

Madeline G. Eppley

PhD Candidate at Northeastern University in Marine and Environmental Science

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CAREER EXCELLENCE SUMMARY

Since starting my PhD, I have been accorded an NSF-GRFP Honorable Mention and received grants from the American Museum of Natural History and the Society for the Study of Evolution to support my work on eastern oyster genomics and parasite ecology. I was the recipient of the *Melbourne R. Carriker Award* for excellence in shellfish research from the National Shellfisheries Association in 2024. I presented as an invited symposia speaker at the 3rd Joint Congress on Evolutionary Biology in Montreal, Canada and have earned Best Talk awards at annual department symposia. Before starting my PhD, I graduated *magna cum laude* with my B.A. in Biology from Bard College at Simon's Rock. My undergraduate honors thesis about shark markets in New England is in review for publication at *Conservation Genetics*.

EDUCATION

- 2021 - current **Northeastern University**, Marine Science Center, Nahant, MA.
PhD Marine and Environmental Science; *Ecology and Evolution Concentration*
Advised by Dr. Katie E. Lotterhos
- 2020 **Bard College at Simon's Rock**, Great Barrington, MA.
Bachelor of Arts (B.A.) Biology. *Magna Cum Laude*
- 2018-2019 **Smith College**, Northampton, MA. Visiting Student Program.
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PUBLICATIONS

JOURNAL ARTICLES

- (1) **Eppley M.**, Coote T. (*In review*). DNA barcoding reveals mislabeling of endangered sharks sold as swordfish in New England fish markets. Journal: *Conservation Genetics*

DIGITAL ARTICLES

- (1) **Eppley M.***, Schaal, S.*, Whalen, J., Modi, S., Rayfield, K., Baldisimo, J., Ho, E., & Gaughran, S. (2024). Ancient and Degraded DNA. *MarineOmics*. https://marineomics.github.io/POP_09_aDNA.html

SCIENCE COMMUNICATION and MEDIA

- (1) **Eppley M.**, (2024). American Society of Naturalists. Forthcoming Paper: "Whole-Genome Sequencing Reveals That Regulatory and Low Pleiotropy Variants Underlie Local Adaptation to Environmental Variability in Purple Sea Urchins". Access: <https://amnat.org/an/newpapers/Oct-2023-Petak-et-al.html>
- (2) **Eppley M.**, (2023). American Society of Naturalists. Forthcoming Paper: "Seasonality and the Coexistence of Pathogen Strains". Access: <https://www.amnat.org/an/newpapers/May-2023-Andreasen-and-Dwyer.html>

UNDERGRADUATE THESIS

- (1) **Eppley M.**, A Study of Shark and Swordfish Meat Substitutions in New England Markets. Senior Theses, Bard Digital Commons. <https://digitalcommons.bard.edu/sr-theses/1431/>

* Denotes equal contribution

ORAL PRESENTATIONS

INVITED CONFERENCE SYMPOSIA

- 2024 **Eppley M.**, "Revealing adaptation to a severe disease epizootic in the eastern oyster using historic DNA" 3rd Joint Congress on Evolutionary Biology, Montreal, Canada. *Conservation Genetics Across Multiple Species Symposia*. Organizers: Dr. Ruth Rivkin & Dr. Chloe Schmidt

REGULAR CONFERENCE CONTRIBUTED

- 2023 **Eppley M.**, Lotterhos K. "Geographic associations of eastern oyster phenotypes and macroparasite presence" *Evolution 2023*, Albuquerque, New Mexico.

- 2023 **Eppley M.** “Spatial and temporal scales of adaptation in the eastern oyster” Gloucester Marine Genomics Institute, Gloucester, Massachusetts.

ANNUAL DEPARTMENT SYMPOSIA

- 2024 **Eppley M.**, “Revealing adaptation to a severe disease epizootic in the eastern oyster using historic DNA” Northeastern University Marine Science Center Graduate Symposium, Nahant, Massachusetts. *Awarded Best Talk (1st place) by faculty judging and Best Talk (3rd place) by graduate student judging.*
- 2023 **Eppley M.** “Geographic associations of eastern oyster phenotypes and macroparasite presence” Northeastern University Marine Science Center Graduate Symposium, Nahant, Massachusetts.
- 2022 **Eppley M.** “Spatio-temporal dynamics of oyster disease pressure driven by abiotic stressors in the Chesapeake Bay” Northeastern University Marine Science Center Graduate Symposium, Nahant, Massachusetts.

