bengal during the southwest monsoon.* Oceanography, 29 (2), 134-145.

2. Gordon, A., Shroyer, E., Mahadevan, A., Sengupta, D., and **Freilich, M.** (2016) *Bay of Bengal: Upper Ocean Circulation from the 2013 Northeast Monsoon.* Oceanography, 29 (2), 82-91

1. **Freilich, M.** and Connolly, S. (2015). *Phylogenetic Community Structure When Similarity-Based Competition and Environmental Filtering Determine Abundances.* Global Ecology and Biogeography, 24: 1390-1400.

Non-peer reviewed publications

3. Lerner, P., Palevsky, H.I., Busecke, J., **Freilich, M.**, Cavan, E., Eddebbar, Y., Fassbender, A., Lauderdale, J., Luo, J., Mongwe, P., Stephens, B., Traylor, S. *CMIP6 Biogeochemistry*
doi: https://doi.org/10.5281/zenodo.3559209 [Project coordinator]

2. Dever, M., **Freilich, M.**, Hodges, B.A., Farrar, J.T., Lanagan, T., Mahadevan, A., "UCTD and EcoCTD Observations from the CALYPSO Pilot Experiment (2018): Cruise and Data Report", 2019-01, DOI:10.1575/1912/23637, https://hdl.handle.net/1912/23637

1. Haitians and Guantanamo: Who is a refugee? What is a refuge? Guantanamo Public Memory Project. National Traveling Exhibit. 2012.

FELLOWSHIPS AND ACADEMIC HONORS

Henry Merritt Wriston Fellowship, Brown University	2026
Editor's Award – Journal of Physical Oceanography, American Meterological Society	2025
Scialog Fellow, Research Corporation for Science Advancement	2025
National Academy of Engineering, China-America Frontiers of Engineering	2024
NASA group achievement award (awarded to S-MODE science team)	2023

Chemical Currencies of a Microbial Planet, Faculty Fellowship 2023-2025
Oberwolfach Leibniz Graduate Student Grant 2022
Rossby Award for Best Thesis, MIT Program in Atmospheres, Oceans, and Climate 2022
Scripps Institutional Postdoc Program 2021-2023
AGU Voices for Science Fellowship 2021-2022
EAPS Community Builder Award (team award to Towards Increasing Diversity in EAPS) 2021
Fye Award for Excellence in Oceanographic Research Graduate Student Best Paper Award 2020
Martin Fellowship for Sustainability 2018-2020
Fulbright Fellowship 2016
National Defense Science and Engineering Graduate Fellowship 2015-2018
Jerome L Stein Memorial Award, Division of Applied Math, Brown University 2015
Summer Student Fellowship, Woods Hole Oceanographic Institution 2014
Phi Beta Kappa (elected as a junior) 2014
Royce Fellowship, Brown University research fellowship 2013
Columbia Economics Review Climate Policy Competition, Winner 2012
American Meteorological Society Scholarship 2011

GRANTS

Current

Kavli Foundation. *From Feeding to Flux: Unraveling the Impact of Animal Behavior on Global Ocean Carbon Flow*. Lead PI **MA Freilich** with Diana Rennison and Jason Keagy, 2025-2026

Ocean Biogeochemistry Virtual Institute, *Ocean Margins Initiative*, Lead PIs A. Mahadevan, E. Mahu, M. Omand, PIs A. Lucas, K. Appeaning-Addo, B. Arbic, B. Jönsson, C. Durkin, D. Lindell, D. Menemenlis, J.T. Farrar, J. Ansong, **MA Freilich**, M. Church, M. Mazloff, N. Levine, P. Girguis, 2024-2029

NASA EPSCoR, *Precipitation extremes and land-sea biogeochemical connections in the California Current System*, PI **MA Freilich** 2024-2025

NASA Ocean Biology and Biogeochemistry, *Mechanistic insight into submesoscale biogeochemical fluxes from surface observations*, PI **MA Freilich** 2024-2025

NSF STC Chemical Currencies of a Microbial Planet, *Biophysical mechanisms of dissolved organic carbon flux*, subaward to **MA Freilich** 2023-2026

NASA Ocean Vector Winds Science Team, *Coupling between the ocean and the atmosphere from meso to submesoscales*, PI L Lenain, co-Is **MA Freilich**, N Pizzo 2023-2027

