

Sara D. Williams, Ph.D.
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EDUCATION

Ph.D. Ecology, Evolution, and Marine Biology, Northeastern University (2015 – 2020)

Advisor: Mark R. Patterson

Dissertation: *Coral reefs are more than the sum of their colonies: A network science perspective on the role of coral complexity and its consequences for coral reef health*

Committee: Brian Helmuth, Tarik Gouhier, Erinn Muller, & Steve Vollmer

B.S. Physics (Honors), College of William and Mary (2009-2014)

Minor in Biology

POSTDOCTORAL EXPERIENCE

2020 – 2022 Coral Health and Disease Postdoctoral Researcher

Mote Marine Laboratory

Advisor: Dr. Erinn Muller

PROFESSIONAL APPOINTMENTS

2023 – present Staff Scientist
Coral Health and Disease Research Program
Mote Marine Laboratory

2025 – present Affiliate Graduate Faculty
Department of Biology and Marine Biology
University of North Carolina Wilmington
Five-year appointment to serve on a PhD committee

2022 fall semester Part-time Lecturer
Three Seas Program
Northeastern University
Ocean and Coastal Processes Field Course (Panama)

2019 – 2020 Coral health and disease modeler
Mote Marine Laboratory
Contract position with Dr. Erinn Muller

2014 – 2015 Research technician
Northeastern University
Marine Science Center
Field Robotics Lab with Dr. Mark Patterson

SUMMARY OF ACADEMIC ACTIVITY

- 5 six-figure research grants as a PI or Co-PI
- 11 publications in peer-reviewed journals, 4 currently in review
- 7 semesters of teaching experience as a teaching assistant and instructor of record
- 42 undergraduate mentees, 9 graduate mentees, and 1 postdoctoral mentee

GRANTS & FELLOWSHIPS

2025: Florida Department of Environmental Protection Grant
Gene Banking Florida's Porites astreoides and additional weedy coral species. N.J. MacKnight, S.M. Rosales and **S.D. Williams**. (\$163,000).

2025: National Park Service Additional Funding Amendment
Assessing the status of the threatened coral Acropora palmata and mitigating disease transmission at Buck Island Reef National Monument. **S.D. Williams**, E.M. Muller, E. Gwilliam, and K. Ewen. (\$180,000).

2025: Florida Protect our Reefs Grant
Strategic integration of thermal resilience and microbial intervention into restoration practices to recover Florida's coral reefs. N.J. MacKnight, S.M. Rosales, and **S.D. Williams**. (\$21,671.25).

2024: Florida Protect Our Reefs Grant
Coral Survivor - Resist, Recover, Restore: Analysis of Mote Marine Laboratory's Coral Restoration Data in Relation to Major Disturbances, Including the 2023 Bleaching Event. **S.D. Williams**. (\$29,979.27).

2024: Florida Protect Our Reefs Grant
Coral Survivor - Resist, Recover, Restore: Elucidating mechanisms underlying variation in Acroporid bleaching and survival following the 2023 marine heat wave. E.M. Muller, H.R. Koch, and **S.D. Williams**. (\$100,248.21).

2024: National Park Service Grant
Assessing the status of the threatened coral Acropora palmata and mitigating disease transmission at Buck Island Reef National Monument. **S.D. Williams**, E.M. Muller, E. Gwilliam, and K. Ewen. (\$259,354.00).

2023: South Florida Environmental Protection Agency Grant
Using Natural-Based Products to Treat Common Endemic Coral Diseases in Florida's Coral Reef. E.M. Muller and **S.D. Williams**. (\$388,777.00).

2023: Florida Department of Environmental Protection Grant
Multi- 'omic analysis of stony coral tissue loss disease resistance in restoration genotypes of Orbicella faveolata. M. Studivan, S. Rosales, N. Traylor-Knowles, E. Muller, and **S.D. Williams**. (\$285,766.55).