ADDITIONAL TALKS

- 2024 **Eppley M.**, “Revealing 25 years of genomic evolution to the eastern oyster using preserved historic museum specimens” American Museum of Natural History, New York City, New York (Lightning Talk).
- 2024 **Eppley M.**, “Revealing 25 years of genomic evolution in the eastern oyster using preserved historic museum specimens” University of Oklahoma LMAMR (Laboratories of Molecular Anthropology and Microbiome Research) Lab Meeting, Virtual.
- 2022 **Eppley M.** “Research Synopsis: Genetic basis of adaptation to multivariate environments through space and time” Evolving Seas Research Coordinated Network (RCN) Training and Integration Workshop, Shoals Marine Lab, Appledore Island, Maine. (Lightning Talk)

CONFERENCE POSTERS

- 2024 **Eppley M.**, Lee A., Swank A., Curtis L., Estien C., Forg L. Dellinger R., Jones A. Centering justice and belonging for progress: Queer perspectives on DEI initiatives in ecology and evolutionary biology. 3rd Joint Congress on Evolutionary Biology, Montreal, Canada.
- 2023 Crandall, E.D., Toczydlowski, R., Liggins L., Gaither, M.R., Pritt, A., Wham, B. Morr, D., Dudas, P. ... **Eppley, M.** ... Riginos, C., Toonen, R.J.(36 total co-authors) “GEODE: A Global Genomic Observatories Diversity Explorer”. October 2023. Poster at Group on Earth Observations Biodiversity Observation Network 2023 Meeting. Montreal, Canada.
- 2022 **Eppley M**, Lotterhos K. “Spatio-temporal dynamics of disease pressure driven by abiotic stressors and implications for space-for-time substitution modeling” Evolution 2022, Cleveland, Ohio.
- 2022 **Eppley M**, Lotterhos K. “Visualizing the impact of spatio-temporal marine stressors on oyster evolution using generalized additive models and GIS” Northeastern GIS Symposium, Boston, Mass.
- 2022 Leung E, **Eppley M**, Lotterhos K. “Synopsis of Non-Invasive Genotyping Methods with Associated Mortality for Juvenile Eastern Oysters” SSMPG 2022, Aussios, France.

HONORS and AWARDS

- 2023 **Honorable Mention**, NSF GRFP (National Science Foundation Graduate Research Fellowship Program)
- 2020 **Highest Honors** Senior Thesis, from Bard College at Simon’s Rock. *Awarded only by unanimous decision of the four-member thesis committee to indicate exceptional scholarship.*
- 2020 **Dean’s List Award**, four semesters from Bard College at Simon’s Rock

GRANTS and SCHOLARSHIPS

RESEARCH GRANTS and SCHOLARSHIPS

- 2024 **Melbourne R. Carriker Research Grant**, National Shellfisheries Association (\$1250)
- 2024 **DEIJ Equity Action Grant**, Northeastern University College of Science (\$800)
- 2023 **Lerner-Gray Marine Research Grant**, American Museum of Natural History (\$2,000)
- 2019 **Senior Thesis Research Grant**, Bard College at Simon’s Rock (\$1,500)
- 2016 **Center for Talented Youth (CTY) Scholarship**, Bard College at Simon’s Rock (\$40,000)

TRAVEL GRANTS

- 2024 **Evolution 2024 Conference Travel Award**, Society for the Study of Evolution (\$325)
- 2023 **College of Science Travel Award**, Northeastern University (\$350)

- 2023 **PhD Network Travel Award**, Northeastern University, (\$500)
 2023 **Marine and Environmental Sciences Travel Award**, Northeastern University (\$300)
 2023 **Evolution Travel Award**, RCN: Cross-Scale Processes Impacting Biodiversity (\$350)
 2022 **College of Science Travel Award**, Northeastern University (\$350)
 2022 **PhD Network Travel Award**, Northeastern University (\$500)
 2022 **Marine and Environmental Sciences Travel Award**, Northeastern University (\$300)