Current Internal Grants

DOR Research Resilience Award, *Phytoplankton responses to environmental gradients: modeling and observations*, PI **MA Freilich** 2026

Equitable Climate Futures, *Equitable Climate Information*, Lead PI **MA Freilich**. 2025-2027

Pending

NSF Science Technology Centers, *Chemical Currencies of a Microbial Planet*, Directors: Moran, M.A., Kujawinski, E., PIs Agmon, E., Bates, N., Braakman, R., Covert, M., Dolan, E., Doney, S., Dyhrman, S., Edison, A., **Freilich, M.A.**, Hurley, S., Kim, H., O'Dwyer, L., Saito, M., Segre, D. 2026-2031

NSF EPSCoR, *Collaborative Research E-RISE: A Collaborative Data-AI Analysis & Prediction Engine for Sustainable Economic Growth*, PI **MA Freilich**, Co-PIs C. Horvat, S. Frickel, M. Hastings, E. Di Lorenzo, R. Robinson 2026-2030

NSF Office of Polar Programs, *Antarctic Winter Water as a Conduit for Biophysical Ventilation across the Southern Ocean*, PI L. Dove, **Co-PI MA Freilich** 2026-2029

Completed

NASA Sub-Mesoscale Ocean Dynamics Experiment, *Mechanistic insight into vertical biogeochemical fluxes using S-MODE observations* 2024-2025

Conicyt (Chile), Exploración 2022, *Biological and Quantum Open System Dynamics: evolution, innovation and mathematical foundations*, PIs Pablo Marquet and Rolando Rebolledo, co-PIs NR Aburto, L Videla, C Quiñinao, M Tejo, **MA Freilich**, H Olivero 2023-2025

NASA Applied Sciences, *NASA Earth Observations for Resilient Salton Sea Communities*, PI **MA Freilich**, co-Is Alianza Coachella Valley, I.B. Arzeno-Soltero, K. Heitz, R. Sinclair, Q. Montgomery
(early termination due to DEI executive order) 2023-2025

Burroughs Wellcome Fund, *Environmental geochemistry, human health, and environmental justice: Hydrogen sulfide and the Salton Sea*, PI **MA Freilich**, Collaborators I Arzeno Soltero, R Sinclair, Climate Change and Human Health Seed Grant 2023-2025

ESI Curriculum Mini-Grants for Infusing Sustainability in STEM 2021
Access to the Sea, 1 day of ship time on R/V Neil Armstrong 2019
Grassle Fellowship Fund 2018
Montrym Fund 2018
MISTI-Chile – UC Graduate Student Seed Fund 2017-2018

TEACHING

Courses

- APMA2200: Nonlinear Dynamical Systems (7 students) Spring 2026
- EEPS1400: Climate Modeling I (48 students, 23 students) Fall 2024, 2025
- APMA2980: Geophysical Fluid Dynamics Independent Study (1 student) Spring 2024
- APMA1930P: Mathematics and Climate (21 students, 25 students) Spring 2024, 2025

Gull Island Institute 2022-present
Advisory Committee

- Faculty, Buzzards Bay Term May 2025

University Course Guest Lectures

- Ocean Biogeochemical Cycles, Brown 2023
- Ethical Challenges in Engineering, Brown 2023
- Computational Ocean Modeling, MIT-WHOI 2022
- Ethics Seminar, MIT 2020, 2021
- Sociopolitical Perspectives on Math and Science Education, University of Illinois at Urbana-Champaign 2020
- Social Movements in Boston, Northeastern University 2019
- Biophysical Interactions, MIT-WHOI 2019, 2021

Curriculum Assistant 2019-2021
Write climate science-related problem sets for first year math courses *MIT*

MENTORING

Research advisor

Postdocs

- Shailja Gangrade 2025-present
- Arianna Krinos, C-CoMP Postdoctoral Fellow 2024-present

· Lilian Dove (next position: Assistant Professor, Georgia Institute of Technology) 2023-2025

PhD students

· Lulabel Ruiz Seitz, APMA PhD student, NDSEG Fellow 2023-present
· Alejandra Lopez, EEPS PhD student 2024-present
· Katarina Merk, EEPS PhD student 2024-present
· Leah Hoogstra, APMA PhD student (co-advisor with Baylor Fox-Kemper) 2025-present
· Erin Okey, APMA PhD student 2025-present
· Élise Beaudin, co-advised EEPS PhD student (next position: Data Analyst, Ocean Networks Canada) 2023-2025

