SARAH M. ROBERTS

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EDUCATION

2017-2021: **Duke University Program in Marine Science and Conservation**
Ph.D. Marine Geospatial Ecology
Advisor: Dr. Patrick Halpin
Thesis: *Species Distributions in a Changing Ocean: from Individuals to Communities*

2015-2017: **Duke Nicholas School of the Environment**
Master of Environmental Management (Coastal Environmental Management)
Master's thesis: *Analyzing the spatial distribution of fish species along the Mid and South Atlantic Bights and projecting future distributions under a climate change scenario.*
Certificate: Geospatial Analysis

2011-2015: **Davidson College**
B.A. Environmental Science (minor in Spanish)
Undergraduate thesis: *Davidson College environmental history: Examining landscape and social changes*
Intercollegiate Athletics: NCAA Division 1 Volleyball Athlete, 4 years.

PEER-REVIEWED PUBLICATIONS

1. **Roberts, S.,** Jacoby, A.M., Roberts, J., Leslie, J., Payne, K., Read, A.J., Halpin, P.N. Barco, S., Garrison, L., McLellan, W., Palka, D. & Nye, J. (2023). Tight spatial coupling of a marine predator with soniferous fishes: using joint modeling to aid in ecosystem approaches to management. *Diversity and Distributions.* *https://onlinelibrary.wiley.com/doi/full/10.1111/ddi.13746*

2. Tang, B., **Roberts, S.,** Clark, J.S & Gelfand, A.E. (2023). Mechanistic modeling of climate effects on redistribution and population growth in a community of fish species. *Global Change Biology.* https://doi.org/*10.1111/gcb.16963* .

3. Palacio-Abrates, J., **Roberts, S.,** Cashion, T., Brink, T., Cheung, W.L., Mook, A., Nguyen, T. (2023). Marine Protected Areas Can Reduce Localized Losses to Fisheries Under Climate Change. *FACETS*. **8**: 1-16. https://doi.org/10.1139/facets-2022-0101

4. **Roberts, S.M.,** Halpin, P.N. & Clark, J.S. Jointly modeling marine species to inform the effects of environmental change on an ecological community in the Northwest Atlantic. *Nature Sci Rep* 12, 132 (2022). https://doi.org/10.1038/s41598-021-04110-0

5. **Roberts, S.,** Boustany, A., Halpin, P. (2020). Substrate-dependent fish have shifted less in distribution under climate change. *Nature Communications Biology.* https://doi.org/10.1038/s42003-020-01325-1

6. Cashion, T., Nguyen, T. , Palacio-Abrates, J., Brink, W.L., Mook, A., **Roberts, S.** (2020). Shifting Seas, Shifting Boundaries: Dynamic Marine Protected Area designs for a Changing Climate. *PLOS One.* https://doi.org/10.1371/journal.pone.0241771

7. **Roberts, S**., Boustany, A., Halpin, P., & Rykaczewski, R. (2019). Cyclical climate oscillation alters species' relationships with local habitat. *Marine Ecology Progress Series.* https://doi.org/10.3354/meps12890

Manuscripts in Review

1. Scher, L.C., **Roberts, S.,** Kraus, K., Clark, J.S. (2023). Capturing information from some species abundances to improve predictions of others. *Methods in Ecology and Evolution. In Review.*

2. Cheung, W.L., Palacio-Abrates, J., **Roberts, S.** (2023) Projecting contributions of marine protected areas to rebuild fish stocks under climate change. *Ocean Sustainability. In Review*

Manuscripts in preparation

1. Weisberg, S., **Roberts, S.**, Gruenberg, L., Nye, Janet., Asch, Rebecca. (2023). Gulfstream Intrusions Associated with Extreme Seasonal Fluctuations Among Larval Fishes. *In prep.*

2. **Roberts, S.,** Roberts, J., Halpin, P.N., Thorne, L., Wiley, D., & Nye, J. (2023). Humpback whales have shifted inshore in the Gulf of Maine in association with climate and prey. *In prep*

3. **Roberts, S.,** Saba, V., Halpin, P., (2023). Jointly modeling fishing gear as a species demonstrates regional changes in fishing suitability under climate change. *In prep.*

4. **Roberts, S.,** Boustany, A., Halpin, P.N. & Clark, J.S (2023). Vulnerable fished species distributions are influenced by density dependent interactions: A dynamic joint model of the Northeast US Continental Shelf. *In prep.*

