

CATHERINE LAWRENCE ALVES, PH.D.

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EDUCATION

Doctor of Philosophy in Ecology 2015 – 2020

University of North Carolina at Chapel Hill | Advisor: Dr. John Bruno

Thesis: Assessment of reef and fisheries management in Belize using a social-ecological systems approach

Bachelor of Arts in Biological Sciences, Minor in Chemistry 2009 – 2013

Connecticut College | Advisor: Dr. Stephen Loomis

Spring 2012: Tropical Marine Ecology and Conservation Semester in Bonaire, Dutch Caribbean

POSTDOCTORAL EXPERIENCE

2020 – Present **Postdoctoral Scholar** (contractor with ECS, Tech)
NOAA Fisheries, Social Sciences Branch, Northeast Fisheries Science Center
Advisor: Dr. Lisa Colburn

PUBLICATIONS (* Undergraduate mentee)

PEER-REVIEWED

- 2022** **Alves, C.**, A. Valdivia, R. Aronson, N. Bood, K. Castillo, C. Cox, C. Fieseler, Z. Locklear*, M. McField, L. Mudge, J. Umbanhowar, and J. F. Bruno. Twenty years of benthic community changes across the Belize Mesoamerican Barrier Reef. *PLOS ONE* (17)1: e0249155. <https://doi.org/10.1371/journal.pone.0249115>.
- 2021** **Alves, C.** Marine resource management and fisheries governance in Belize exhibit a polycentric, decentralized, and nested institutional structure. *Ocean and Coastal Management* 211:105742.
- 2019** Mudge, L., **C. Alves**, B. Figueroa-Zavala, and J. Bruno. 2019. Assessment of elkhorn coral populations and associated herbivores in Akumal, Mexico. *Front. Mar. Sci.* 6:683. DOI: 10.3389/fmars.2019.00683.
- Under review** Donovan, M., **C. Alves**, and 16 additional co-authors. From polyps to pixels: Understanding coral reef resilience to local and global change across scales. *Under review at Landscape Ecology*.
- Under review** **Alves, C.**, D. Garcia, and R. Kramer. Fisher perceptions of Belize's Managed Access program reveal overall support but need for improved enforcement. *Under review at Marine Policy*.

PUBLICATIONS FOR PUBLIC AUDIENCES

- 2020** **Alves, C.** Ctenophora (*Mnemiopsis leidyi*). Published April 1, 2020. Article for the Narrow River Preservation Association website and newsletter.
- 2019** **Alves, C.** Belize's coral reefs: Fostering sustainable practices through co-management. National Geographic Open Explorer Expedition Posts. Supported by the Science Exploration Education (SEE) Initiative.
- 2018** Baumann, J., L. Mudge, and **C. Alves**. North Carolina can lead the fight against climate change if we make it our priority. Op-Ed. Published December 11, 2018 in the *Durham Herald Sun* and *Raleigh News and Observer*.
- 2015** **Alves, C.** The Offshore Adventures Continue. Blog post. Williams-Mystic Maritime Studies Program Blog. Published February 11, 2015.

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GRANTS, FELLOWSHIPS & AWARDS

- Gulf and Caribbean Fisheries Institute (GCFI) Outstanding Student Achievement Award (\$1,500) 2019
- UNC-CH Graduate School Graduate Student Transportation Grant Recipient (\$1,000) 2019
- Rufford Foundation Small Grant Recipient (\$6,400) 2019
- **National Geographic Society Early Career Grant Recipient (\$5,000)** 2018
- UNC-CH Carolina Center for Public Service Mingma Norbu Sherpa Fellowship (\$1,250) 2018
- Women Diver's Hall of Fame Marine Conservation Research Grant (\$2,000) 2018
- **National Science Foundation (NSF) Graduate Research Fellowship (\$138,000 for 3 years)** 2017
- UNC-CH Institute for the Study of the Americas Field Research Grant (\$2,000) 2017
- UNC-CH Tri-Beta Biology Honor Society Biology Teaching Assistant of the Year 2016
- National Science Foundation (NSF) Graduate Research Fellowship Honorable Mention 2016
- Connecticut College E. Frances Botsford Prize for excellence in biology and service to department 2013
- Connecticut College President's Sustainability Grant Recipient (\$4,000) 2013
- Connecticut College Office of Student Engagement and Leadership Collaboration Award 2013
- Connecticut College Travel Grant for Student Researchers (\$500) 2012
- Rhode Island Lieutenant Governor Elizabeth Roberts's Leadership Award 2009
- Narrow River Preservation Association's Environmental Awareness Award 2007

