

Rene D. Francolini

Bigelow Laboratory for Ocean Sciences • 60 Bigelow Drive • East Boothbay, Maine 04544
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EDUCATION:

Ph.D., Marine Biology 2020-2025 (Expected)

University of Maine, Darling Marine Center, Walpole, ME
Bigelow Laboratory for Ocean Sciences, Boothbay, ME
Advisors: Dr. Doug Rasher & Dr. Damian Brady

M.S., Computational Biology 2015-2016

Carnegie Mellon University, Pittsburgh, PA
Thesis: *Analysis of ChIP-Seq Data to Determine Functional Uses of Primary and Secondary Tbrain Motifs*
Advisor: Dr. Veronica Hinman

B.S., Biological Sciences 2011-2015

Carnegie Mellon University, Pittsburgh, PA

RESEARCH INTERESTS:

Ecosystem Biology; Molecular Ecology; Biodiversity of Marine Organisms; Metagenomics; Population Dynamics; Bioinformatics; Trophic Cascades; Environmental Impacts; Climate Change Response; Conservation Policy

RESEARCH:

Graduate Research Assistant July 2020 – Current

Bigelow Laboratory for Ocean Sciences

Investigating the impact of climate change on the Gulf of Maine kelp forests, forecasting the future of the kelp forest community, genetic variation and associated biodiversity.

Advisors: Dr. Doug Rasher & Dr. Damian Brady

Research Assistant III: Govindarajan Laboratory December 2018 – June 2020

Research Assistant II: Govindarajan Laboratory June 2018 – December 2018

Woods Hole Oceanographic Institution

Developed protocols to use environmental DNA to identify and build a library of eukaryotic animals inhabiting the mesopelagic zone of the ocean. Participated in research expeditions to collect and process eDNA and zooplankton samples. Collaborated with engineers to design large scale *in situ* eDNA sampling instrument.

Advisor: Dr. Annette Govindarajan

Research Assistant III: Stegeman Laboratory December 2018 – November 2019

Research Assistant II: Stegeman Laboratory February 2017 – December 2018

Woods Hole Oceanographic Institution

Studied the effects of environmental toxicants, particularly PCBs, using zebrafish and killifish as model organisms. Assembled marine animal genomes with Oxford Nanopore Technology. Generated and maintained multiple wildtype and CRISPR zebrafish lines. Analyzed the effects of pharmaceuticals and sewage on oysters.

Advisor: Dr. Jed Goldstone

Master's Thesis Research January 2015 – May 2016

Carnegie Mellon University

Utilized computational methods to analyze raw ChIP-Seq data and identify binding locations of transcription factor Tbrain in *P. miniata* and *S. purpuratus* to determine evolutionary significance of presence of secondary binding site in orthologous genes.

Advisor: Dr. Veronica Hinman

Undergraduate Research Intern

Summer 2014

Hawaii Institute of Marine Biology, University of Hawaii - Manoa

Investigated the relationship of *Montipora* coral and algae metabolomics in abnormal temperature zones through NMR analysis of metabolite extractions. Examined spawning patterns and growth of *Montipora* coral in varying carbon dioxide conditions.

Advisor: Dr. Ruth Gates

Andes to Amazon Study Abroad

Summer 2013

Ceiba Foundation for Tropical Conservation

Conducted field work in El Pahuma cloud forest, Tiputini Biodiversity Station, and Lalo Llor Dry Forest Ecological Station in Ecuador, focusing on zoology and botany of wet and dry forest ecosystems.

Advisor: Dr. Joe Meisel

Phage Genomics Research

2011-2012

Carnegie Mellon University

Isolated, characterized, and analyzed unique bacteriophages using molecular and computational techniques including an Ion Torrent Personal Genome Machine.

Advisors: Dr. Maggie Braun & Dr. John Jarvik

Summer Research Intern

2007-2012

Wellfleet Bay Wildlife Sanctuary, Massachusetts Audubon Society

Conducted juvenile horseshoe crab surveys, maintained diamondback terrapin nest protection enclosures, and aided in oyster reef spawning and restoration projects.

Advisor: Mark Faherty

**TEACHING
EXPERIENCE:****Instructor: 2021 Bigelow Data Carpentry Workshop**

April 2021

Bigelow Laboratory for Ocean Sciences

Topics taught include best data management practices, introduction to R, manipulating data in R, plotting in R, and visualizing ocean data

Teaching Assistant:**Experimental Biochemistry**

Spring 2015

Experimental Techniques in Molecular Biology and Genetics

Fall 2014

Carnegie Mellon University

Led review and extension sessions for students to ensure understanding of difficult material and graded problem sets, quizzes, and tests for the class.

Advisor: Dr. Carrie Doonan

Teacher: Research Experience in Marine Sciences

Summer 2014

Hawaii Institute of Marine Biology

Taught 20 high school students marine science, experimental design, how to write lab reports, and presentation skills. Guided student group projects on topics including jellyfish zooxanthellae and snapping shrimp regeneration.

Advisor: Dr. Malia Rivera

Day Camp Instructor: Natural History Day Camp

2011-2013

Wellfleet Bay Wildlife Sanctuary, Massachusetts Audubon Society

Arranged and taught lessons on migration, natural habitats, salt marshes, native organisms, and coastal waterways for students age 4-15 years old. Led and managed educational tours for families focused on the environment & conservation of Cape Cod.

