

EDUCATION

University of California, Santa Barbara

Ph.D., Bren School of Environmental Science and Management, awarded 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, awarded 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

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

National Center for Ecological Analysis and Synthesis, Santa Barbara, CA

Graduate Student Researcher, Iterative Eden Project, 2019

Fathom Consulting, Santa Barbara, CA

Fisheries Management Consultant, 2014 – 2019

Environmental Defense Fund, San Francisco, CA

High Meadows Fellow, 2012 – 2014

Smithsonian Tropical Research Institute, Panama

Short-Term Fellow, 2011

GRANTS

Awarded

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

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

H. William Kuni Bren Research Award (Co-PI), \$15,000, 2017

National Oceanic and Atmospheric Administration Saltonstall-Kennedy Grant (lead authored under contract for Fathom Consulting), \$70,000, 2016

National Fish and Wildlife Federation Fisheries Innovation Fund Grant (lead authored under contract for Fathom Consulting), \$550,000, 2016

National Fish and Wildlife Federation Fisheries Innovation Fund Grant (lead authored under contract for Fathom Consulting), \$85,000, 2014

National Fish and Wildlife Federation Fisheries Innovation Fund Grant (written for the Environmental Defense Fund), \$90,000, 2013

Pending

UCSC Center for Coastal Climate Resilience Climate Resilience Pilot Initiative (Lead PI), \$94,098
Experiment Foundation Ocean Solutions Challenge Grant (Lead PI), \$9,980

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 (\$153,226), 2014 – 2017
Bren School Fellowship (\$40,000; deferred to 2017)
High Meadows Fellowship, Environmental Defense Fund and Princeton University (\$73,163 plus benefits), 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
Sigma Xi Research Society, 2012 Smithsonian Tropical Research Institute Short-Term Fellowship (\$2,400), 2011

PEER-REVIEWED PUBLICATIONS In Press and Published

1. **A. Fredston** and B.S. Halpern. 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. *In press, CRC Press*.
2. Burgess, M., S. Becker, R.E. Langendorf, **A. Fredston**, and C. Brooks. Climate change scenarios in fisheries and aquatic conservation research. *In press, ICES Journal of Marine Science*. [10.1093/icesjms/fsad045](https://doi.org/10.1093/icesjms/fsad045)
3. Halpern, B.S., *et al.* 2023. Priorities for synthesis in ecology and environmental science. *Ecosphere* 14(1): e4342. [10.1002/ecs2.4342](https://doi.org/10.1002/ecs2.4342)
4. 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](https://doi.org/10.1111/gcb.16371)
5. 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](https://doi.org/10.3389/fmars.2022.796050)
6. **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](https://doi.org/10.1111/gcb.15614)
7. 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](https://doi.org/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](https://doi.org/10.1177/0036850420936204)
9. **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](https://doi.org/10.1111/gcb.15035)
10. 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](https://doi.org/10.1007/s12080-019-0417-4)

11. 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](https://doi.org/10.1111/1365-2664.13331)
12. **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](https://doi.org/10.1111/nyas.13597)
13. 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](https://doi.org/10.1073/pnas.1607551114)
14. **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](https://doi.org/10.3389/fmars.2016.00273)
15. **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](https://doi.org/10.5343/bms.2012.1077)

In Preparation, Review or Revision (drafts available upon request)

1. **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. Marine heatwaves are not a dominant driver of change in North Atlantic and Pacific fish communities. *In revision, Nature*.
2. **Fredston, A.** D. Ovando, A. Allyn, J.T. Thorson, and M. Pinsky. Operational dynamic range models for near-term forecasts of species on the move. *In prep. for Ecology Letters*.
3. **Fredston, A.**, and Lowndes, J. Open data science for marine sciences. *In review, Annual Review of Marine Sciences*.
4. Lindmark, M., A. Orio, **A. Fredston**, F. Maioli, V. Thunell, J. Indivero, and S.C. Anderson. Local biomass changes in demersal fish in relation to oxygen, temperature, and the metabolic index in a warming and deoxygenating ecosystem. *In prep.*
5. 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 Derenden, and B. Mérigot. An integrated database of fish biodiversity sampled with scientific bottom trawl surveys. *In revision, Scientific Data*. [10.31219/osf.io/2bcjw](https://doi.org/10.31219/osf.io/2bcjw)

