Alexa Fredston **fredston@ucsc.edu | www.alexafredston.com**

Employment

University of California, Santa Cruz, Santa Cruz, CA
Assistant Professor, Department of Ocean Sciences, 2023 – present

Rutgers University, New Brunswick, NJ
Postdoctoral Associate, Department of Ecology, Evolution, and Natural Resources, 2020 – 2022
Part-Time Lecturer, Department of Ecology, Evolution, and Natural Resources, 2022

Education

University of California, Santa Barbara

Ph.D., Bren School of Environmental Science and Management, 2020
Committee: Steven D. Gaines (co-adviser), Benjamin S. Halpern (co-adviser), Malin Pinsky
Dissertation: Causes and consequences of species range edge shifts in a warming ocean

Princeton University

B.A. *summa cum laude*, Ecology and Evolutionary Biology, 2012
Adviser: Stephen W. Pacala
Thesis: A paleontological approach to the "shifting baselines" question in ecology: A case study of Caribbean reef-based mollusk communities

Grants

Zegar Family Foundation Renewal Grant (Co-PI), $685,240, 2023 – 2025

Zegar Family Foundation Grant (Co-PI), $194,902, 2019 – 2021

Awards, Honors, and Fellowships

Outstanding Oral Presentation, Effect of Climate Change on the World's Ocean meeting, 2023

Runner-Up Best Short Talk, Bren PhD Student Symposium, 2017

Semifinalist, UCSB Grad Slam, 2015

National Defense Science and Engineering Graduate Fellowship, 2014 – 2017

High Meadows Fellow, Environmental Defense Fund, 2012 – 2014

Highest Honors, Department of Ecology and Evolutionary Biology, Princeton University, 2012

Charles M. Cannon Memorial Prize for Best Presentation of a Senior Thesis, Department of Ecology and Evolutionary Biology, Princeton University, 2012

Short-Term Fellow, Smithsonian Tropical Research Institute, 2011

Peer-Reviewed Publications

21. Soifer, L.G., *et al.* 2025. Extreme events drive rapid and dynamic range fluctuations. *Trends in Ecology and Evolution* 40(9): 862-873. 10.1016/j.tree.2025.06.009
20. Kitchel, Z.J., *et al.* 2025. Marine communities do not follow the paradigm of increasing similarity through time. *PLOS Climate* 4(7): e0000659. 10.31223/X5GM7M
19. **Fredston, A.L.**,** M.W. Tingley**, *et al.* 2025. Reimagining species on the move over space and time. *Trends in Ecology and Evolution* 40(7): 629-638. 10.1016/j.tree.2025.03.015
18. Maureaud, A.M., Z. Kitchel, **A. Fredston**, R. Guralnick, J. Palacios-Abrantes, M.L.D. Palomares, M.L. Pinsky, N.L. Shackell, J.T. Thorson, B. Mérigot, and the FISHGLOB Consortium. 2025. FISHGLOB: A collaborative infrastructure for marine science and management. *Conservation Science and Practice* 7: e70035. 10.1111/csp2.70035
17. **Fredston, A.L.** and J.S.S. Lowndes. 2024. Welcoming more participation in open data science for the oceans. *Annual Review of Marine Science* 16: 537-549. 10.1146/annurev-marine-041723-094741

16. Maureaud, A.M., J. Palacios-Abrantes, Z. Kitchel, L. Mannocci, M.L. Pinsky, **A. Fredston**, E. Beukhof, D.L. Forrest, R. Frelat, M.L.D. Palomares, L. Pecuchet, J.T. Thorson, P.D. van Denderen, and B. Mérigot. 2024. An integrated database of fish biodiversity sampled with scientific bottom trawl surveys. *Scientific Data* 11(24). 10.1038/s41597-023-02866-w

15. **Fredston, A.**, W.W.L. Cheung, T.L. Frölicher, Z. Kitchel, A. Maureaud, J.T. Thorson, A. Auber, B. Mérigot, J. Palacios-Abrantes, M.L.D. Palomares, L. Pecuchet, N. Shackell, and M.L. Pinsky. 2023. Marine heatwaves are not a dominant driver of change in demersal fishes. *Nature* 621: 324-329. 10.1038/s41586-023-06449-y

    News & Views by Payne, M.R.: 10.1038/d41586-023-02594-6

    Press coverage by *BBC*, *Agence France-Presse*, *Axios* (USA), *Le Figaro* (France), *Deutschlandfunk* (Germany), *Weekendavisen* (Denmark), and others.

