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

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 and Fellowships

Zegar Family Foundation Grant (co-written with Steven D. Gaines, Owen R. Liu, and Mary McElroy; $194,902), 2019 – 2021

H. William Kuni Bren Research Award (co-written with Casey C. O'Hara, Sebastian Tapia, and Margaret W. Wilson; $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 Defense Science and Engineering Graduate Fellowship ($153,226), 2014 – 2017

Bren School Fellowship ($40,000; deferred to 2017)

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

High Meadows Fellowship, Environmental Defense Fund and Princeton University ($73,163 plus benefits), 2012 – 2014

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

Smithsonian Tropical Research Institute Short-Term Fellowship ($2,400), 2011

Awards and Honors

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

Semifinalist, UCSB Grad Slam, 2015

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

Peer-Reviewed Publications

In Press and Published

1. Halpern, B. S., *et al.* Priorities for synthesis in ecology and environmental science. *In press, Ecosphere.*
2. 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
3. **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.*
4. 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
5. **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
6. 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
7. 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
8. **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
9. 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
10. Brown, C.J., S.D. Jupiter, S. Albert, K.R.N. Anthony, R.J. Hamilton, **A. Fredston-Hermann**, B.S. Halpern, H.-Y. Lin, J. Maina, S. Mangubhai, P.J. Mumby, H.P. Possingham, M.I. Saunders, V.J.D. Tulloch, A. Wenger, and C.J. Klein. (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
11. **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

12. 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
13. **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
14. **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

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

1. Burgess, M., S. Becker, **A. Fredston,** and C. Brooks. Perspectives on most plausible climate futures, and recommendations for using scenarios in fisheries and aquatic conservation research. *Submitted to Fish and Fisheries.* 10.31235/osf.io/nwxae
2. **A. Fredston,** W. Cheung, T. Frölicher, A. Maureaud, J. T. Thorson, and M. L. Pinsky. Marine heatwaves are not a dominant driver of change in North Atlantic and Pacific fish communities. *In revision, Nature.*
3. **A. Fredston,** 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.*
4. Lowndes, J., and **A. Fredston**. Open data science for marine sciences. *In prep. for Annual Review of Marine Sciences.*
5. Maureaud, A., *et al.* An integrated database of fish biodiversity sampled with scientific bottom trawl surveys. *In prep. for Scientific Data.*

* 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

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

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, 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

Forecasting species responses to global change, Life Science Seminar Series, LaSalle University, 2022

Causes and consequences of ocean species on the move, Wildlife, Fish, and Conservation Biology, University of California, Davis, 2022

Causes and consequences of ocean species on the move, Biology, Temple University, 2022

Causes and consequences of ocean species on the move, Earth and Environment, Boston University, 2022

Causes and consequences of ocean species on the move, Biology, University of Houston, 2022

Causes and consequences of ocean species on the move, Earth and Environmental Sciences, Lehigh University, 2022

Understanding changing marine ecosystems – how do we get the science right? (Panelist) Whitman College, 2021

Understanding, predicting, and managing marine species on the move, Ecology and Evolutionary Biology, Kansas State University, 2021

Ocean species on the move: mechanisms and management, Environmental Studies, University of Colorado Boulder, 2021

Understanding and forecasting species range dynamics in the oceans, U.S. Northeast Climate-Fisheries Seminar Series, 2021

Understanding, predicting, and managing marine species on the move, Ridley Seminar Series, Newcastle University, 2021

Understanding, predicting, and managing marine species on the move, Thünen Institute of Sea Fisheries, 2021

Understanding, predicting, and managing marine species on the move, Les Ecologistes, Simon Fraser University, 2021

Dialogue on research, working with stakeholders, and marine careers, Sustainable Oceans NSF Research Traineeship, University of California, Davis, 2021

Understanding, predicting, and managing marine species on the move, Centre for Biodiversity and Conservation Science, University of Queensland, 2021

Understanding, predicting, and managing marine species on the move, Biodiversity Legendary Internal Seminar Series, University of British Columbia, 2021

Understanding and predicting Anthropocene range dynamics in the sea, Ecology, Evolution, and Marine Biology, University of California, Santa Barbara, 2021

Causes and consequences of species range shifts in a changing climate, Graduate Program in Ecology and Evolution, Rutgers University, 2020

Range edge dynamics of marine species in a changing climate, School for Marine Science and Technology, University of Massachusetts Dartmouth, 2020

Understanding and managing range dynamics in a warming ocean, National Center for Ecological Analysis and Synthesis, 2019

Non-climate processes and "species on the move," National Center for Ecological Analysis and Synthesis, 2017

Contributed Presentations

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 meeting, 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)

Policy Presentations

Short-term forecasts of species distributions for fisheries management (webinar with M. Pinsky and B. Muffley), Ecosystem and Ocean Planning Committee and Advisory Panel, Mid-Atlantic Fishery Management Council, 2022

Short-term forecasts of species distributions for fisheries management (webinar with M. Pinsky and B. Muffley), Ecosystem and Ocean Planning Committee and Advisory Panel, Mid-Atlantic Fishery Management Council, 2020

Predicting Near-Term Fisheries Shifts Under Climate Change (webinar with M. Pinsky and B. Muffley), Lenfest Ocean Program, 2020

Invited Workshops, Working Groups, and Short Courses

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: *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