* Student mentee authors

OTHER PUBLICATIONS

- Pinsky, M., and **A. Fredston**. (2022). A stark future for ocean life. *Science* 376(6592): 452-453. [10.1126/science.abo4259](https://doi.org/10.1126/science.abo4259)
- Burgess, M.G., **A. Fredston-Hermann**, M. Pinsky, S.D. Gaines, and D. Tilman. (2017). Reply to Le Pape et al: Management is key to preventing marine extinctions. *Proceedings of the National Academy of Sciences* 114(31): E6275-E6276. [10.1073/pnas.1708147114](https://doi.org/10.1073/pnas.1708147114)
- 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, Biological Oceanography (upper-level 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

Lectures and Workshops

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

Guest lecture, Conservation and Management of Aquatic Resources (undergraduate course), University of Washington (Instructor: Daniel Ovando), 2022

Guest lecture, Aquatic Food and Resource Management (upper-level undergraduate course), UCSB (Instructor: Halley Froehlich), 2021

Guest lecture, Advanced Ecological Data Analysis (graduate course), Rutgers University (Instructors: Malin Pinsky and Rachael Winfree), 2021

Using data science to understand and predict human impacts on the global oceans. OSCAR Summer Team Impact Projects (undergraduate research program), George Mason University (Instructor: Amy Fowler), 2020

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

Introduction to GitHub. Eco-Data-Science R workshop, UCSB, 2018

Guest lecture, Computational Skills for Efficient Data Processing and Analysis (upper-level undergraduate course), Cornell University (Instructor: Nina Therkildsen), 2018

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

Data wrangling with the Tidyverse. Eco-Data-Science R workshop, UCSB, 2018

Guest lecture, Ecology (upper-level undergraduate course), Saint Mary's College (Instructor: Joel Ralston), 2017

Guest lecture, Conservation Planning (upper-level undergraduate course), UCSB (Instructor: Stephanie Moret), 2017

Introduction to GitHub. Eco-Data-Science R workshop, UCSB, 2017

INVITED TALKS

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

Biology Seminar, Temple University, 2022

Earth and Environment Seminar, Boston University, 2022

Biology Seminar, University of Houston, 2022

Earth and Environmental Sciences Seminar, Lehigh University, 2022

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

Graduate Program in 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

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, Ecological Society of America meeting (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

Do TURFs confer resilience to climate change? (with Casey O'Hara), Bren PhD Student Symposium, Santa Barbara, CA, 2018

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

How far can marine species shift their ranges in response to climate change?, UCSB Grad Slam, Santa Barbara, CA, 2017

Predicting the effects of non-climate processes on “species on the move” (Runner-Up: Best Short Talk Award), Bren PhD Student Symposium, Santa Barbara, CA, 2017

Non-climate drivers of species distributions in the Anthropocene, Western Society of Naturalists

Meeting, Monterey, CA, 2016

A conceptual framework for understanding the relative impact of nitrogen runoff on coastal ecosystems (semifinalist), UCSB Grad Slam, Santa Barbara, CA, 2015

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

PUBLIC AND
STAKEHOLDER
OUTREACH

Science Communication

R for the Planet, NY-R Conference, 2021

R for the Planet, R-Ladies Amsterdam, 2021

Interviews: All Things Wild Podcast (2021), LEST Talk (2022)

Skype a Scientist engagements: Salem County Vocational Technical High School, Woodstown, NJ (2020), Oscar F. Smith High School, Chesapeake, VA (2021)

Quoted in *Scientific American*, *The Daily Beast*, and others

Policy Presentations

Mid-Atlantic Fishery Management Council, 2023

Scientific and Statistical Committee, Mid-Atlantic Fishery Management Council, 2023

Ecosystem and Ocean Planning Committee and Advisory Panel, Mid-Atlantic Fishery Management Council, 2023

Ecosystem and Ocean Planning Committee and Advisory Panel, Mid-Atlantic Fishery Management Council, 2022

Ecosystem and Ocean Planning Committee and Advisory Panel, Mid-Atlantic Fishery Management Council, 2020