BOOK CHAPTERS

1. **Roberts, S. M.** (2019). The role of cyclical climate oscillations in species distribution shifts under climate change. In *Predicting Future Oceans* (pp. 129-135). *Elsevier.* https://doi.org/10.1016/B978-0-12-817945-1.00011-3

POLICY DOCUMENTS

1. Cleary, J., **S. Roberts,** C. Curtice, P.N. Halpin (2017). Exploring Species Range Shifts in the U.S. Mid Atlantic: Existing Literature, Web Portals, and Data. *report prepared for the MidAtlantic Council on the Ocean (MARCO)*, Marine Geospatial Ecology Lab at Duke University, Durham, North Carolina, 54p. https://www.midatlanticocean.org/wp-content/uploads/2017/06/Exploring-Species-Range-Shifts-in-the-U.S.-Mid-Atlantic-Existing-Literature-Web-Portals-and-Data.pdf

SCIENCE COMMUNICATION

2. Nature Sustainability Community behind the paper blog post (2020) https://sustainabilitycommunity.springernature.com/posts/sticky-fish-in-a-changing-climate

3. Blog post on the North Atlantic Oscillation and Fish Migrations – Nereus program website (2019): https://nereusprogram.org/works/how-is-the-north-atlantic-oscillation-influencing-fish-migration-patterns/

GRANTS, FELLOWSHIPS and AWARDS

2022: **Early Career Research Award** ($4,200).
Award to present research at ICES AFS conference in Dublin.

2021: **RIDE Summer Fellowship** ($3,000)
Worked with the Dean of the Nicholas School and Dr. Cindy Van Dover at Duke to identify how the school can improve training PhD students for careers beyond academia

2021: **Dean's Award for Outstanding PhD student Manuscript** ($1,000)
Manuscript selected from all Nicholas School graduate students.

2021 **Data+ Duke Big Data Initiative** ($2,500)
Project manager leading a group of undergraduate students to analyze a 10+ year oceanographic time-series dataset sampled near the Duke Marine Laboratory. Project led by Dr. Zackary Johnson.

2018-2020: **SESYNC Graduate Pursuits** ($2,000)
Graduate student pursuit to study Marine Protected Areas and climate change with 4 other PhD students from different disciplines and universities.

2017-2019: **Nereus Fellowship** ($120,000 + Cost of Education)
Nippon Foundation Nereus fellow

2016: **NC ArcGIS User Group Scholarship** ($500)

2015: **Stanback Internship** ($5,000)
Medical Advocates for Healthy Air internship with Clean Air Carolina

2015: **Athletic Scholarship** ($10,000)
Davidson College Athletic Department.

2014: **Southern Conference All-Academic Team**
NCAA Division 1 students with a 3.3 GPA and 50% percent participation.
Southern Conference Honor Roll all 4 years

TEACHING and MENTORING EXPERIENCE

2023: **Bass Connections – Innovations in Research Technology to Assess Forest Wildlife**. Project leader. Duke University

2023: **BIO652 - Statistics for Environmental Scientists.** Instructor on Record
University of North Carolina at Chapel Hill.

2023: **Co-advisor/committee member.** Jadyn Sethna (PhD, UNC), Melissa Merritt (Masters, Duke)

2022: **PhD mentor:** Becky Tang (Duke), Sally Dowd (UNC).

2021: **Data+ Duke Big Data Initiative:** Project manager for a 10-week summer program, applying data science to analyze a 10+ year oceanographic time-series dataset sampled near the Duke Marine Laboratory. Student team learned how to program in R, access environmental data, perform time series analysis and interpret ecological implications of their results, and prepare a manuscript for publication. Project led by Dr. Zackary Johnson.

2021: **Data Analytics for Environmental Science (graduate level):** Teaching Assistant

Instructors: Luana Lima and John Fay

2020: **Applied Data Analysis for Environmental Social Science (graduate level):** Teaching Assistant
Instructor: Elizabeth Albright

2020: **Co-advisor for master's student project –** Crystal Franco

2019: **Marine Geospatial Analysis for Duke Environmental Leadership (graduate level):** Teaching Assistant
Instructor: Jesse Cleary

2019: Guest lecturer in **Marine Fisheries Ecology and Biogeography (graduate level)**
Instructor: Daniel Dunn and Guillermo Ortuno Crespo

2018: **Marine Geospatial Analysis (graduate level):** Teaching Assistant
Instructor: Patrick Halpin.

INVITED WORKSHOPS

2022: East Coast Climate Change Scenario Planning. **NOAA, MAFMC, ASMFC. (Scientific expert)** https://www.mafmc.org/climate-change-scenario-planning.