PUBLICATIONS:

A.F. Govindarajan, **R.D. Francolini**, J.M. Jech, A.C. Lavery, J.K. Llopez, P.H. Wiebe, W.G. Zhang. (2021) *Exploring the Use of Environmental DNA (eDNA) to Detect Animal Taxa in the Mesopelagic Zone*. *Frontiers in Ecology and Evolution*. Vol. 9, doi: 10.3389/fevo.2021.574877. [full text](#).

M. C. Salanga, N. R. Brun, **R.D. Francolini**, J. J. Stegeman, J. V. Goldstone. (2020) *CRISPR-Cas9 Mutated Pregnane X Receptor (pxr) Retains Pregnenolone-induced Expression of cyp3a65 in Zebrafish (Danio rerio) Larvae*. Toxicological Sciences, Vol. 174, Issue 1, pgs 51-62, doi: 10.1093/toxsci/kfz246. [full text](#).

G.A. Cary, A.M. Cheate Jarvela, **R.D. Francolini**, V. F. Hinman. (2017) *Genome-wide use of high- and low- affinity Tbrain transcription factor binding sites during echinoderm development*. Proc Natl Acad Sci USA. Vol. 114 no. 23. 5854-5861, doi: 10.1073/pnas.1610611114. [full text](#).

Pope WH, Bowman CA, et al. (2015) *Whole genome comparison of a large collection of mycobacteriophages reveals a continuum of phage genetic diversity*. Kolter R, ed. *eLife*. 2015; 4:e06416. doi:10.7554/eLife.06416. **(contributing author)**. [full text](#).

PRESENTATIONS:

Using Population Genetics to Characterize the Gulf of Maine Kelp Forests. May 11, 2021. School of Marine Sciences Graduate Student Symposium. Maine. Virtual Talk.

How are Gulf of Maine Kelp Forests Responding to Climate Change? October 26, 2020. Maine EPSCoR Maine-eDNA All-Hands Meeting. Maine. Virtual Talk.

On Podcasting & Communicating Science. March 4, 2020. Sea Education Association. Invited Talk.

LabOratory Podcast: Documenting Personal Narratives of Scientific Significance. February 17, 2020. Ocean Sciences. San Diego. eLightening Session.

GRANTS:

Graduate Student Government Individual Grant, <i>University of Maine</i>	March 2021
Technical Staff Training & Development Opportunity, <i>WHOI</i>	July 2018

SPECIAL COURSEWORK:

OceanHackWeek, <i>University of Washington/Bigelow Laboratory</i>	August 2020
Strategies & Techniques for Analyzing Microbial Populations & Structures, <i>Marine Biological Laboratory</i>	August 2018
Oxford Nanopore Training, <i>Woods Hole Oceanographic Institution</i>	December 2017

AWARDS:

NSF-REU Honorable Mention	April 2020
Academic Achievement Scholarship	2015-2016
CMU Senior Leadership Recognition	May 2015
Biology Student Advisory Council Service Award	May 2015
Alpha Phi Omega Distinguished Service Key	May 2015
CMU Dean's List	May 2014
CMU Dean's List with Honors	December 2013
Tartans Abroad Scholarship	Summer 2013

MENTORING:

Katie Pell, WHOI Undergraduate Guest Student, 2020
 Sarah Stover, WHOI Undergraduate Guest Student, 2019
 Nicole Suren, WHOI Summer Student Fellow, 2018

OUTREACH:

Skype A Scientist, <i>Girl Guides of Canada</i>	April 2021
Skype A Scientist, <i>Ellis Mendell Elementary School 3rd Grade</i>	March 2021
Skype A Scientist, <i>MSU Montclair Marine Biology Organization</i>	March 2021
Skype A Scientist, <i>Parkway South High School AP Bio</i>	March 2021
Judge, <i>Falmouth Academy Science Fair</i>	February 2021

Host and Producer, LabOratory Podcast	January 2020 – April 2021
Interviewee, Kai Talks Science, Falmouth Community TV	February 2020
Volunteer, Woods Hole Science Stroll	August 2018
Instructor, East Falmouth Elementary School 3rd Grade Field Trip	2018
Judge, Falmouth Academy Science Fair	February 2018
Tutor, Falmouth Volunteers in Public Schools High School	2017-2018
Volunteer, Woods Hole Science Stroll	August 2017
Instructor, East Falmouth Elementary School 3rd Grade Field Trip	June 2017
Instructor, Leonard Gelfand Center Biological Sciences Outreach	2012-2016
Instructor, Pennsylvania Junior Academy of Science Workshops	2011-2016

CRUISE

PARTICIPATION:

R/V Armstrong, Woods Hole, March 10 – March 16, 2020
R/V Manta, Texas, September 21 – September 27, 2019
R/V Henry B. Bigelow, Rhode Island, July 24 – August 8, 2019
S.S.V. Corwith Cramer, Visiting Scientist, Bermuda to NYC, April 22 – May 2, 2019

PROFESSIONAL

AFFILIATIONS:

Society for Women in Marine Science (SWMS)