

# SARAH M. ROBERTS

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## EDUCATION

2017-Current: **Duke University Program in Marine Science and Conservation**

**Ph.D.** Marine Geospatial Ecology

**Advisor:** Dr. Patrick Halpin

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

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.**, 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>
2. 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>
3. **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>
4. **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>

### *Manuscripts in Review*

1. 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*.

### *Manuscripts in Preparation*

2. **Roberts, S.**, Halpin, P. Clark, J. (2020). Jointly modeling marine species to inform the effects of environmental change on an ecological community in the Northwest Atlantic. *In prep*.

3. **Sarah M. Roberts\***, Christopher L. Kilner\*, Guillermo Ortuno Crespo\*, 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

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/>

## PRESENTATIONS (selected)

1. **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
2. **Roberts, S.** Cyclical Climate Oscillations and Species Distribution Shifts under CC. *Presentation at Nereus Annual Meeting.* 2019. <https://www.youtube.com/watch?v=5ddCc1hBmr8>
3. **Roberts, S.** Climate and Fisheries Modeling in the Southeast. *Presentation at Nereus Annual Meeting.* 2018
4. **Roberts, S.** Projecting the distribution shifts of South Atlantic Fish Species under Climate Change. *Presentation at Coastal GeoTools Conference.* 2017
5. **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
6. **Roberts, S,** Rose, J, Johnson, B. Mapping the Environmental History of Davidson College. *Presentation at ESRI User Conference.* 2015.

## GRANTS, FELLOWSHIPS and AWARDS

- 2021: **RIDE Summer Fellowship** (\$3,000)  
Worked with the Dean of the Nicholas School 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 (\$1,000):**  
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 Role all 4 years

## **TEACHING and MENTORING EXPERIENCE**

- 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.

## **REVIEWER**

*Science advances, ICES Journal of Marine Science*

## **PROFESSIONAL AND RESEARCH EXPERIENCE**

- 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, 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