PRESENTATIONS & SCIENCE COMMUNICATION

INVITED SPEAKING ENGAGEMENTS

- 2021** *The Importance of using a social-ecological lens to conduct oral histories in fishing communities.* South County Museum's Oral History Hub Lab Training Workshop (invited speaker). Virtual due to COVID-19.
- 2021** *Assessment of reef and fisheries management in Belize using a social-ecological systems approach.* Texas A&M University – Corpus Christi course in Biology and Ecology of Coral Reefs (invited guest lecturer). Virtual due to COVID-19.
- 2021** *Climate Impacts on Marine Ecosystems (CLIME) session and discussion.* Leadership Initiative for Networking and Collaboration (LINC) Conference, NOAA's Northeast Fisheries Science Center (NEFSC) and Living Marine Resources Cooperative Science Center (LMRCSC) (invited panelist). Virtual due to COVID-19.
- 2020** *Preparing to Apply to Graduate School.* University of Rhode Island's Society for Women in Marine Science (SWMS) Symposium (invited panelist). Virtual due to COVID-19.
- 2019** *My PhD Journey.* ENEC 567: Ecological Analysis and Applications (invited guest lecturer). Chapel Hill, NC.
- 2019** *Life as a Marine Conservation Ecologist.* Higher Edge, Inc's Summer Institute for high school seniors in College Access Program (invited panelist). Stonington, CT.
- 2019** *Searching for the win-win: Can community-based fisheries management restore ecological function and improve the livelihoods of Belizean fishers?* University of Massachusetts at Dartmouth School for Marine Science and Technology (invited speaker). New Bedford, MA.
- 2014** *Coral Reef Ecology.* Invited Guest Lecture. Williams-Mystic Maritime Studies Program Marine Ecology Class. Mystic, CT.
- 2014** *Citizen Science and the Reef Environmental Education Foundation (REEF).* Invited Speaker. Connecticut College's Spring Log Jam Fundraiser. New London, CT.

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ACADEMIC CONFERENCES

- 2020 **Alves, C.** *Marine resource management in Belize: Historical analysis and ways forward.* Poster Presentation. Gulf and Caribbean Fisheries Institute (GCFI). Virtual due to COVID-19.
- 2020 **Alves, C.,** R. Kramer, J. Bruno. *Assessing fisher perceptions of the Territorial User Rights for Fishing (TURF) Program: A case study in southern Belize.* Oral Presentation. International Marine Conservation Congress (IMCC). Virtual due to COVID-19.
- 2020* **Alves, C.,** J. Bruno. *Assessing fisher perceptions of the Territorial User Rights for Fishing (TURF) Program: A Belizean case study.* Poster Presentation. International Coral Reef Symposium (ICRS). Bremen, Germany.
- 2020* **Alves, C.** Belize's coral reefs: fostering sustainable practices with community-based management. Rufford Small Grant Conference. Roatán, Honduras.
- 2019 **Alves, C.,** J. Bruno. *Assessing fisher perceptions of the Territorial User Rights for Fishing (TURF) Program: A Belizean case study.* Poster Presentation. Gulf and Caribbean Fisheries Conference (GCFI). Punta Cana, Dominican Republic.
- 2017 **Alves, C.,** Z. Locklear, M. McField, J. Bruno. *MPAs did not mitigate coral reef phase shifts in Belize caused by disease and warming.* Oral Presentation. Benthic Ecology Meeting (BEM). Myrtle Beach, SC.
- 2014 Weiner, M., L. Gilbert, **C. Alves,** P. Poole, S. Schleicher. *A salt marsh erosion model: Interplay between biotic and physical factors at the seaward edge.* Poster Presentation. American Geophysical Union (AGU) Conference. San Francisco, CA.
- 2013 Perry, E., **C. Alves,** C. Craig, V. Miller-Sims, W. Kimmerer, and C.S. Cohen. *Genetic variability of mitochondrial COI ranges from low to dramatically high in invasive species of copepods in San Francisco Estuary.* Poster Presentation. Society for Integrative and Comparative Biology (SICB) Conference. San Francisco, CA.
- 2012 **C. Alves,** and E. Perry. *Determining genetic diversity at cytochrome c oxidase (COI) of copepod species in the San Francisco Estuary.* Oral Presentation. San Francisco State University (SFSU)'s Summer Undergraduate Research Symposium. San Francisco, CA.

