Noelle M. Lucey

Curriculum Vitae

University of Puerto Rico Mayagüez

Isla Magueyes, La Parguera, Puerto Rico

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Goal: Marine life plays a vital role in global climate but it is severely threatened by multiple, intensifying anthropogenic stressors. My eco-physiological-based research aims to understand and identify ways to alleviate the most severe threats to marine life and improve future ocean health.

Interests: ecophysiology, marine invertebrates, global change biology, ocean deoxygenation, hypoxia, biogeography, modern extinctions, evolution, phenotypic plasticity, climate resilience, tropics, marine policy and conservation

Education

2012-2016 **Ph.D.** Marine Ecosystem Health & Conservation, Plymouth University, UK, University of Pavia, Italy; MARES Joint Doctoral Program; Erasmus Mundus

2007-2010 **M.A.** Marine Affairs and Policy, RSMAS University of Miami, FL

2002-2006 **B.S.** Marine Science and Biology; Chemistry Minor, University of Miami, FL

Academic Appointments

2025–present: **Assistant Professor**, University of Puerto Rico Mayagüez, Department of Marine Sciences, La Parguera, Puerto Rico.

2023–2025: **Lecturer**, Princeton University, Princeton, New Jersey. Advisor: Curtis Deutsch

2021– 2023: **Postdoctoral Research Fellow**, Smithsonian Tropical Research Institute, Bocas del Toro, Panama: Biodiversity and resilience of corals and their microbiomes in response to ocean deoxygenation Advisor: Rachel Collin

2017– 2023: **Postdoctoral Research Fellow**, Smithsonian Tropical Research Institute, Bocas del Toro, Panama: The role of phenotypic plasticity and adaptation in marine ectotherm's persistence to increasingly warm and hypoxic coastal habitats. Advisor: Rachel Collin

2013–2016: **Doctoral Researcher**, ENEA Italian Governmental Agency for Environmental Research, La Spezia, Italy: Evolutionary persistence in an increasingly high CO_2 world: Insight from marine polychaetes at a low pH vent system. Advisor: Piero Calosi

2012–2013: **Visiting Researcher**, University of Alaska School of Fisheries and Ocean Sciences, Fairbanks, Alaska: Alaska's Ocean Acidification Sensitivity Index: integrating chemistry, biology, and socio-economic data into the fisheries sector to inform policy. PI: Jeremy Mathis

Professional Appointments

2012–2013: **Policy Analyst**, National Oceanic and Atmospheric Administration, Woods Hole, MA: North East Climate Database Development - Role: Developed a relational database and website that served as an interactive tool for climate stakeholders in the eastern United States, addressed climate needs, data, products and services; collaborated with NOAA partners and stakeholders to specify and refine climate needs; prepared the Eastern Region Climate Needs Assessment in support of the Eastern Climate Action Plan.

2011–2012: **Research Assistant**, Woods Hole Oceanographic Institution, National Ocean Sciences Accelerator Mass Spectrometry Facility NOSAMS, Woods Hole, MA - Role: Provided technical support for the radiocarbon dating services, and quality control of radiocarbon results for investigators using 14C.

Teaching Activities

Fundamentals of Marine Aquaculture - CBOM 5007, 3 credits: Designed and teaching lectures/labs in the Department of Marine Sciences' graduate program (Spring 2026): University of Puerto Rico Mayaguez

MSc Thesis Adviser - CIMA 6999, 3 credits: Carolina Cesar-Ávila, Jonathon Burnap, Mariela Cortes-Medina (Spring 2026): University of Puerto Rico Mayaguez

Marine Ecology and Natural Resource Management - CBOM 5017, 6 credits: Designed and taught lecture and lab in the Department of Marine Sciences' graduate program (Fall 2025): University of Puerto Rico Mayaguez

Tropical Marine Biodiversity in a Changing Ocean - EEB 349, 3 credits : Designed and taught field course for the Ecology and Evolutionary Biology Department's undergraduate semester abroad course in Panama in Spring 2025: Princeton University

STRI Neotropical Environmental Field Course Instructor: Bocas Research Station, Panama - Designed and taught the tropical hypoxia module exploring the connections between ocean deoxygenation, human communities, and ecosystem health, McGill University: *https://www.mcgill.ca/neo/* May 2022

Workshop Instructor: Bocas Research Station, Panama - Planned and led Panamanian teacher trainings to provide low-cost effective teaching tools for high school level courses in marine biology, 2018, 2019