Research assistants

· Emily Hu, Bridge to PhD Fellow 2024-present
· Diego Centeno, research assistant (next position: PhD student, UCLA) 2023-2024

Undergraduates

· Wyatt Simienski '26, UTRA, Voss, senior thesis "How big are ocean fronts?' 09/2024-present
· Cassidy Charles '26, Presidential Scholars Program, senior thesis "Transient Overyielding in Ocean Microbial Communities" 01-08/2024, 06/2025-present
· Liam Johnson '26, senior thesis (co-advised with USGS mentor) "Modeling wintertime carbon concentrations in a northern-latitude coastal salt marsh" 09/2025-present
· Raymond Zhong '27, UTRA, "Eddy killing the presence of surface waves" 09/2025-present
· Kathy Sun '28, UTRA, "Modeling salinity tolerance in marine microorganisms" 09/2025-present
· Ashely Aguayo, College of the Desert '26, Leadership Alliance REU, "From Locals to Labs: Community Science Reveals Seasonal Phytoplankton Patterns in the Salton Sea" 06/2025-present
· Scarlett Lindgren '28, UTRA, "Investigating the Transport of Marine Phytoplankton in Eddies" 01/2026-present
· Ethan Tindel '27, UTRA, "Steady States in the Turbulent Ocean" 09/2025-12/2025
· Remy Dufresne '27, Laidlaw Fellow, "Modeling H_2S Production in the Salton Sea: Biogeochemical Drivers and Environmental Justice Implications" 06/2025-08/2025
· Evan Li '28, Laidlaw Fellow, "Modeling Mixing Dynamics of the Salton Sea" 06/2025-08/2025
· Anjali Shah '25, senior thesis "Ice-algae blooms" 09/2024-06/2025
  · Next position: Alaska Fellows
· Ayushman Choudhury '25, UTRA, senior thesis "Carbon Fluxes in the Southern Ocean" 01/2024-06/2025
  · Next position: PhD student, University of Chicago
· Tommy Frank '25, UTRA, "EEPS1400: Climate Modeling I" 07/2024-12/2024
· Margaret Gonzalez, Loyola University of Chicago '26, Leadership Alliance, "Antarctic Winter Water and the global carbon cycle" 06-12/2024

PhD advisory committees: Uthkarsh Das (EEPS, 2023-present), Anna Lo Piccolo (EEPS, 2023-2026), John Nicklas (EEPS, 2023-2026), Alexia Rojas (EEPS, 2024), Simone Tetu (APMA academic advisor, 2024-2026), Gillian Cheong (EEPS, 2024-present), Brianna Hoegler (EEPS, 2024-present), Uma Dayal (APMA academic advisor, 2025-present)

Undergraduate thesis readers: Jasper Chen (APMA-CS, 2024), Lorenzo Davidson (EEPS, 2024), Anna Lapre (APMA-CS, 2025)

INVITED PRESENTATIONS

$*$ = upcoming

2026: University of Maryland, American Mathematical Society Eastern Section Meeting, NOAA Geophysical Fluid Dynamics Laboratory*, Gordon Research Conference on Ocean Mixing*

2025: Boston University Mathematics Department, Rutgers University, Boston University Biogeosciences Seminar, Women in PDEs and Applied Mathematics Workshop (keynote speaker), BGC Argo webinar

2024: University of Chile Center for Mathematical Modeling, Bard College, New England Dynamics Seminar, Clivar Workshop on Pathways Connecting Climate Changes to the Deep Ocean, University of Southern California, Isaac Newton Institute, NASA Ames Earth Science Division, University of Toronto, Nature Editors Community

2023: Scripps Institution of Oceanography, Oregon State University, University of Rhode Island, Sante Fe Institute, APS Physics of Climate webinar

2022: NASA Jet Propulsion Lab, University of Washington Applied Physics Lab, Winds and Currents Webinar, Alfred Wegener Institute Carbon Seminar, FilaChange Paris, Second National Conference: Justice in Geoscience, CYU ECODEP 2022 Conference on Networks Reconstruction, Brown University, University of California Berkeley EPS Seminar, Yale University EPS Seminar, Ocean Sciences Meeting "New insights into submesoscale ocean biogeochemistry", Gordon Research Seminar on Ocean Mixing, NYU Courant Institute Atmosphere Ocean Science Colloquium