14. Burgess, M., S. Becker, R.E. Langendorf, **A. Fredston,** and C. Brooks. 2023. Climate change scenarios in fisheries and aquatic conservation research. *ICES Journal of Marine Science* 80(5): 1163-1178. 10.1093/icesjms/fsad045

13. Halpern, B.S., *et al.* 2023. Priorities for synthesis in ecology and environmental science. *Ecosphere* 14(1): e4342. 10.1002/ecs2.4342

12. Brodie, S., *et al.* 2022. Advancing practices for modeling species distribution changes under climate change. *Global Change Biology* 28(22): 6586-6601. 10.1111/gcb.16371

11. Hoel, P.*, **A. Fredston,** and B.S. Halpern. 2022. A global evaluation framework for risk of marine ecological diversity loss from land-based impacts. *Frontiers in Marine Science* 9. 10.3389/fmars.2022.796050

10. **Fredston, A.**, M. Pinsky, R.L. Selden, C. Szuwalski, J.T. Thorson, S.D. Gaines, and B.S. Halpern. 2021. Range edges of North American marine species are tracking climate change over decades. *Global Change Biology* 27(13): 3145-3156. 10.1111/gcb.15614

9. Pandya, U.M., A. Tellechea, M. A. Manzanares, C. Egbuta, J. Daubriac, C. Jaramilla, F. Samra, **A. Fredston**, M. Michalak, and L.I. Gold. 2020. Calreticulin exploits TGF-β for extracellular matrix induction engineering a tissue regenerative process. *The FASEB Journal* 34(12): 15849-15874. 10.1096/fj.202001161R

8. Taylor-Burns, R.*, C. Cochran*, K. Ferron*, M. Harris*, C. Thomas*, **A. Fredston**, and B. Kendall. 2020. Locating gaps in the California Current Ocean Acidification Monitoring Network. *Science Progress* 103(3): 1-27. 10.1177/0036850420936204

7. **Fredston-Hermann, A.**, R. Selden, M. Pinsky, S.D. Gaines, and B.S. Halpern. 2020. Cold range edges of marine fishes track climate change better than warm edges. *Global Change Biology* 26(5): 2908-2922. 10.1111/gcb.15035

6. Burgess, M.G., **A. Fredston-Hermann**, D. Tilman, M. Loreau, and S.D. Gaines. 2019. Broadly inflicted stressors can cause ecosystem thinning. *Theoretical Ecology* 12(2): 207-223. 10.1007/s12080-019-0417-4

5. Brown, C.J., *et al.* 2019. A guide to modelling priorities for managing land-based impacts on coastal ecosystems. *Journal of Applied Ecology* 56(5): 1106-1116. 10.1111/1365-2664.13331

4. **Fredston-Hermann, A.**, S.D. Gaines, and B.S. Halpern. 2018. Biogeographic constraints to marine conservation in a changing climate. *Annals of the New York Academy of Sciences: The Year in Ecology and Conservation Biology* 1429(1): 5-17. 10.1111/nyas.13597

3. Burgess, M.G., C. Costello, **A. Fredston-Hermann**, M. Pinsky, S.D. Gaines, D. Tilman, and S. Polasky. 2017. Range contraction enables harvesting to extinction. *Proceedings of the National Academy of Sciences* 114(15): 3945-3950. 10.1073/pnas.1607551114

    Letter by Le Pape, O., S. Bonhommeau, A.-E. Nieblas, and J.-M. Fromentin: 10.1073/pnas.1706893114

    Reply by Burgess, M.G., **A. Fredston-Hermann**, M.L. Pinsky, S.D. Gaines, and D. Tilman: 10.1073/pnas.1708147114

    Press coverage by *Futurity*, *UPI*, and others.

2. **Fredston-Hermann, A.**, C.J. Brown, S. Albert, C. Klein, S. Mangubhai, J.L. Nelson, L. Teneva, A. Wenger, S.D. Gaines, and B.S. Halpern. 2016. Where does river runoff matter for coastal marine conservation? *Frontiers in Marine Science* 3(273): 1-10. 10.3389/fmars.2016.00273
1. **Fredston-Hermann, A.L.**, A. O'Dea, F. Rodriguez, W.G. Thompson, and J.A. Todd. 2013. Marked ecological shifts in seagrass and reef molluscan communities since the mid-Holocene in the Southwestern Caribbean. *Bulletin of Marine Science* 89(4): 983-1002. 10.5343/bms.2012.1077

Preprints

Fredston, A.L. Measuring the edges of species' geographic ranges. 10.32942/X2QP69