Funding

- Eric and Wendy Schmidt Transformative Technology Fund "Mapping threats to tropical biodiversity with reef-roving robots" ($480,000). 2025. Noelle Lucey and Curtis Deutsch
- Thomas A. and Currie C. Barron Family Biodiversity Research Challenge: "Assessing the costs of biodiversity loss in hypoxic coral reef ecosystems" ($200,000) 2024-2025; Noelle Lucey, Curtis Deutsch, Michael Oppenheimer
- Revive and Restore: Biotech for Climate Resilience, "Developing probiotics to protect tropical seagrass ecosystems smothered by sargassum algae." Noelle Lucey (2025; Unsucessful).
- National Science Foundation, Organismal Response to Climate Change, "An aerobic origin for temperature-dependent growth and cold range limits of marine species." Curtis Deutsch, Noelle Lucey, Hans Dam (2025; Unsucessful).
- National Science Foundation, Chemical Oceanography, "Advancing body size as a barometer of ocean oxygenation in Earth history." Curtis Deutsch, Noelle Lucey (2024; Unsucessful).
- National Science Foundation Grant: "Collaborative Research: Biodiversity and resilience of corals and their microbiomes in response to ocean deoxygenation" 2021-2023; PI Rachel Collin, (2 year postdoc, awarded to N. Luce)
- Smithsonian Tropical Research Institute 3-year Postdoctoral Fellowship ($158,700) 2017-2020
- Erasmus mundus Ph.D. Scholarship: "The Challenge of Living in a High-CO_2 World" ($120,000) 2012-2016

Skills and Other Activities

Field-work: AAUS Scientific Diver, Smithsonian Scientific Diver, PADI Advanced, Nitrox, and Rescue diver, Small boat driver with Panamanian-US Captains License (<39'), DNRA Captain's License for boating in Puerto Rican waters (<39'), First Aid, Oxygen, and EMT-B certified

Laboratory Skills: Respirometry; qPCR; DNA extraction, microscopy, multi-stressor experimental manipulations, oxygen gas-exchange

Culturing Activities: Corals, Ostracods, Copepods, Polychaetes, Echinoderms, Ophiuroids, Molluscs, Micro-algae, Bacterial Culture, Invertebrate Larval Culture

Laboratory Technology: Open-source development of multiple stressor aquarium control system and climate-change aquaria systems, manipulating temperature, oxygen and CO_2; *Purpose*: making long-term multi-stressor climate change experiments feasible *with: Barreleye Designs*

Reviewer/Editor: Intergovernmental Panel on Climate Change IPCC SR Ocean and Cryosphere, Marine Ecology Progress Series, Marine Biology, Limnology and Oceanography, Global Change Biology, Frontiers, Plos ONE, Journal of Experimental Biology, Nature Communications, Frontiers Editor of the Research Topic "Drivers and Consequences of Ocean Deoxygenation in Tropical Ecosystems"

Software: R, LaTeX, Microsoft Office, ArcGIS, Git

Publications

Lucey, N., César-Ávila, C., Kline, E.*, Collin, R., Altieri, A., Deutsch, C. (In 2nd review). Tropical metabolic storms cause coral bleaching. *Nature Communications*.

Johnson, K., van Oostveen, R., van der Zand, R., **Lucey, N.**, Schoepf, V., (2025). "Compound hypoxia with heat or acidification stress induces synergistic and additive effects on coral physiology." *bioRxiv* https://doi.org/10.64898/2025.12.01.690742

Lucey, N., César-Ávila, C., Eckert, A.*, Veintimilla. P.*, Collin, R. (2025). Locally adapted coral species withstand a 2-week hypoxic event. *Oceans*.

Cabral, H., Madeira, D., Diniz, M., Madeira,C., Maulvault, A., Arevalo, E., **Lucey, N.**, Dupont, S. Climate change impacts on coastal biological communities, chapter in *An ecosystem view of anthropogenic impacts in the ocean*, edited by J.M. Molina and G. Blasina, CRC Press/ Taylor and Francis Group, *2025*, 1-107.

Lucey, N., César-Ávila, C., Eckert, A.*, Rajagopalan, A.*, Kline, E.*, Brister, W.*, Altieri, A., Deutsch, C., Collin, R. (2024). Coral community composition linked to hypoxia exposure. *Global Change Biology*.

Johnson, M., Klein, S,. **Lucey, N.**, Steckbauer, A., Shore, A., Camp. E. (2024). Editorial: Drivers and consequences of ocean deoxygenation in tropical ecosystems. *Frontiers in Marine Science*. https://doi.org/10.3389/fmars.2024.1425902

Deutsch, C., Penn, J. **Lucey, N.** (2023). Climate, oxygen, and the future of marine biodiversity. *Annual Review of Marine Science*. doi.org/10.1146/annurev-marine-040323-095231

Lucey, N., Deutsch, C., Carignan, M.H.*, Vermandele, F.*, Collins, M.*, Collin, R., Calosi, P. (2023). Climate warming erodes tropical reef habitat by increasing frequency and intensity of low oxygen extremes. *PLOS Climate*. doi.org/10.1371/journal.pclm.0000095; *Press.*

Lucey, N., Aube, C.*, Herwig, A.*, Collin, R. (2022). Compound extreme events induce rapid mortality of coral reef herbivores. *The Biological Bulletin.* doi:10.1086/722283