COMPETITIVE SELECTIVE TRAINING and WORKSHOPS

FUNDED ATTENDEE

- 2024 Telling Stories Through Data, University of Georgia Marine Science Institute. **(Awarded \$2,200)**
 2023 Multidimensional Biodiversity Data: Management, Analysis, Process-Based Modeling, and Statistical Inference Workshop. Albuquerque, New Mexico. **(Awarded \$2,350)**
 2022 Evolution in Changing Seas Research Coordinated Network Training and Integration Workshop. Shoals Marine Lab, Appledore Island, Maine. **(Awarded \$1000)**

NON-FUNDED ATTENDEE

- 2024 Ancient DNA Analysis Workshop, American Museum of Natural History, New York City, New York.
 2024 Phylogenetic Comparative Methods in R Workshop, University of Massachusetts, Boston.
 2023 SLiM Evolutionary Simulation, Harvard Museum of Comparative Zoology, Cambridge, Massachusetts.

TEACHING EXPERIENCE

Northeastern University Teaching Assistant (Instructor of Record)

- Spring 2024 **ENVR1501: Introduction to Biological, Environmental, and Social Data.** Laboratory instructor of record for one class section of 13 students. Designed final project and grading rubrics.
 Spring 2023 **EEMB2701: Marine Biology.** Laboratory instructor of record for two class sections, 28 students total.
 Fall 2021 **ENVR1501: Introduction to Biological, Environmental, and Social Data.** Laboratory instructor of record for one class section of 19 students. Designed instructional materials.

K-12 Teaching Experience

- 2020-2021 **City Year San Jose/Silicon Valley Americorps Member and Student Success Coach.**
- Co-taught, tutored and mentored a 4th grade math and science class of 31 students for 12 hrs/week, with individualized attention to groups of 5-7 students per day.
 - Facilitated two after-school STEM enrichment clubs (Computer Science & Coding; Animal Science) to expand access to STEM education for 1-5th graders for 1 hour per club/week.
 - Served a low-income public elementary school of 300 students (86% of students qualify for free/reduced lunch), focused on improving academic performance and offering enhanced learning opportunities and STEM curricula to students.

INVITED SPEAKER PANELS

- 2024 *Navigating the Graduate School Application Process*, Graduate Student Representative. BEACHES Outreach Workshop, Northeastern University.
 2022 *The Graduate School Application Process: Life Sciences*, Biology Department Alumni Representative. Division of Science and Mathematics, Bard College at Simon's Rock.
 2022 *Navigating the Graduate School Application Process*, Graduate Student Representative. BEACHES Outreach Workshop, Northeastern University.
 2022 *Senior Thesis Alumni Panel*, Division of Science and Mathematics Representative. Senior Thesis Workshop, Bard College at Simon's Rock.
 2020 *Senior Thesis Alumni Panel*, Division of Science and Mathematics Representative. Senior Thesis Workshop, Bard College at Simon's Rock.

SCIENCE OUTREACH AND PRESENTATIONS

- 2024 *Oyster Doctors Dissection Workshop*, High School Marine Science Symposium, Northeastern University.
 2024 *Meet a Scientist*, Lynn Public High Schools, Northeastern University Marine Science Center.
 2024 *Skype-a-Scientist*, Beverly Elementary 5th grade (3 classes, 60-minute visit)
 2024 *Skype-a-Scientist*, Lighthouse Connections Academy 6th-8th grade (1 class, 60-minute visit)

- 2023 *Graduate School and Careers in Marine Biology*, Northeastern University Marine Biology Club.
 2023 *Oyster Doctors Dissection Workshop*, High School Marine Science Symposium, Northeastern University.
 2023 *Meet a Scientist*, Lynn Public High Schools, Northeastern University Marine Science Center.
 2023 *Oyster Doctors Dissection Workshop*, Coastal Ocean Sciences Academy, NU Marine Science Center.

