

SARAH M. ROBERTS

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Research interests

Species distribution modeling

Climate Change and fisheries

Joint modeling

Coastal and Marine Spatial Planning

Education

2017-Current: **PhD Candidate, Marine Science and Conservation**

Duke University, Marine Geospatial Ecology Lab, Durham NC

Advisor: Dr. Patrick Halpin

Thesis: Ch-Ch-Changes: Understanding the role of climate, benthic structure, species interactions, and anthropogenic climate change in marine species distribution shifts in the North Atlantic.

Fellowship: Nereus Fellow (2017-2019)

2015-2017: **Masters of Environmental Management**

Duke University, Nicholas School of the Environment, Durham, NC

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: **Bachelor of Arts, Environmental Studies**

Davidson College, Davidson, NC

Minor: Spanish

Undergraduate thesis: Davidson College environmental history: Examining landscape and social changes

Intercollegiate Athletics: NCAA Division 1 Volleyball Athlete, 4 years.

Research activities

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 Summer: Air Pollution and Health GIS database

Masters internship

Company: Clean Air Carolina

Publications

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>

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>

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>

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>

Palacio-Abrates, J., **Roberts, S.,** Cashion, T., Brink, T., Cheung, W.L., Mook, A., Nguyen, T. (2020). Marine Protected Areas Can Reduce Localized Losses to Fisheries Under Climate Change. *Global Change Biology. In Review*.

Roberts, S., Halpin, P. Clark, J. (2020). Understanding climate change effects on species distributions requires joint species distribution modeling. *In prep*.

Christopher L. Kilner*, Guillermo Ortuno Crespo*, **Sarah M. Roberts***, Amanda C. Lohmann, Patrick N. Halpin, and James S. Clark. (2020) Hooked on their own line: Leveraging statistical forensics to estimate under-reported by-catch of threatened species on the High Seas. *In prep*

*these authors contributed equally to this work

Policy Documents

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>

Presentations

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

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

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

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

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

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

Science Communication

Nature Sustainability Community behind the paper blog post (2020)

<https://sustainabilitycommunity.springernature.com/posts/sticky-fish-in-a-changing-climate>

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/>

Awards and Funding

2018-2020: **SESYNC Graduate Pursuits:** Graduate Fellowship.

2017-2019: **Nereus Fellowship** Nippon Foundation.

2016: **Merit Scholarship:** NC ArcGIS User Group.

2016: **Our Ocean Leadership Summit:** Our Ocean Conference.

2015: **Stanback Internship:** Clean Air Carolina.

2015: **Athletic Scholarship:** Davidson College Athletic Department.

2014: **Southern Conference All-Academic Team:** NCAA Division 1 Athletics.

Teaching Experience

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.

Additional Information

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

Languages: Spanish, read and write fluently.

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