

Monica D. Schul

Ph.D. Marine Ecologist
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Research Experience

Jan 2023- Jun 2025

Co-founder and Chief Science Officer
Cordelia Biosciences, Alachua, FL

- Established and scaled a research department from the ground up, including strategic planning, team recruitment, and infrastructure development.
- Directed two product development projects funded by Florida Sea Grant for the identification and development of marine microbes capable of creating high value, bioactive compounds.
- Led the development of provisional patents and facilitated discussions for technology transfer agreements between academic institutions and industry.
- Built and mentored a diverse, interdisciplinary team of scientists and business professionals.
- Developed and managed grant-funded projects and secured over \$85,000 in non-dilutive funding and over \$100,000 in in-kind services. Oversaw budgets, timelines, and deliverables.
- Established partnerships with academic, governmental, and industry stakeholders to advance marine bioprospecting and sustainability metrics.

Aug 2021- Jul 2025

Graduate Research Assistant
University of Florida, Gainesville, FL

- Designed and led field and laboratory research to investigate the microbial connectivity between reef-building corals and their mobile interstitial associates using various molecular and microbiological techniques.
- Led extended field expeditions in remote locations in Panama, the Cayman Islands, and South Florida collecting animal, water, and sediment samples under various field conditions.
- Wrote and secured collection permits for national and international marine research.
- Authored and co-authored peer-reviewed publications.
- Wrote and secured over \$300,000 in grant and award funding.
- Performed multivariate statistical modeling in R to identify taxonomic, functional, and environmental drivers of marine invertebrate associated microbiomes, including potential bacterial toxin pathways linked to coral disease.
- Developed and validated novel tools for microbiome manipulation and probiotic delivery.
- Disseminated research findings through public talks and presentations to scientific and general audiences.
- Communicated the importance of marine research to K-12 public schools through platforms such as Skype a Scientist and the Cedar Key School Guardians of the Gulf youth program.

Aug 2020 – Jul 2021

Biological Scientist I

University of Florida, Gainesville, FL

- Investigated the underlying microbial contributions of stony coral tissue loss disease (SCTLD) in Caribbean coral species for the Florida Department of the Environment using microbial analyses to identify microbial shifts associated with animal health state.
- Assessed the effectiveness of field applied experimental probiotic treatments for diseased corals by quantifying probiotic strain colonization using droplet digital PCR (ddPCR) and 16S rRNA amplicon sequencing.
- Developed and optimized bioinformatic workflows to evaluate coral-probiotic interactions using metagenomic and coral physiology data to generate actionable insights for coral disease mitigation strategies.
- Prepared technical figures, interpreted microbial datasets, and contributed to DEP scientific reports to support the development of coral conservation strategies at the state level.

Jul 2018- Aug 2021

Scientific Diver Development Program NAUI SCUBA Instructor

University of Florida, Gainesville, FL

- Instructed and certified university students in NAUI Open Water, Advanced Diver, Nitrox, CPR/First Aid, and AAUS Scientific Diver certifications by supporting safe and standardized diving practices for recreational and research applications.
- Led underwater training and assisted in field-based scientific diving by collaborating with faculty across UF Agricultural and Life Sciences, the Florida Museum of Natural History, and UF Engineering to develop field-ready research divers.
- Served as an active AAUS scientific diver on interdisciplinary research teams to assist in underwater sampling, data collection, and ecological monitoring for projects in marine microbiology, coral reef ecology, and environmental restoration of reef, oyster, and seagrass habitats.

Internships**Sep 2024 – Dec 2024**

National Science Foundation INTERN

HOPO Therapeutics, Berkeley, CA

- Assisted in the design and optimization of experiments to contaminate macroalgae and investigate its potential to uptake and act as reservoir for rare earth elements.
- Prepared analytical standards and samples for liquid chromatography, mass spectrometry, and inductively coupled plasma optical spectroscopy (ICP-OES) analysis.
- Analyzed LCMS and ICP-OES data with Benchling insights and R statistical software.
- Assisted in writing ARPA-E quarterly reports.

Jan 2020 – Jul 2020

Coral Disease Chemical Ecologist Intern

Smithsonian Marine Station, Fort Pierce, FL

- Collaborated with interdisciplinary teams from the University of Florida, Georgia Tech, and Florida Atlantic University to identify potential pathogens and test probiotic treatments against stony coral tissue loss disease (SCTLD) in both aquarium and *in situ* reef environments.
- Extracted and characterized secondary metabolites from healthy and diseased coral tissues using chemical fractionation techniques to support efforts in identifying coral-derived chemical compounds and their role in coral disease resistance or disease lesion progression.
- Processed coral mucus and tissues for microbiome analyses to identify microbial shifts linked to SCTLD progression and resistance.
- Authored and co-authored peer-reviewed publications.
- Created scientific illustrations for public talks and videos.