* = Canceled due to COVID-19.

PUBLIC OUTREACH AND EDUCATION

- 2019 *Assessing fisher perceptions of the Territorial User Rights for Fishing (TURF) Program: A Belizean case study.* Invited Speaker. Environment, Ecology, and Energy Program Student Seminar Series. Chapel Hill, NC.
- 2019 *Explorer Classroom: My path to becoming a marine conservation ecologist.* National Geographic's Explorer Classroom. YouTube link [here](#).
- 2018 *A day in the life of a marine biologist.* Oral Presentation. Temple Beth Or Synagogue Senior Luncheon. Raleigh, NC.
- 2017 *Life as a marine biologist: Using SCUBA to study coral reef communities.* Oral Presentation. Culbreth Science Day. Culbreth Middle School, Chapel Hill, NC.

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- 2013 *Invasive Lionfish Ecology*. Oral Presentation. Diving Equipment and Marketing Association (DEMA) Conference. Orlando, FL.
- 2012 *Examining the effect of different grazers on algal biomass*. Oral Presentation. CIEE Research Station Bonaire's Public Lecture Series. Kralendijk, Bonaire.

TEACHING & MENTORING

- University of North Carolina at Chapel Hill | Chapel Hill, NC 2016 – 2017
- Mentored senior Biology honors thesis student, Zachary Locklear on research titled: *Belizean coral functional group shifts from 1997 to 2016*
- Academic Support Program for Student Athletes, UNC-CH | Chapel Hill, NC 2016 – 2017
- Tutor for student athletes in Biology, Mathematics, Marine Science
- University of North Carolina at Chapel Hill | Chapel Hill, NC 2015 – 2017
- Teaching Assistant for BIOL 201: Ecology and Evolution
 - Teaching Assistant for BIOL 252 Lab: Human Anatomy and Physiology
 - Teaching Assistant for ENEC 201: Environment and Society
- Wyzant Tutoring | Chapel Hill, NC 2015 – 2017
- Private freelance tutor in High School Biology, Chemistry, ACT preparation
- Williams-Mystic Maritime Studies Program | Mystic, CT 2014 – 2015
- Mentored 2-3 undergraduate lab assistants and 8-10 independent undergraduate research projects in marine ecology and oceanography per semester

PROFESSIONAL SERVICE

- 2017 – 2018 The Scientific Research and Education Network (SciREN), Chapel Hill, NC
Co-Organizer
- 2016 – 2018 Graduate and Professional Student Federation (GPSF), UNC-CH, Chapel Hill, NC
Senator; Representing Ecology graduate students; Serving on Joint Code Working Group, to re-write code between undergraduate and graduate students at UNC-CH
- 2016 – 2018 Graduate Environment and Ecology Association (GEEA), UNC-CH, Chapel Hill, NC
GPSF Senator, co-organize annual Ecology research symposium
- 2016 – 2018 Biology Graduate Student Association (BGSA), UNC-CH, Chapel Hill, NC
Liaison, Curriculum for the Environment and Ecology
- 2016 – 2017 Curriculum for the Environment and Ecology (CEE), UNC-CH, Chapel Hill, NC
Seminar Committee Member, coordinating weekly guest seminar series
- 2012 - 2013 Forest Justice Student Organization, Connecticut College, New London, CT
Co-President
- 2011 - 2013 Biology Student Advisory Board, Connecticut College, New London, CT
Co-Chair