2022: National Science Foundation Research Experience for Undergraduates Site
Mote Marine Laboratory Research Experiences for Undergraduates in Estuarine and Coastal Sciences. C. Walsh and **S.D. Williams**.

2021: Florida Protect Our Reefs Grant
Developing an environmental DNA method to detect biomass of a cryptic corallivore, Coralliophila galea, at coral restoration sites on Florida's coral reef. **S.D. Williams**. (\$18,073.00).

2015: National Science Foundation Graduate Research Fellowship

2020: Northeastern University Dissertation Completion Fellowship

2018: Northeastern Graduate Research Fellowship

2017: Smithsonian Tropical Research Institute Short Term Fellowship

2015: Florida Protect Our Reefs Grant.
The effects of black band disease and ocean acidification on the physiological performance of a scleractinian coral
 E.M. Muller, **S.D. Williams**, and M.R. Patterson

2012: National Science Foundation Research Experience for Undergraduates
Mote Marine Laboratory, advisor: Dr. Erinn Muller

PUBLICATIONS (*denotes direct student/mentee)

Publications in peer-reviewed journals

11. Manzello, D. P., Cunning, R., Karp, R. F., Baker, A. C., Bartels, E., Bonhag, R., ... **Williams, S.D.**, & Williamson, O. M. (2025). Heat-driven functional extinction of Caribbean Acropora corals from Florida's Coral Reef. *Science*, 390(6771), 361-366.
10. Toth, L. T., Johnson, S. A., Lyons, E. O., Spadaro, J., Stathakopoulos, A., Bloomer, S., ... **Williams, S.D.**, ... & Muller, E. (2025). Coral restoration can drive rapid increases in reef accretion potential. *Scientific Reports*, 15(1), 28353.
9. *Pearson-Lund, A. S., **Williams, S. D.**, Eaton, K. R., Clark, A. S., Holloway, N. H., Ewen, K. A., & Muller, E. M. (2025). Evaluating the effect of amoxicillin treatment on the microbiome of Orbicella faveolata with Caribbean yellow band disease. *Applied and Environmental Microbiology*, e02407-24.
8. Young, B. D., Williamson, O. M., Kron, N. S., Andrade Rodriguez, N., Isma, L. M., MacKnight, N. J., ... **Williams, S. D.**, & Studivan, M. S. (2024). Annotated genome and transcriptome of the endangered Caribbean mountainous star coral (Orbicella faveolata) using PacBio long-read sequencing. *BMC genomics*, 25(1), 226.
7. Patterson, M., Patterson, S., Edson, E., **Williams, S.**, Torossian, J., & Dwyer, A. (2023). Cosplay as a novel method for outreach in ocean science.
6. **Williams, S. D.**, Klinges, J. G., *Zinman, S., Clark, A. S., Bartels, E., Maurino, M. V. D., & Muller, E. M. (2022). Geographically driven differences in microbiomes of Acropora cervicornis originating from different regions of Florida's Coral Reef. *PeerJ*, 10, e13574.
5. Swain, A., **Williams, S. D.**, Di Felice, L. J., & Hobson, E. A. (2022). Interactions and information: Exploring task allocation in ant colonies using network analysis. *Animal Behaviour*, 189, 69-81.
4. Dobbelaere, T., Holstein, D. M., Muller, E. M., Gramer, L. J., McEachron, L., **Williams, S. D.**, & Hanert, E. (2022). Connecting the dots: transmission of stony coral tissue loss disease from the Marquesas to the Dry Tortugas. *Frontiers in Marine Science*, 9, 778938.
3. Clark, A. S., **Williams, S. D.**, Maxwell, K., Rosales, S. M., Huebner, L. K., Landsberg, J. H., ... & Muller, E. M. (2021). Characterization of the microbiome of corals with stony coral tissue loss disease along Florida's coral reef. *Microorganisms*, 9(11), 2181.
2. **Williams, S. D.**, Walter, C. S., & Muller, E. M. (2021). Fine scale temporal and spatial dynamics of the stony coral tissue loss disease outbreak within the lower Florida Keys. *Frontiers in Marine Science*, 8, 631776.