2021: Physical Oceanography Dissertation Symposium, NOAA Coastal Ocean Modeling Science Seminar, University of California Santa Barbara, Marine Science Seminar, Woods Hole Oceanographic Institution Department of Physical Oceanography, MIT Program in Atmosphere, Oceans, and Climate

2020: University of Massachusetts, Dartmouth School for Marine Science & Technology Seminar, University of Washington Oceanography Seminar, Caltech Oceanography Seminar

2019: Woods Hole Oceanographic Institution Department of Physical Oceanography

2018: Brown University, Sarah Doyle Center for Women and Gender, Brown University Department of Earth, Environmental, and Planetary Sciences

2015: Princeton University Department of Atmospheric and Oceanic Sciences

2014: Intensive Workshop on Greenhouse Gas Emissions Reductions in RI: From Goals to Implementation

Conference participation (as invited participant)

5. Climate Applications of Layering, Isaac Newton Institute (2024 May).
4. Multiscale Wave-Turbulence Dynamics in the Atmosphere and Ocean, MFO, Oberwolfach (2022 September).
3. Environmental Data Science Summit, National Center for Ecological Analysis and Synthesis (2023 February).
2. Gordon Research Conference on Ocean Mixing (2018 June, 2022 June).
1. Life in a Turbulent Environment: How the dynamic ocean shapes the distribution, diversity and growth of microorganisms, Harvard Radcliffe Institute (2015 February).

ACADEMIC AND UNIVERSITY SERVICE

- Service to scientific community

Associate Editor, Journal of Physical Oceanography 2022-present
Scientific Committee Member, Liege Colloquium on Submesoscale Ocean Dynamics 2026
Conference organizer, BioGeoSCAPES Modeling Workshop 2025
Session Convener
· Ocean Sciences Meeting. [Session: Vertical Transport] 2022, 2024, 2026
· Ocean Sciences Meeting. [Session: Scaling Nature's Symphony] 2024
· Ocean Sciences Meeting. [Session: Community Science] 2024
· American Physical Society [Session: Statistical and Nonlinear Physics of Earth and its Climate] 2023
· Graduate Climate Conference 2017, 2019
· Ocean Carbon and Biogeochemistry meeting. [Session: Student lightning talks] 2017

Executive Committee, APS Topical Group on the Physics of Climate, member-at-large 2022-2024
Conference organizer, From Filaments to Climate Change (CLIVAR workshop) 2022
Society for Women in Marine Science, treasurer 2019-2021

Executive committee and outreach lead, Graduate Climate Conference 2017, 2019
Reviewer for AGU books, Biogeosciences, Deep Sea Research I, Ecology Letters, FEMS Microbiology Reviews, Geophysical Research Letters, The ISME Journal, Journal of Geophysical Research: Oceans, Marine Ecology Progress Series, Nature Climate Change, Oceanography, Journal of Physical Oceanography, Proceedings of the National Academy of Sciences, Science Advances
Grant reviewer and panelist for NASA, NSF
Abstract reviewer for SACNAS

- Service to broader community
Salton Sea Management Program Science Committee, member 2025-present

- University Service
Lefschetz Center for Dynamical Systems Seminar Organizer, APMA 2025-present
Community Engaged Research Department Pilot Program Committee, EEPS 2025-present
DEI Committee, APMA 2024-2025
Colloquium Committee, EEPS 2023-2024

Professional affiliations: Society for Industrial and Applied Mathematics, American Geophysical Union, The Oceanography Society, American Physical Society

OUTREACH

Scientific Lead, Salton Sea Environmental Timeseries 2021-present
Outreach in schools, 14 presentations in English and Spanish to over 300 students 2015-present
The Old Farmer's Almanac, "Current Events: How and why the oceans hold a key to our future climate", (circulation 3 million). 2024
UNESCO, invited panelist. "Empowering women in the Ocean Decade." November 2020
MIT Science Policy Initiative, invited panelist, "Oceans and Climate" November 2019
Rhode Island School of Design, keynote speaker, "Reclaiming STEAM" April 2019
Science Fair Judge, McCormack Middle School February 2019
National Park Service, PLACE fellowship, presenter "Career Pathways to Marine Science" November 2018
Oceanus magazine, "Forecasting Where Ocean Life Thrives." 2018
Public Lecture Series on Climate Science and Policy, lecturer and coordinator January 2016