COMMUNITY ENGAGEMENT & OUTREACH

- 2018 – 2020 Narrow River Kayaks, Narragansett, RI
Guide, teaching children and families about ecology of Narrow River while kayaking

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- 2018 – 2020** **Skype a Scientist**
Scientist, sharing research with students in classrooms around world via video calls
- 2018 – 2019** **National Geographic Society Open Explorer Expedition, Science Exploration Education (SEE) Initiative**
Belize's coral reefs: Fostering sustainable practices through co-management
Recipient of Sofar Trident underwater drone, write blog posts about expedition
- 2017 – 2018** **Inspiring Meaningful Programs and Communication through Science (IMPACTS), NC**
Science Communication Ambassador
- 2016 – 2017** **The Scientific Research and Education Network (SciREN), Chapel Hill, NC**
Researcher, developed lesson plan in marine food webs for grades 8-12
- 2013** **Biscayne National Park, Homestead, FL**
National Parks Service Blue-Card Diver, contributing to management projects
- 2013** **John Pennekamp Coral Reef State Park, Key Largo, FL**
Volunteer Diver, assisted with lionfish research and seagrass restoration

PROFESSIONAL DEVELOPMENT

- 2019** **National Science Policy Network Symposium**, funded participant in event for early-career scientists interested in science policy, advocacy and diplomacy. National Science Policy Network. University of Wisconsin-Madison, Madison, WI.
- 2019** **Inclusive SciComm Symposium**, participant in three-day symposium designed to engage trainers, scholars, and practitioners in engaging audiences in conversations and activities related to STEM topics. Metcalf Institute. University of Rhode Island, Kingston, RI
- 2019** **Data Carpentry Geospatial Workshop in R**, participant in two-day training in geospatial analysis in R. University of Massachusetts Boston, Boston, MA
- 2018** **National Geographic Science Telling Boot Camp**, Video Production Course designed to teach participants how to use video to communicate science, Online
- 2018** **Policy Engagement Workshop Training**, led by Scholars Strategy Network, UNC-Chapel Hill
- 2018** **Data Science for Coral Reefs: Data Integration and Team Science**, Coral Reef Science and Cyberinfrastructure Network (CRESCYNT) and National Center for Ecological Analysis and Synthesis (NCEAS), weeklong-training in open data science. Santa Barbara, CA
- 2017** **Inspiring Meaningful Programs and Communication through Science (IMPACTS)**, Science Communication Ambassador training, Morehead Planetarium and Science Center, UNC-CH
- 2016** **Teaching in Challenging Times Workshop**, designed to prepare faculty and teaching assistants to discuss gender, race, sexuality and politics in the classroom, led by The Center for Faculty Excellence, UNC-Chapel Hill
- 2016** **Software Carpentry Workshop**, participant in two-day training in R Studio, GitHub, and Unix Shell, UNC-Chapel Hill

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RELEVANT EXPERIENCE

ECS Tech, Inc. | Narragansett, RI

December 2020 – Present

Social Scientist

- Contracted to NOAA Fisheries, Social Sciences Branch, Northeast Fisheries Science Center
- Collaborate with interdisciplinary team to assess the vulnerability to climate change of the Atlantic sea scallop social-ecological system by developing socio-economic models that will inform policy decision-making about the adaptive capacity of the industry
- Conduct literature review on the regulatory history of the Atlantic sea scallop fishery
- Evaluate the social and economic well-being of fishermen and coastal communities
- Compile existing socio-economic data on fishing fleets and coastal communities to understand the relationship between harvesting zones at sea and landings locations and how that might change in response to increasing ocean acidification and warming

University of North Carolina at Chapel Hill | Chapel Hill, NC

August 2015 – December 2020

Ph.D. Candidate/Researcher

- Lead project manager responsible for designing, grant-writing and executing international interdisciplinary research projects in fisheries management, coral reef ecology, and marine conservation
- Provided critical insights into social and ecological efficacy of community-based fisheries management to stakeholders (natural resource managers at the governmental and local levels)
- Secured \$157,150 USD in grant and fellowship funding to support research
- Used advanced quantitative and statistical approaches to conduct spatial and time series multivariate analyses to detect temporal changes in benthic community structure, and understand complex relationships between coral reef community structure and environmental and human drivers.
- Designed and implemented 3-month study interviewing Belizean fisherfolk about their perceptions and knowledge of fisheries management rules; collaborated closely with government and non-governmental agencies in Belize; hired and trained 8 field assistants in social science survey methods.