1. **Williams, S. D.**, & Patterson, M. R. (2020). Resistance and robustness of the global coral–symbiont network. *Ecology*, 101(5), e02990.

Publications in Review

15. **Williams, S.D.**, MacKnight, N.J., Beavers, K.M., Brandt, M., Mydlarz, L.D., & Muller, E.M. From immunity to community: a predictive trait-space model for white plague disease on Caribbean reefs. *Ecosphere*.
14. **Williams, S.D.**, Studivan, M.S., Sirotzke, S., Andrade Rodriguez, N., Craig, Z., Hamlyn, S.B., Holstein, D.M., Isma, L.M., MacKnight, N.J., Mandara, J.A., Rosales, S.M., Rossin, A.M., Traylor-Knowles, N., Walter, C., Young, B.D., and Muller, E.M. Restoration stocks of a Caribbean coral species contain low levels of inherent stony coral tissue loss disease resistance. *Scientific Reports*.
13. Holstein, D.M., Dobbelaere, T., Gramer, L., McEachron, L., Muller, E.M., **Williams, S.D.**, and Hanert, E. Balancing the benefits and risks of population connectivity to coral restoration in the age of emergent disease. *Landscape Ecology*.
12. *Farmer, B.H., **Williams, S.D.**, Carpenter, G.E., Brandt, M., Muller, E.M., and Holstein, D.M. Influences of host density, community, and environment on an unprecedented stony coral epizootic disease. *Ecology*.

Publications in Preparation

19. **Williams, S.D.** and Patterson M.R. *Time scales of mixing in an imperforate scleractinian coelenteron*.
BioRxiv. <https://www.biorxiv.org/content/10.1101/2020.09.03.281709v2>
18. **Williams S.D.**, *Sartor, S., Cunning, R., Rogers, C.S., & Muller, E.M.
Characterizing the microbiome of corals in Hurricane Hole, St. John, US Virgin Islands.
17. *Dear, M., Muller, E.M., McMahon, N., Engelsma, C., Gregory, C., Fix, L., and **Williams, S.D.** *Coral Microbiomes on the Move: exploring differences in microbial communities of Acropora palmata moved from the field nursery to two Florida aquaculture facilities*.
16. *Perino, B., **Williams, S.D.**, Klings, G., Hall, E., Bartels, E., Dungan, A., Million, W., Kenkel, C., and Muller, E.M. *Microbial Communities and Tradeoffs of Disease Susceptible and Resistant Acropora cervicornis under Climate Change Scenarios*.

Conference abstracts (last 5 years)

2025: *Lexi Zagarola, Celia Leto, *Elise Keister, **Sara Williams**, Cody Engelsma, Nick McMahon, *Benjamin Ballinger, Ashlee Hylton, Mogan Jewell, Stephanie Sirotzke, Emily Luberto, Marina Villoch, & Erinn Muller. Investigating the effects of coral rearing conditions on the uptake of *Durusdinium trenchii* on Florida Coral Species. ReeFL. Oral.

2025: **Williams, S.D.**, Brennan, R., Teagues, K., Miller, J., Ewen, K., Gwilliam, E., & Muller, E.M. Status of the *Acropora palmata* population at Buck Island Reef National Monument (St. Croix, USVI) before and after the 2024 bleaching event. Association of Marine Labs of the Caribbean. Puerto Rico. Oral.

2025: *Keister, E.F., **Williams, S.D.**, Villoch, M., Koch, H.R., Bartels, E., Leto, C., Spadaro, J., & Muller, E.M. Association of Marine Labs of the Caribbean. Puerto Rico. Oral.