Woods, A., Moran, A., Atkinson, D., Audzijonyte, A, Berenbrink, M., Borges, F., Burnett, K., Burnett, L., Coates, C., Collin, R., Costa-Paiva, E., Duncan, M., Ern, R., Laetz, E., Levin, L., Lindmark, M., **Lucey, N.**, McCormick, L., Pierson, J., Rosa, R., Roman, Sampaio, E., Schulte, P., Sperling, E., Walczyńska, A., Verberk, W. (2022). Integrative approaches to understanding organismal responses to aquatic deoxygenation. *The Biological Bulletin.*

Johnson, M., Scott, J., Leray, M., **Lucey, N.**, Rodriguez L., Wied, W., Altieri, A. (2021). Catastrophic cascading effects of deoxygenation on coral reef communities. *Nature Communication*. hypocolypse.github.io/

Lucey, N., Haskett, E.*, and Collin, R. (2021). Hypoxia from depth shocks shallow tropical reef animals. *Climate Change Ecology.* doi: 10.1016/j.ecochg.2021.100010

Johnson, M., Rodriguez L.*, **Lucey, N.**, Altieri, A. (2021). Environmental legacy effects and acclimatization of a crustose coralline alga to ocean acidification. *Climate Change Ecology.* doi: 10.1016/j.ecochg.2021.100016

Figuerola, B., Grossman, E., **Lucey, N.**, Leonard, N., O'Dea, A., (2021). Millennial-scale change on a Caribbean reef system that experiences hypoxia. *Ecography.* doi: 10.1111/ecog.05606

Lucey, N., Haskett, E.*, and Collin, R. (2020). Multi-stressors on tropical coral reefs impair performance. *Frontiers in Marine Science.* doi:10.3389/fmars.2020.588764 *Press*

Lucey, N., Collins, M.*, and Collin, R. (2020). Oxygen-mediated plasticity confers hypoxia tolerance in a corallivorous polychaete. *Ecology and Evolution.* doi: 10.1002/ece3.5929 *Press*

Wilkins, Laetitia G.E., Leray, M., O'Dea, A., Yuen, B., Peixoto, R., Pereira, T., Bik, H., Coil, D., Duffy, E., Herre, A., Lessios, H., **Lucey, N.**, Mejia, L., Rasher, D., Sharp, K., Sogin, E., Thacker, R., Thurber, R, Wcislo, W., Wilbanks, E., Eisen, J. (2019). Host-associated microbiomes and their roles in marine ecosystem functions. *PLOS Biology.* doi: 10.1371/journal.pbio.3000533

Lucey, N., Lombardi, C., Florio, M.*, Rundle, S., Calosi, P., and Gambi, M. C. (2018). A comparison of life history traits in calcifying Spirorbinae polychaetes along natural pH gradients. *Marine Ecology Progress Series* doi:10.3354/meps12453

Lucey, N., Lombardi, C., Florio, M.*, DeMarchi, L.*, Rundle, S., Gambi, M. C., and Calosi, P. (2016). An *in situ* assessment of local adaptation in a calcifying polychaete from a shallow CO_2 vent system. *Evolutionary Applications* doi: 10.1111/eva.12400

Lucey, N., Lombardi, C., DeMarchi, L.*, Schulze, A., Gambi, M. C., and Calosi, P. (2015). To brood or not to brood: Are marine invertebrates that protect their offspring more resilient to ocean acidification? *Scientific Reports.* doi: 10.1038/srep12009 *awarded 2016 highlight for Ocean Acidification research at Quebec Oceans; *Press*

Reum, J., Alin, C., Harvey, S., Bednarsak, N., Evans, W., Feely, R., Hales, B., **Lucey, N**., Mathis, J., McElhany, P., Newton, J., and Sabine, C. (2015). Interpretation and design of ocean acidification experiments in upwelling systems in the context of carbonate chemistry co-variation with temperature and oxygen. *ICES Journal of Marine Science.* doi:1o.1093/icesjms/fsu231

Mathis, J., Cooley, S., **Lucey, N.**, Colt, S., Ekstrom, J. Hurst, T., Hauri, C., Evans, W., Cross, J., Feely, R. (2015). Ocean Acidification Risk Assessment for Alaska's Fishery Sector.*Progress in Oceanography.* doi:10.1016/j.pocean.2014.07.001 *selected as an outstanding NOAA OAR paper for 2016.

Cooley, S., **Lucey, N**., Kite-Powell, H., and Doney, S. (2011). Nutrition and income from mollusks today imply vulnerability to ocean acidification tomorrow. *Fish and Fisheries.* doi:10.1111/j.1467-2979.2011.00424.x

Lucey, N. (2016). Improving our understanding of evolutionary persistence in an increasingly high CO_2 world: Insight from marine polychaetes at a low pH vent system. Doctoral dissertation, University of Pavia, Italy and Plymouth University, UK. http://hdl.handle.net/10026.1/6531.

Lucey, N. (2010). A Global Assessment of National Vulnerability to Ocean Acidification Through the Mollusc Industry. Master's Thesis, University of Miami. Available upon request.