2022: Climate & International Fisheries: Avenues for Adaptation Focus Group. **NOAA. (Scientific expert)**

PRESENTATIONS (selected)

1. **Roberts, S.** Spatiotemporal modeling reveals distribution shifts of common marine predator - bottlenose dolphins. *Species on the Move Conference,* 2023.

2. **Roberts, S.** Joint modeling in marine systems: three case studies from the Northwest Atlantic. *5th International Symposium on Effects of Climate Change on the World's Oceans*, 2023

3. **Roberts, S.** Jointly modeling top predator distributions and prey species: evidence of strong ties to drumming prey species and temperature. *ICES AFS Conference.* 2022

4. Dissertation defense presentation (2021): https://duke.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=35681c2e-b308-4660-b44b-ade301621bc5&start=1.803005

5. **Roberts, S.** The influence of climate and habitat on the distribution and ecology of coastal and pelagic fish species. *Presentation at the Marine Sciences Conference of AGU.* 2020

6. **Roberts, S.** Cyclical Climate Oscillations and Species Distribution Shifts under CC. *Presentation at Nereus Annual Meeting.* 2019. https://www.youtube.com/watch?v=5ddCc1hBmr8

7. **Roberts, S.** Climate and Fisheries Modeling in the Southeast. *Presentation at Nereus Annual Meeting.* 2018

8. **Roberts, S.** Projecting the distribution shifts of South Atlantic Fish Species under Climate Change. *Presentation at Coastal GeoTools Conference.* 2017

9. **Roberts, S.** ArcMap tool to downscale IPCC regional predictions of SST and Salinity: the delta method. *Presentation at NC ArcGIS User Group Conference. ArcGIS toolbox now available.* 2017

10. **Roberts, S**, Rose, J, Johnson, B. Mapping the Environmental History of Davidson College**.** *Presentation at ESRI User Conference.* 2015.

REVIEWER

Nature, Science advances, ICES Journal of Marine Science, Journal of Biogeography, Fish and Fisheries

PROFESSIONAL AND RESEARCH EXPERIENCE

2023 – Present **Climate change in the Kafue Ecosystem**
Postdoctoral researcher
Lab: Duke Nicholas School of the Environment and Sanford School of Public Policy
Supervisor: Dr. John Poulsen

2022 – 2023 **Species distributions and climate along the East Coast of the United States**
Postdoctoral researcher
Lab: Nye Lab, University of North Carolina – Institute of Marine Science
Supervisor: Dr. Janet Nye

2018-2020: **Bayesian joint attribute modeling of Climate Change impacts on species interactions**
Thesis project (chapters 3 and 4)
Lab: Marine Geospatial Ecology Lab
Supervisor: Dr. Jim Clark, Dr. Patrick Halpin

2017-2020: **Modeling the influence of cyclical oscillations and habitat on species distributions in the Northwest Atlantic**
Thesis project (chapters 1 and 2)
Lab: Marine Geospatial Ecology Lab
Supervisor: Dr. Patrick Halpin

2017-2020: **Conditional joint modeling of pelagic species bycatch in the Pacific.**
Research Project
Lab: Marine Geospatial Ecology Lab
Supervisor: Dr. Jim Clark, Dr. Andre Boustany

2018-2020: **Using Marine Protected Areas to Investigate Potential Socio-Ecological Impacts of Climate Change in Marine Spatial Planning**
SESYNC Graduate Pursuit Research Project

2015-2016: **The Source: How Rivers Made America and America Remade Its Rivers (Book in Print)**
Cartographer (9 months)
Lab: Doyle Research Lab, Duke University

2016: **Perceptions of North Carolina residents on offshore wind energy**
Client project (3 months)
Client: Southeastern Wind Coalition
Supervisor: Dr. Randall Kramer

2015: **Air Pollution and Health GIS database**
Masters internship (3 months)
Company: Clean Air Carolina

ADDITIONAL INFORMATION

Skills: GIS analysis (model building, tool building, LIDAR, ESRI, ArcView, Fusion), Cartography, Statistical analysis (R), joint modeling, machine learning, Bayesian statistics, climate modeling, python coding, web mapping, technical and professional scientific writing.

Languages: Spanish, conversational proficiency.

Service:
2018: Graduate Student Representative: Marine Geospatial Ecology Lab
2017-2018: Croatan Conservation Committee student liaison
2018: Professional Development Coordinator: Marine Science and Conservation Students