2024: **Williams, Sara D.**, Klepac, C., Eaton, K., Petrik, C., Bartels, E., Hall E.R., & Muller, E.M. Seven years of ocean warming and acidification coral resilience experiments to inform resilient reef restoration strategies on Florida's Coral Reef. Reef Futures Meeting. Riviera Maya, Mexico. Oral.

2024: Grace McDermott, **Sara Williams**, Sarah Hamlyn, Joseph Mandara, Zachary Craig, Erich Bartels, Cory Walter, Erinn Muller. Seven Years of Coral Disease Resistance Experiments to Inform Coral Reef Resilience Restoration strategies on Florida's Coral Reef. Reef Futures Meeting. Riviera Maya, Mexico.

2024: **Sara Williams**, Joe Kuehl, Mike Favero, Katie Curtis, Marina Villoch Diaz Maurino, Grace McDermott, Stephanie Siroitzke, & Erinn Muller. Natural-based, non-antibiotic ointments for restoration site maintenance to prevent coral loss from an infectious coral disease. Reef Futures Meeting. Riviera Maya, Mexico.

2024: Megan Dear*, Erinn M Muller, Nick McMahon, Cody Engelsma, Charlie Gregory, Leneita Fix, & **Sara D Williams**. Coral Microbiomes on the Move: exploring differences in microbial communities of *Acropora palmata* moved from a Lower Florida Keys field nursery to two land-based Florida facilities. Reef Futures Meeting. Riviera Maya, Mexico.

2024: Celia Leto, **Dr. Sara D. Williams**, Dr. Hanna R. Koch, Marina Villoch, Jason Spadaro, Dr. Erinn M. Muller. Informed Selective Breeding for Increased Resiliency in *Acropora cervicornis* and *A. palmata*. ReeFL Meeting. Miami, Florida.

2024: **Sara D. Williams**, Erich Bartels, Hanna R. Koch, Cory Walter, Joe Kuehl, Ryan Bonhag, Amanda Lewan, Alex Borreil, Celia Leto, Jason Spadaro, & Erinn M. Muller. Searching for Survivors: Learning from the 2023 coral bleaching event to inform resilient restoration strategies for Florida's *Acropora* species. ReeFL Meeting. Miami, Florida. Oral.

2024: Perino B*, **Williams SD**, Dungan AM, Million WC, Bartels E, Kenkel CD, Hall ER, & Muller EM. Microbial Communities and Tradeoffs of Disease Susceptible and Resistant *Acropora cervicornis* under Climate Change Scenarios. Benthic Ecology Meeting. Charleston, South Carolina.

2024: Pearson-Lund A*, **Williams SD**, Eaton K, Clark A, Holloway NH, Ewen K, & Muller EM. Evaluating the impact of treatment with amoxicillin on the microbiome of *Orbicella faveolata* affected by Caribbean yellow band disease (CYBD). Benthic Ecology Meeting. Charleston, South Carolina.

2024: Farmer, B.*, **Williams, S.**, Muller, E., & Holstein, D. Epidemic modeling of a multi-host environmentally mediated coral disease demonstrates the influence of community structure on disease trajectories. Ocean Sciences Meeting. New Orleans, Louisiana.

2023: **Sara D. Williams**, Nicholas J. Macknight, Kelsey Beavers, Marilyn Brandt, Laura D. Mydlarz, & Erinn M. Muller. From immunity to community: a predictive trait-space model for a Caribbean coral disease. Ecological Society of America Annual Meeting. Portland, Oregon. Oral.

2023: **Sara Williams**, Mike Favero, Katie Curtis, Devon Tyson, Thomas Kelley, Kristen Ewen, Nathaniel Hanna Holloway, Katherine Eaton, Abigail Clark, Stephanie Sirotzke, & Erinn Muller. (Not) all about that Base(2B): using natural-based, non-antibiotic ointments to treat two common endemic Caribbean coral diseases. Association of Marine Labs of the Caribbean. St. Kitts. Oral.