Narrow River Kayaks | Narragansett, RI

June 2018 – September 2020, Seasonally

Lead Eco Tour Guide and Naturalist

- Educated diverse audiences about the local history, marine and terrestrial ecology, and conservation of the Narrow River Estuary while kayaking
- Coordinated schedules, planned tours and maintained safety
- Topics included fish and wildlife conservation, salt marsh restoration projects, endangered species, climate change mitigation, and human-wildlife interactions

Williams-Mystic Maritime Studies Program | Mystic, CT

January 2014 – June 2015

Marine Science Laboratory Manager and Teaching Assistant

- Managed Marine Sciences Center (8,000 sq-ft lab) by maintaining extensive aquaria system, small fleet of research boats and all laboratory equipment
- Mentored 2-3 undergraduate lab assistants and 8-10 research projects in marine ecology and oceanography per semester, collaborating with Marine Ecology and Oceanography faculty
- Participated in interdisciplinary field seminars including a 10-day sailing expedition on a tall ship and road trips to the Pacific and Gulf Coasts of the United States

Reef Environmental Education Foundation (REEF) | Key Largo, FL

May – December 2013

Intern Project Coordinator

- Promoted to leadership position after four months as Marine Conservation Intern
- Coordinated field-based lionfish research, local volunteer opportunities, outreach events, presentations on Caribbean fish identification and daily office management

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REVIEWER

- *PLOS ONE*
- *Marine Ecology Progress Series*
- *Ecosphere*

PROFESSIONAL AFFILIATIONS

2019	Gulf and Caribbean Fisheries Institute (GCFI)
2019	International Coral Reef Symposium (ICRS)
2018	Ecological Society of America (ESA)
2018	National Science Policy Network
2017	Inter-university Consortium for Political and Social Research (ICPSR)
2017	Society for Conservation Biology (SCB)
2016	American Association for the Advancement of Science (AAAS)
2013	Reef Environmental Education Foundation (REEF)
2011	Diver's Alert Network (DAN)

CERTIFICATIONS

2017	Divemaster (# 406704), Professional Association of Diving Instructors (PADI)
2016	Scientific Diver, American Academy of Underwater Sciences (AAUS)
2013	Emergency First Responder, Emergency First Response (EFR)
2013	Enriched Air Nitrox Diver & Equipment Specialty (PADI)
2012	Rescue and Advanced Open Water Diver (PADI)
2011	Open Water Diver, SCUBA Diving International (SDI)

LANGUAGES

French	Intermediate written and oral proficiency
Spanish	Beginner oral proficiency
Italian	Beginner written and oral proficiency

SKILLS & EXPERTISE

Field & Research Skills

- Accomplished SCUBA Diver (PADI Divemaster with >250 logged dives, mostly scientific)
- Caribbean and Northeast Atlantic marine species identification (coral, algae, invertebrates, fish)
- Small boat handling and sailing skills
- Marine science research methods (underwater transects, water quality testing, species identification)
- Quantitative and qualitative social science research methods (focus groups, interviews, content analysis)
- Analysis of socio-economic and environmental fisheries data
- Extensive collaboration with natural resource managers and marine stakeholders (including government agencies, academic institutions, NGOs and media) to build capacity and increase community engagement

Computer Proficiency

- Advanced coding skills and proficiency with R, GitHub, and SPSS
- Experience using relational databases including SQL and Oracle
- Geospatial mapping in ESRI ArcGIS
- Qualitative text analysis using MAXQDA
- Benthic community composition analysis using Coral Point Count (CPCe) and CoralNet
- Multi-media communication via Adobe Illustrator, Photoshop, Premiere Pro
- Strong organizational and time management skills using Slack, Asana, Zoom, Skype
- Fluency in Microsoft Office and Google Drive suites
- Web design via Weebly and Wordpress