SERVICE AND VOLUNTEER WORK

- 2024 **Diversity & Inclusion Committee Graduate Representative**, Marine and Environmental Science Department at Northeastern University. Two-year term (2024-2026).
 2023 **Treasurer**, Graduate Student Association. Marine and Environmental Science Department at Northeastern University, Academic Year Term.
 2022 **You Are Welcome Here (YAWH) LGBTQ+ Education Facilitator**, Northeastern University. Lead a three-person team in delivering a two-hour workshop twice per year through 2025, with the goal of educating and uniting the Northeastern community in creating a more welcoming culture for LGBTQ+ members.
 2022 **BEACHES: Bridging Each Applicant's Chances for Higher Education Success Workshop**. Co-led *Acing the Graduate School Interview* workshop, panelist for *Navigating the Graduate School Application Process*, supported facilitation of programming. Mentored two undergraduate students. Workshop targets students who identify with underrepresented in STEM groups, and those do not have access to the graduate school pipeline.

MENTORSHIP

- 2024 Co-op Intern Z. Chapman, undergraduate at Northeastern University
 2024 High School Intern E. Gouralnik, now undergraduate at McMaster University
 2024 BEACHES mentee O. Ferguson, undergraduate at Bates College
 2024 Co-op Intern L. Fenuccio, undergraduate at Northeastern University
 2023 Co-op Intern Z. Segnitz, undergraduate at Northeastern University
 2023 Co-op Intern K. Bajaj, undergraduate at Northeastern University
 2023 Co-op Intern N. Mongillo, undergraduate at Northeastern University
 2022 Co-op Intern E. Leung, undergraduate at Northeastern University
 2022 Co-op Intern A. Christie, undergraduate at Northeastern University
 2022 BEACHES mentee S. Labbe, undergraduate at Salve Regina University
 2022 BEACHES mentee A. Frick, undergraduate at University of New Orleans
 2021 High School Intern S. Wagner, now undergraduate at University of Massachusetts Amherst
 2021 High School Intern A. Pojoy, recently graduated high school student

ACADEMIC AFFILIATIONS

- Current **Society for the Study of Evolution**, graduate student member
 Current **National Shellfisheries Association**, graduate student member
 Current **American Society of Naturalists**, graduate student member
 2019 - 2021 **American Elasmobranch Society**, undergraduate student member

RESEARCH SKILLS

Field Collections: Extensive experience collecting marine invertebrates from intertidal environments and preserving tissue specimens for molecular analysis. Organizing field gear, collecting samples from a boat, sieving, dredging.
Laboratory: DNA Extraction; PCR- Program and Primer Design; Gel Electrophoresis and Imaging; Qubit DNA quantification; Liquid Nitrogen; Autoclave; RNA Extraction; Tissue Biopsy; Operating Drills and Dremels.
Natural History Collections: Cataloging and Database Design; Curatorial Methods - Dry and Wet Specimen Preservation; Brahm's Curatorial Software; Tagging and Labeling; Specimen Identification with Dichotomous Keys.
Live Specimens: Aquaculture; Oyster Breeding and Experimental Crosses; Sea Tables and Flow-Through Tanks; Flipping Oyster Aquaculture Bags; Oyster Relaxing Protocols; Animal Husbandry; Greenhouse Care; Plant Propagation.
Computer: R (intermediate); Python (foundational); ArcGIS; App Development with AppSheet; Github; Github Project Management; Google Sheets; Microsoft Excel; Statistics in Excel; NCBI BioProjects, GEOME Metadata Databasing.
Data Management: Data Collection and Entry; Data Analysis; Data Visualization and Validation; Pivot Tables.
Bioinformatics: Sequence Alignment; Phylogenetic Analysis. Software - MEGAX, Network, Arlequin, NCBI BLAST.

GRADUATE INTERNSHIP AND EXTERNAL RESEARCH EXPERIENCE

- 2023 **Conservation Genomics Metadata Curator: Pennsylvania State University.**

Supervised by Dr. Eric Crandall, Assistant Research Professor

- Curated genomic sequence metadata to support open science and data reuse efforts.
- Collected and databased spatial and temporal metadata for ~150 published projects of eukaryotic populations in NCBI's Sequence Read Archive (SRA) and uploaded data to the Genomic Observatories Metadatabase (GEOME).
- Wrote original R code to download sample metadata from NCBI, cross-check the sample metadata within the GEOME repository, and sort sample metadata in a human-readable .csv file format.