Skills

Software:

R, MS Office, Inkscape, Procreate, Canva, Adobe Lightroom, Benchling, Geneious Prime, JGI IMG/M

Permitting and Documentation: Preparing CITES permits; applying for international collection and transport permits; preparing government reports for ARPA-E, Florida Department of the Environment, Florida Sea Grant, and the National Science Foundation; maintaining permit records and logs for individual projects; coordinating with government agencies to meet research milestones; ensuring compliance with national and international environmental regulations; preparing University of Florida safety and ethics documentation for university scientific diving; drafting material transfer agreements (MTAs) for biotechnology applications coming from a university; writing standard operating procedures (SOPs) for chemical, microbiology, and marine field research; writing scientific grant proposals for academic and industry research projects; applying for preliminary patents for biological materials and chemical products.

Data Collection and Processing: small boat operation and handling; AAUS scientific diving up to 130ft; biological collection from marine organisms; DNA/RNA preservation and extraction; PCR; ddPCR and qPCR analysis; 16S NG Sequencing preparation and data analysis; JGI IMG/M data visualization and analysis for metagenomes; sterile technique; Sanger Sequencing preparation and data analysis; LCMS and ICP-OES sample preparation and sample analysis for metal contaminants; multivariate statistical analysis and application of machine learning prediction models in R.

Design and Social Media: Illustrator for May 2019 cover of *Nature Machine Intelligence: Going Against the Current*; scientific illustrations for the Smithsonian Marine Science Station presentations; illustrations for personal and lab presentations and publications; speaker in Smithsonian Marine Station web series on stony coral tissue loss disease; guest on *The Ground Floor with Josh Bush* podcast for Gainesville entrepreneurs.

Leadership Experience

2023-2025 Chief Science Officer and Co-founder, Cordelia Biosciences
Alachua, FL

2024-Current Affiliate Faculty-Lecturer, Florida Atlantic University Biotech Bridge
Boca Raton, FL

2022-Current Member, University of Florida Board of Dive Safety
Gainesville, FL

2018-2021 Instructor, University of Florida Scientific Diver Development Program
Open Water, Advanced, and Nitrox SCUBA Diving
Gainesville, FL

Publications

Pitts, K. A., Scheuermann, M., Lefcheck, J. S., Ushijima, B., Danek, N., Murphy McDonald, E., Milanese, A. R., **Schul, M. D.**, Meyer, J. L., Toth, K. A., Ferris, Z., DeLaFlor, Y., DeMarco, T., Noren, H. K. G., Walker, B. K., & Paul, V. J. (2025). Evaluating the effectiveness of field-based probiotic treatments for stony coral tissue loss disease in southeast Florida, USA. *Frontiers in Marine Science*, 12. <https://doi.org/10.3389/fmars.2025.1480966>

Schul, M. D., Zangroniz, A., Patterson, J., Krueger, S., Smyth, A., & Meyer, J. (2024). *The coral holobiont: A brief overview of corals and their microbiome*. Ask IFAS - Powered by EDIS. <https://edis.ifas.ufl.edu/publication/SS733>

Howard, R. D., **Schul, M. D.**, Rodriguez Bravo, L. M., Altieri, A. H., & Meyer, J. L. (2023). Shifts in the coral microbiome in response to experimental deoxygenation. *Applied and Environmental Microbiology*, 89(11), e0057723.

Schul, M. D., Anastasious, D.-E., Spiers, L. J., Meyer, J. L., Frazer, T. K., & Brown, A. L. (2023). Concordance of microbial and visual health indicators of white-band disease in nursery reared Caribbean coral. *PeerJ*, 11, e15170.

Brown, A. L., Anastasiou, D. E., **Schul, M.**, MacVittie, S., Spiers, L. J., Meyer, J. L., Manfrino, C., & Frazer, T. K. (2022). Mixtures of genotypes increase disease resistance in a coral nursery. *Scientific Reports*, 12(1), 1–6.

Schul, M., Mason, A., Ushijima, B., & Sneed, J. M. (2022). Microbiome and Metabolome Contributions to Coral Health and Disease. *The Biological Bulletin*, 243(1), 76–83.