2023: Stephanie Sirotzke, **Sara Williams**, Stephanie M. Rosales, Michael Studivan, Nikki-Traylor Knowles, & Erinn Muller. Screening the susceptibility and resistance of *Orbicella faveolata* to stony coral tissue loss disease (SCTLD) for restoration practices. Association of Marine Labs of the Caribbean. St. Kitts. Oral.

2022: **Williams SD**, Klinges JG, Zinman S*, Clark AS, Bartels E, Villoch Diaz Maurino M, and Muller EM. Geographically driven differences in microbiomes of *Acropora cervicornis* originating from different *in situ* nurseries on Florida's Coral Reef. Reef Futures. Key Largo, FL. Oral.

2022: **Williams, S.D.**, Koch, H.R., Bartels, E., and Muller, E.M. Predicting the resilience of restored *Acropora cervicornis* populations facing ongoing disease outbreaks on Florida's Coral Reef. Reef Futures. Key Largo, FL. Oral.

2022: **Sara D. Williams**, Nicholas J. Macknight, Kelsey Beavers, Marilyn Brandt, Laura D. Mydlarz, and Erinn M. Muller. From immunity to community: a predictive trait space model for coral species exposed to white plague disease. International Coral Reef Symposium. Bremen, Germany. Oral.

2022: Holstein DM, Bloomberg J, Brandt ME, Ennis R, Farmer B, Limber B, Meiling S, Rossin A, Smith T, Dobbelaere T, Hanert E, Gramer L, McEachron L, Muller E, **Williams S**. Spatially and temporally realistic disease dispersal and epidemic modeling of SCTLD in Florida and the US Virgin Islands. International Coral Reef Symposium. Bremen, Germany. Oral.

2021: Katherine R. Eaton, **Sara D. Williams**, Samara Zinman*, Erinn M. Muller, and Jan H. Landsberg. *Rhodobacterales*, *Rhizobiales*, *Desulfovibrionales*, and *Clostridiales* are significant taxa associated with stony coral tissue loss disease in *Montastraea cavernosa* and *Orbicella faveolata*. Gulf and Caribbean Fisheries Institute Conference. Florida. Oral.

2021: **Williams, S.D.** and Patterson M.R. Time scales of mixing in an imperforate scleractinian coelenteron. Society of Integrative and Comparative Biology. Virtual. Oral.

COURSES TAUGHT

Northeastern University

Ocean and Coastal Processes Field Course (Three Seas Program)

2022 Fall: Part-time Lecturer (Undergraduate)

2019 Spring: Instructor of Record (Masters)

2018 Spring: Teaching Assistant (Masters)

2017 Spring: Teaching Assistant (Masters)

Biostatistics Laboratory

2020 Spring: Teaching Assistant (Undergraduate)

Oceanography

2016 Fall: Teaching Assistant (Masters)

College of William and Mary

Invertebrate Zoology Laboratory

2012 Fall: Teaching Assistant (Undergraduate)

INVITED SEMINARS AND GUEST LECTURES

2025: *The Coral Microbiome & Coral Disease*
Coral Biology Course, Nova Southeastern University.

2024: *Coral Disease & USVI Elkhorn Research*
Ocean and Global Change Course, Sea Education Association.

2024: *Disease Ecology*
Coral Reef Ecology Course, Nova Southeastern University.

2023: *Coral Disease Research Overview*
Mote Volunteer Monthly Meeting Seminar

2022: *Science Communication – Science is story*
Mote Intern Alliance Series

2022: Mote Summer Brown Bag Seminar

2022: *Coral Reef Fluid Mechanics & Biomechanics*
Ocean and Coastal Processes Class Seminar, NU Three Seas Program

2021: Mote Brown Bag Seminar.

2020: *Resistance and resilience of coral-algal symbiosis networks*
Invited virtual seminar for the Women in Network Science seminar series.

2019: Diversify NetSci workshop showcase speaker at the annual Network Science Society meeting in Burlington, VT.

2019: *Networks, from social science to symbiosis*
Invited by Dr. Sarah Davies to speak at Boston University.