2023 **Virtual Lab Meeting Training Program (VLTP): Dr. Courtney Hofmann Lab, University of Oklahoma**
Facilitated by the Evolving Seas NSF-Research Coordinated Network (RCN)

- Attended 10+ lab meetings with the Hofmann Lab and LMAMAR (Laboratories of Molecular Anthropology and Microbiome Research) at the University of Oklahoma.
- Led two meetings that were devoted to my professional development and feedback on my work.
- The VLTP connects students with research groups from other institutions that share similar interests, uniting evolutionary biologists and marine scientists to further understand adaptation in the ocean.

2022 **Research Exchange, Tjärno Marine Laboratory, University of Gothenburg, Sweden**
Facilitated by Dr. K. Lotterhos' Fulbright Award to Sweden

- Collected and identified 50+ invertebrate specimens native to the Baltic Coast of Sweden and submitted samples to the Ocean Genome Legacy biorepository collection at Northeastern University.
- Conducted routine data collection for salinity sondes logging environmental data for an ongoing eelgrass seascape genomics study in the Baltic Sea.
- Assisted on a University of Gothenburg research vessel which dredged 5 sites of increasing depth along the coastal shelf and sorted dredge samples by taxonomic group.
- Attended the European Society for Evolutionary Biology Working Group on Invasions Session.

UNDERGRADUATE RESEARCH

2020 **Honors Senior Thesis: *A Study of Shark Meat Substitutions in New England Markets***

- Research identifying shark and Swordfish substitutions in southern New England fish markets utilizing the mtDNA barcoding region COI. Extracted DNA, designed PCR primers and cycles, and performed phylogenetic analysis. Analyzed conservation legislation at the global, national, and local level alongside fisheries management protocols to determine necessary steps for future prevention of substitutions. Year-long, independent, original research with full funding support.

UNDERGRADUATE INTERNSHIP EXPERIENCE

2019- **Environmental Science Laboratory Technician, Bard College at Simon's Rock.**

- 2020
- Technician for novel genetic research on preserved invertebrate specimens from the on-site Bard College at Simon's Rock Natural History Collection.
 - DNA extraction, PCR program primer design, electrophoresis, and sequence analysis.
 - Morphological identification and specimen photography of invertebrate natural history specimens.

2017 - **Natural History Internship, Bard College at Simon's Rock.**

- 2020
- Mastery of curatorial methods, including taxonomic identification, labeling, cataloguing, and organization in museum collections. Identification of 500+ dry and wet preserved animal specimens. Mounting of lepidoptera. Ordering of new custom-fit cabinetry for malacology collection.
 - Integration of new database software for the Bard College at Simon's Rock Natural History Collection and Herbarium using Brahm's software. Databasing living greenhouse collections using Google Sheets.
 - Animal care and husbandry, maintenance of greenhouse facilities, plant care and propagation.

CERTIFICATIONS

- **Hazardous Waste Management Training**, Northeastern University
- **Cryogenic Liquids Training**, Northeastern University
- **Autoclave Training**, Northeastern University
- **Fundamentals of Laboratory Safety Training**, Northeastern University
- **Orientation for Labs, Shops, and Studios Training**, Northeastern University
- **Shop Safety Training**, Northeastern University

- **Biosafety Awareness, Biosafety I & II**, Northeastern University
 - **Google Certified Educator Level One**, Google. Sept. 2020 - Sept. 2023
 - **Zoom Teacher/Educator Academy Training**, Zoom.
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RELEVANT ACADEMIC COURSES

Northeastern University

Graduate

Ecological & Conservation Genomics; Biostatistics; GIS - Geographic Informational Systems; Evolution; Ecology and Evolution Seminar; Marine Science Seminar

Bard College at Simon's Rock

Undergraduate

Bioinformatics; Cellular and Molecular Biology; Organic Chemistry I; Oceanography; Environmental Management; Marine Ecology; Animal Behavior; Animal Physiology; Coral Reef Biology; Malacology; Botany; Evolution