Lenfest Ocean Program, 2020

SYNERGISTIC
ACTIVITIES

Environmental Data Science Summit, National Center for Ecological Analysis and Synthesis, 2023

Future of Synthesis Summit, National Center for Ecological Analysis and Synthesis, 2021

Fish Biodiversity under Global Change Working Group, Centre for the Synthesis and Analysis of Biodiversity (France) / Canadian Institute of Ecology and Evolution, 2020 – present

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

“Location, Location, Location” Species Distribution Modeling Workshop, 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, National Center for Ecological Analysis and Synthesis, 2014 – 2016

MENTORING

UCSB undergraduate: Paige Hoel, “Evaluating risk of human induced impacts on coastal oceans”

Bren Masters in Environmental Science and Management (MESM) group projects:

Jo Anna Beck, Nathan Burroughs, Leah Gonzales, Alyssa Obester, and Elijah Papen, “Quantifying the benefits of river restoration for Chinook salmon on the Lower Yuba River”

Courtney Cochran, Kelly Ferron, Madison Harris, Rae Taylor-Burns, and Courtney Thomas, “Ocean acidification monitoring network design and hotspot mapping in the California Current System”

ACADEMIC AND
PROFESSIONAL
SERVICE

Treasurer, Society for Open, Reliable, and Transparent Ecology and Evolutionary Biology, 2021 – present

School of Environmental and Biological Sciences Diversity, Equity, and Inclusion Strategic Plan Steering Committee (Chair: Faculty Subcommittee), Rutgers University, 2021

Diversity, Equity, and Inclusion Committee, Ecology and Evolution Graduate Program (Office of Disability Services liaison), Rutgers University, 2020 – 2022

EEB Mentor Match, Small Pond Science / Dynamic Ecology blogs, 2019 – 2020

Co-Chair, Bren Seminar Committee, UCSB, 2016 – 2018

Bren PhD Student Symposium Committee (Chair 2015 – 2016), UCSB, 2014 – 2017

Women in STEM Mentorship Program, UCSB, 2016 – 2017

Bren PhD Program Committee, UCSB, 2015 – 2016

Residential College Adviser, Princeton University, 2011 – 2012

Peer-reviewed publications refereed: *Science Advances*, *Nature Ecology and Evolution*, *Scientific Reports*, *BioScience*, *Global Change Biology*, *Conservation Biology*, *Methods in Ecology and Evolution*, *ICES Journal of Marine Science*, *Ecography*, *Global Ecology and Biogeography*, *Journal of Biogeography*, *Ecology and Evolution*, *Ecosphere*, *Fisheries Oceanography*, *Diversity and Distributions*, *Marine Ecology Progress Series*, *Frontiers in Marine Science*, *Progress in Oceanography*, *Current Research in Environmental Sustainability*, *Reviews in Fish Biology and Fisheries*, *Acta Ecologica Sinica*, *PeerJ*

Grants, fellowships, and awards refereed: National Science Foundation Biological Oceanography Program; Ecological Society of America Buell Award; Ecological Society of America Lotka-Volterra Prize; Ecological Society of Australia Holsworth Wildlife Research Endowment

COMMUNITY
SERVICE

Member, Mercer County Medical Reserve Corps, Mercer County, NJ, 2021 – 2022

Teenage Independent Living Training Mentor, LifeTies, Trenton, NJ, 2020 – 2022

Volunteer, Cayuga Medical Center, Ithaca, NY, 2019 – 2020

Volunteer EMT, Doctors Without Walls–Santa Barbara Street Medicine, Santa Barbara, CA, 2015 – 2018

Member, Santa Barbara County Medical Reserve Corps, Santa Barbara, CA, 2015 – 2018

Volunteer EMT, Bay Area Mountain Rescue Unit, San Francisco Bay Area, CA, 2013 – 2014

Volunteer EMT, Corresponding Secretary, and EMS Lieutenant, Princeton First Aid and Rescue Squad, Princeton, NJ, 2009 – 2012

PROFESSIONAL
MEMBERSHIPS

Ecological Society of America; Society for Open, Reliable, and Transparent Ecology and Evolutionary Biology

LANGUAGES
SPOKEN

Fluent English; intermediate Spanish; elementary French