WORKSHOPS

2025: Genetically Modified Corals Workshop at University of North Carolina Wilmington, funded by CORDAP.

2025: Student & Early Career Staff Members Re5 Collaborators Workshop. Sarasota, FL. (hosted & taught several lectures/stations).

2021: SCTLD Caribbean Cooperation Workshop, session: Experience with other intervention and treatment approaches. Invited Speaker. *From BBD to SCTLD: Testing Experimental Coral Disease Treatments in the USVI*. Virtual.

2019: Complex Networks Winter Workshop, Quebec City, Quebec Canada. (by invitation only)

OUTREACH AND COMMUNICATION (last 5 years)

2025: Video of Coral Health and Disease Research for Mote Science Education Aquarium teaching laboratory.

2025: Motivational Monday Lecture.

2024: Elkhorn Coral at Buck Island Reef National Monument. Science after Dark Series. Christiansted National Historic Site.

2023: Mote World Ocean's day, led table on Coral Health and Disease Research

2022: Saba Sea and Learn, assisted Dr. Erinn Muller with various local outreach activities.

2021-2023: Science officer for the Sarasota chapter of SCUBAnauts international

2020: Speaker at Northeastern University's Marine Science Center's Science Café series. *Corals and their symbiotic algae, a love story.*

MENTORSHIP

Postdoctoral Researchers

Elise Keister (Resilience Postdoctoral Researcher, Mote Marine Laboratory)

M.S. Thesis Advisor

Allison Reish (2025/2026 M.P.S., University of Miami)

Claire Sydeman (2025 M.S., University of Bremen)

Alexi Pearson-Lund (2024 International Masters of Science in Marine Biological Resources, IMBRSea)

Brianna Perino (2024 International Masters of Science in Marine Biological Resources, IMBRSea)

Shannon McDonnell (2023 M.P.S., University of Miami)

M.S. Thesis (non-advisor role)

Katherine Eaton (University of Miami, 2025)

Shaman Patel (Nova Southeastern University, 2022)

Ph.D. Committees

Charles Gongaware (University of North Carolina Wilmington, current)

Ph.D. Dissertation (non-committee role)

Benjamin Farmer (Louisiana State University, 2025)

Young Southeast Asian Leaders Initiative

Addin Mazni (Fall 2025)

Research Experience for Undergraduates Interns

Keegan Madigan (Mote REU 2025)

Isabella Borges (Mote REU 2023)

Coral Rodriguez (NSF REU 2023)

Charles Gongaware (Mote REU 2022 & College Intern 2023)

Eurnett Christopher (NSF REU 2022)

Oshean Lehrman (Mote REU)

Elizabeth Cochrane (LEAF REU)

MarSci-LACE

Wyatt Weaver (URE PReP 2025)

Kamaile-rose Formica (URE PReP 2025)

Madeleine Yang (URE PReP 2025)

Lani Brand (URE PReP 2025)

Sabrina Ferrand (URE PReP 2024)
Dkaria Bascom (URE PReP 2024)
Ester Markulike (URE PReP 2024)
Xavier Houston (MarSci-LACE REU 2021)

College Interns

Addison Love (Mote 2025)
Sara Leon (Mote 2025)
Christopher Kelzer (Mote 2025)
Maggie Nestor (Mote 2025)
Adam Lambright (Mote 2024)
Angela Cecere (Mote 2023)
Bethany Ryder (Mote 2023)
Hannah Meade (Mote 2023)
Megan Dear (Mote 2022-2023)
Emmanuel Perry (Mote 2022)
Ben Ballard (Mote 2022)
Kyle Awalt (Mote 2022)
Stephanie Crooks (Mote 2022)
Kyra Lenderman (2021)
Renee Grambihler (2021)
Molly Blake (2021)
Chloe Manley (2021)
Midori Mendoza (2021)
Samara Zinman (2020-2021).
Zoe Ruben (2020)