Fredston, A.,** D. Ovando,** L. da Cunha Godoy, J. Kong, B. Muffley, J.T. Thorson, and M. Pinsky. Dynamic range models improve the near-term forecast for a marine species on the move. 10.32942/X24D00

Nazario, E., N. Lezama-Ochoa, M. Czapanskiy, H. Dewar, A. Preti, **A. Fredston**, M. Pinsky, M.P. Buil, and E. Hazen. Dissolved oxygen and metabolic parameters improve species distribution models for a marine predator. 10.22541/au.174100231.19056955/v1

Sevigny, J.*, B.G. Lipsey*, T.T. Tran*, and **A.L. Fredston**. A century of invertebrate range extensions in the eastern North Pacific. 10.32942/X2T94P

* denotes mentee authors, ** denotes co-first authors

Other Publications

Fredston, A. and B.S. Halpern. 2023. Estuarine and Coastal Marine Organism Responses to Climate Change. In: *Climate Change and Estuaries,* edited by M.J. Kennish, H.W. Paerl, and J.R. Crosswell. *CRC Press.*

Pinsky, M., and **A. Fredston**. 2022. A stark future for ocean life. *Science* 376(6592): 452-453. 10.1126/science.abo4259

Lowman, D., S. McTee, and **A. Fredston-Hermann**. July 2014. 2014 National Electronic Monitoring Workshop: Final Summary Report. *Environmental Defense Fund.*

Norvell, M., L. Damrosch, B. Blue, S. Jud, S. McTee, **A. Fredston-Hermann**, H. McGonigal, M. Stevens, M. Bell, and K. Labrum. June 2014. Exempted Fishing Permit Application: Electronic Monitoring for Groundfish IFQ Vessels in 2015 and 2016. *Pacific Fishery Management Council Briefing Book.*

Teaching

Instruction

Instructor, Marine Population Dynamics (graduate course), UCSC, 2025

Instructor, Biological Principles for Environmental Sciences (introductory undergraduate course), UCSC, 2023, 2025

Co-Instructor, Biological Oceanography (advanced undergraduate course), UCSC, 2023

Instructor, Statistical Programming for Ecology, Evolution, and Environmental Science (graduate course), Rutgers University, 2022

Teaching assistant, Ecology of Managed Ecosystems (graduate course), UCSB (Instructor: David Tilman), 2018

Workshops

Introduction to species distribution modeling in R, UCSC, 2025

The theory and practice of effective scientific figures, Ocean Sciences PhD program, UCSC, 2024

Authoring websites, documents, and more with Markdown, Society for Open, Reliable, and Transparent Ecology and Evolutionary Biology (SORTEE) webinar, 2022

Mapping open source datasets for ecology and evolutionary biology, SORTEE Conference, 2022

Authoring websites, documents, and more with Markdown, SORTEE Conference, 2022

Workflows and best practices for collaborative coding, Eco-Data-Science, UCSB, 2020

Introduction to GitHub, Eco-Data-Science, UCSB, 2018

Introduction to GitHub, Ecology and Evolutionary Biology, Cornell University, 2018

Data wrangling with the Tidyverse, Eco-Data-Science, UCSB, 2018

Introduction to GitHub, Eco-Data-Science, UCSB, 2017

Invited Talks

Department of Ecology and Evolutionary Biology, University of California, Los Angeles, 2025

Moss Landing Marine Laboratories, San Jose State University, 2025

Webinar, Climate Variability and Predictability (CLIVAR), World Climate Research Programme, 2025

Ecology Seminar, Scripps Institution of Oceanography, University of California, San Diego, 2025

Department of Biological Sciences, San Jose State University, 2024

Department of Ecology and Evolutionary Biology, University of California, Santa Cruz, 2023

Plenary, Species on the Move, Bonita Springs, Florida, 2023

Fisheries Ecology Division Seminar Series, National Oceanic and Atmospheric Administration Southwest Fisheries Science Center, 2023

School of Aquatic and Fishery Sciences Quantitative Seminar, University of Washington, 2023

Life Science Seminar Series, LaSalle University, 2022

Wildlife, Fish, and Conservation Biology Seminar, University of California, Davis, 2022