Talks and Presentations

- 2025** Poster Presentation
Exploring *in situ* microbial sharing dynamics in urchin-coral symbiosis
America Society of Microbiology Conference,
Los Angeles, CA
- 2025** Panelist
Business of the Environment
Florida Atlantic University ECOS Graduate Program Retreat,
Boca Raton, FL
- 2025** Oral Presentation
Exploring *in situ* microbial sharing dynamics in urchin-coral symbiosis
North Florida Marine Science Symposium,
Marineland, FL
- 2024** Oral Presentation
Cordelia Biosciences: How Ocean Exchange Supported Our Business
Ocean Exchange,
Fort Lauderdale, FL
- 2024** Tabling Event and Oral Presentation
Cordelia Biosciences business pitch
Cade Prize,
Gainesville, FL
- 2024** Panelist
Blue Biotech and Biosciences
Seaworthy Collective Event, Miami Yacht Club,
Miami, FL
- 2024** Oral Presentation
Exploring *in situ* microbial sharing dynamics in urchin-coral symbiosis
European Coral Reef Symposium,
Napoli, Italy
- 2024** Oral Presentation
From Students to Startup – How two Ph.D. students created a sustainable biotech company
Florida Atlantic University Charles E. Schmidt College of Science Seminar Series,
Boca Raton, FL
- 2024** Tabling Event
Cordelia Biosciences business pitch
EarthX Blue Impact Startup Pitch

Dallas, TX

- 2024** Coral epibionts may play an important role in the coral host microbiome and delivery of beneficial microbes for coral.
North Florida Marine Science Symposium,
The Whitney Laboratory
Marineland, FL
- 2023** Poster Presentation
Coral epibionts may play an important role in the coral host microbiome and delivery of beneficial microbes for coral.
20th Annual Soil, Water and Ecosystem Sciences Research Forum,
University of Florida
Gainesville, FL
- 2022** Oral Presentation
Coral Probiotics to Treat Stony Coral Tissue Loss Disease on Florida's Coral Reef
International Coral Reef Symposium,
Bremen, Germany
- 2020** Virtual Poster Session
Investigating the coral microbiome and possible etiological agents associated with an acute tissue loss syndrome in nursery reared *Acropora cervicornis*
International Coral Reef Symposium Virtual Conference
- 2019** Poster Presentation
Investigating the coral microbiome and possible etiological agents associated with an acute tissue loss syndrome in nursery reared *Acropora cervicornis*
North Florida Marine Sciences Symposium,
The Whitney Marine Laboratory, UF
Marineland, FL
- 2019** Poster Presentation
Investigating the coral microbiome and possible etiological agents associated with an acute tissue loss syndrome in nursery reared *Acropora cervicornis*
Florida Translational Cell Biology Symposium,
University of Florida
Gainesville, FL
- 2019** Oral Presentation
Central Caribbean Marine Institute Reef Lecture Series: Understanding the Effects of Distance from Shelter on the Herbivory of *Sargassum* spp. in Akumal, Mexico
Southern Cross Club and Resort,
Little Cayman, CI

2019 Guest Lecturer
Coral Fluorescence and an Introduction to Night Diving,
Central Caribbean Marine Institute,
Little Cayman, CI

Grants, Awards and Fellowships

2024 National Science Foundation INTERN Program

2024 University of Florida Big Idea Competition

2024 University of Florida Luby Microgrant

2023 Ocean Exchange Collegiate Award

2023 startgnv Rising Star Startup Award

2023 Rice Business Plan Competition Investment Prize

2023 University of Florida AI Days

2022 Global Underwater Explorers NextGen Legacy Trainee

2022 National Science Foundation Graduate Research Fellowship Program

2022 ‘Bogue Swim’ Marine Research Scholarship,
Central Caribbean Marine Institute, Little Cayman CI

2021 UF Herbert Wertheim College of Engineering Dean’s Research Award

Certifications

Certifications:

American Academy of Underwater Sciences (AAUS) Science Diver
NAUI SCUBA Instructor
Divers Alert Network Oxygen & First Aid Instructor
NAUI Advanced Nitrox Diver
TDI Helitrox Diver
NAUI Cave II Diver
GUE Technical Fundamentals Diver
TDI Drysuit Diver
TDI Diver Underwater Propulsion Vehicle

Licenses:

Panama Maritime License for small boat operation
Florida Driver’s License

Education

2021-2025 PhD Soil, Water and Ecosystem Sciences, *University of Florida*, Gainesville, FL

2015-2019 BS Marine Science, *University of Florida*, Gainesville, FL

2015-2019 BS Biotechnology, *University of Florida*, Gainesville, FL