Earth and Environment Seminar, Boston University, 2022

Biology Seminar, University of Houston, 2022

Earth and Environmental Sciences Seminar, Lehigh University, 2022

Biology Seminar, Temple University, 2021

Panelist, Whitman College, 2021

Ecology and Evolutionary Biology Seminar, Kansas State University, 2021

Environmental Studies Seminar, University of Colorado Boulder, 2021

Seminar, U.S. Northeast Climate-Fisheries Seminar Series, 2021

Ridley Seminar, Newcastle University, 2021

Seminar, Thünen Institute of Sea Fisheries, 2021

Les Ecologistes Seminar, Simon Fraser University, 2021

Sustainable Oceans NSF Research Traineeship Seminar, University of California, Davis, 2021

Centre for Biodiversity and Conservation Science Seminar, University of Queensland, 2021

Biodiversity Legendary Internal Seminar Series, University of British Columbia, 2021

Ecology, Evolution, and Marine Biology Seminar, University of California, Santa Barbara, 2021

Ecology and Evolution Seminar, Rutgers University, 2020

School for Marine Science and Technology Seminar, University of Massachusetts Dartmouth, 2020

National Center for Ecological Analysis and Synthesis Roundtable, 2019

National Center for Ecological Analysis and Synthesis Roundtable, 2017

Contributed Presentations

Measuring the edges of species' geographic ranges, American Society of Naturalists meeting, Asilomar, CA, 2025

Spatial ecological forecasting: applications to marine fish range dynamics, Ecological Society of America meeting (ESA), Portland, OR, 2023

Marine heatwaves are not a dominant driver of change in North Atlantic and Pacific fish communities, Effect of Climate Change on the World's Ocean meeting, Bergen, Norway, 2023

Forecasting range shifts with process-based models and big data, ESA, Montreal, Canada, 2022

Process-based forecasting of near-term range shifts in marine species, American Fisheries Society meeting, Baltimore, MD, 2021

Process-based forecasting of near-term range shifts in marine species, ESA, virtual, 2021

A process-based forecast of near-term distributional shifts in marine species, Society for Industrial and Applied Mathematics meeting, virtual, 2021

Realized thermal niche tracking at range limits of North American marine species, ESA, virtual, 2020

Historical range edge dynamics of marine fishes in a global warming hotspot, Species on the Move, Kruger National Park, South Africa, 2019

Complex dynamics of the "warm" range edge in Northeast U.S. marine species under rapid climate change (poster), Gordon Research Conference on Ocean Global Change Biology, Waterville Valley, NH, 2018

Marine biogeographic controls on climate-related range shifts, ESA, Portland, OR, 2017

Non-climate drivers of species distributions in the Anthropocene, Western Society of Naturalists Meeting, Monterey, CA, 2016

Reconstructing a pristine non-coral reef community in the southwestern Caribbean, International Coral Reef Symposium, Cairns, Queensland, Australia, 2012

Selected Public and Stakeholder Outreach

Science Communication

Panelist: Ocean with David Attenborough screening, Pitch In Santa Cruz, 2025

Panelist: Building Resilient Fisheries and Fishing Communities, Pew Charitable Trusts, 2025

Species on the Move!, Slugs and Steins, UCSC, 2025

R for the Planet, NY-R Conference, 2021

R for the Planet, R-Ladies Amsterdam, 2021

Quoted in *The Atlantic, National Geographic, MIT Technology Review, Scientific American, The Daily Beast,* and others

Policy Presentations

Mid-Atlantic Fishery Management Council (MAFMC), 2023

Scientific and Statistical Committee, MAFMC, 2023

Ecosystem and Ocean Planning Committee and Advisory Panel, MAFMC, 2023

Ecosystem and Ocean Planning Committee and Advisory Panel, MAFMC, 2022

Ecosystem and Ocean Planning Committee and Advisory Panel, MAFMC, 2020

Synergistic Activities

Biodiversity Data Science working group, National Center for Ecological Analysis and Synthesis (NCEAS), 2024 – 2026

Steering Committee and working group member, Fish Biodiversity under Global Change (FISHGLOB), Centre for the Synthesis and Analysis of Biodiversity (France) / Canadian Institute of Ecology and Evolution, 2020 – present

Treasurer (2022 – 2025) and Board of Directors (2022 – 2024), Society for Open, Reliable, and Transparent Ecology and Evolutionary Biology

Environmental Data Science Summit, NCEAS, 2023

Future of Synthesis Summit, NCEAS, 2021

Near-term Ecological Forecasting Initiative Summer Course, Boston University, 2020

"Location, Location, Location" Species Distribution Modeling Workshop, NOAA Northwest Fisheries Science Center, 2020

Bayesian Modeling for Socio-Environmental Data Short Course, National Socio-Environmental Synthesis Center, 2019

Science for Nature and People working group: Ridges to Reef Fisheries, NCEAS, 2014 – 2016