Eleanor K. Bors, PhD

ekbors@gmail.com | +1 (617) 571-1376 | www.eleanorbors.com

EDUCATION

Doctor of Philosophy, Biological Oceanography **February 2017**
Massachusetts Institute of Technology and *Woods Hole Oceanographic Institution*
Dissertation*:* Spatiotemporal Population Genomics of Marine Species: Invasion, Expansion, and Connectivity
Advisor: Dr. Timothy Shank

Bachelor of Arts, Biology major and Politics minor **May 2009**
Bachelor of Music, Cello Performance major **May 2009**
Oberlin College and *Oberlin Conservatory of Music* Double Degree Program

APPOINTMENTS AND PROFESSIONAL EXPERIENCE

Fulbright Arctic Initiative Scholar*, Fulbright Program* **May 2018 – Present**
- Investigating the biological and policy implications of shifting fish stocks in the Arctic
- Participating in a research exchange to Tromsø, Norway, in Spring of 2019 to pursue research with fisheries scientists at the Arctic University of Norway and build long-term collaborations
- Collaborating in a cross-disciplinary research team through the Fulbright Arctic Initiative's Sustainable Arctic Economies Working Group

Postdoctoral Scholar, *Marine Mammal Institute, OSU, Newport OR* **Mar 2018 - Present**
- Developing epigenetic methods (DNA methylation) to determine the age of living Cook Inlet beluga whales to support more accurate population modelling and conservation
- Collaborating with a team including advisor Scott Baker and NOAA collaborator Paul Wade

Knauss Marine Policy Fellow, *NOAA Office of International Affairs, DC* **Feb 2017 - Feb 2018**
- Oversaw NOAA's Cuba engagement, managed the implementation of 3 MOUs, responded to a rapidly evolving diplomatic situation, served as the International Affairs representative for NOAA at the 10th International Congress on Protected Areas in Havana, Cuba
- Proposed and authored a report on invasive species for the Arctic Council
- Led NOAA's contributions to the UN Ocean Resolution
- Contributed to the development of U.S. position papers for the 4th UN Preparatory Committee on biodiversity beyond national jurisdiction and the 2017 UN Environment Assembly
- Coordinated NOAA's participation in the 2017 Our Ocean Conference, briefed NOAA leadership

PhD Researcher, *MIT - Woods Hole Oceanographic Institution (WHOI) Joint Program* **2010 - 2017**
- Developed and executed an independent, interdisciplinary research program focused on the population genomics of rapid range expansion in lionfish and Asian shrimp
- Managed multiple teams of collaborators for 4 independent projects involving 16 domestic and international experts from NGOs, government, and academia
- Gained extensive experience working with molecular biology techniques, population genomics, RAD-sequencing, Illumina data, SNP analysis, bioinformatics pipeline development
- Learned Unix and Python programming for bioinformatics analysis, as well as basic skills in R, and population software including *Stacks*, *PyRAD, BayEnv, Lositan, Eigensoft*, *Structure, etc*

Fulbright Fellow, *National Institute of Water and Atmospheric Research, Wellington, NZ* **2011**
- Conducted independent research using the NIWA Invertebrate Collection to answer questions about deep-sea population genetic structure and protected area placement in New Zealand waters
- Quickly built a network of in-country experts and collaborators including government contacts

Science Volunteer, *Reef Doctor, Ifaty, Madagascar* **2010**
- Demonstrated a capacity to be adaptable, work in teams, and learn new skills quickly
- Engaged in reef monitoring (SCUBA), fish surveys, and outreach in rural southwest Madagascar

Ocean Program Intern, *Conservation Law Foundation, Boston MA* **2009**

Research Assistant, Summer Fellow and **Guest Student,** *WHOI, Woods Hole MA* **2008-2010**

NSF Research Experience for Undergraduates, *Mount Desert Island Biological Laboratory ME* **2007**

PUBLICATIONS

Bors EK, Wade PR, O'Neill K, Jarman S, Baker CS. Identification of candidate cytosine methylation sites for use in a cetacean epigenetic clock. *In prep.*

Bors EK, Carlton JT, and Shank TM. Multiple spatially distinct introductions and not range expansion may explain colonization history in an introduced marine species. *Marine Biology* (accepted)

Bors EK, Morris JA, Herrera SM, and Shank TM. (2019) Population Genomics of Rapidly Invading Lionfish in the Caribbean Reveals Signals of Range Expansion in the Absence of Spatial Population Structure. *Ecology and Evolution*. DOI: 10.1002/ece3.4952

Bors EK and Solomon S (2013) How a nested framework illuminates the challenges of comparative environmental analysis. *PNAS* 110 (19): 7531-7532.

Raineault NA, Ramey-Balci PA, Shank TM, **Bors EK**, *et al.,* (2013) Exploration of the Anaximander Mountains: mud volcanoes, cold-seep communities, and cold water corals. *Oceanography Supplement* 26 (1): 30-35.

Bors EK, *et al.* (2012) Patterns of deep-sea genetic connectivity in the New Zealand region: implications for management of benthic ecosystems. PLoS ONE 7(11): e49474.

Ma M, **Bors EK**, *et al.*, (2009) Characterization of the *Carcinus maenas* neuropeptidome by mass spectrometry and functional genomics. *General and Comparative Endocrinology* 161 (3): 320-334.

Ma M, Chen RB, Sousa GL, **Bors EK**, *et al.*, (2008) Mass spectral characterization of peptide transmitters/hormones in the nervous system and neuroendocrine organs of the American lobster *Homarus americanus*. *General and Comparative Endocrinology* 156 (2): 395-409.

AWARDED GRANTS AND RESEARCH FUNDING

Fulbright Arctic Initiative Scholar Award, $40,000 **2018-2019**

WHOI Ocean Exploration Institute, Robert James Fund, $15,000 **2016**

PADI Foundation, $6,514 **2015**
"Temporal population genomics of the invasive lionfish"

Sea Grant New Initiative Award, $4,637 **2016**
"Population genomics of *Palaemon macrodactylus,* a rapidly invading marine crustacean in New England waters"

WHOI Ocean Ventures Fund, $6,000 **2014**
"Population genomics of the invasive lionfish *Pterois volitans*: impacts of natural selection and genetic drift in a rapidly expanding invasive species"

WHOI Coastal Ocean Institute, $1,464 **2013**
"Population Genomics of the Rapidly Invading Lionfish, *Pterois volitans*"

NSF Graduate Research Fellowship, ~$120,000 towards graduate research **2010 - 2015**

GENOMIC ANALYSIS TRAINING

Workshop on Genomics, Cesky Krumlov, Czech Republic **2014**

Non-Model Genomics Workshop, Cornell University, Ithaca, New York **2013**

INVITED SEMINARS

Department Seminar, Department of Biosciences, Exeter University, UK **2017**

Bauer Forum Seminar, Department of Systems Biology, Harvard University **2015**
"Genetic drift and natural selection during rapid range expansions: population genomics of the invasive lionfish *Pterois volitans* and invasive shrimp *Palaemon macrodactylus*"

OTHER PRESENTATIONS

Speed Talk at the Center for Genome Research and Biocomputing Spring Conference **2018**
"Range expansion population genomics in the invasive lionfish" ***Winner Best Speed Talk**

Conference Presentation, International Congress on Conservation Biology, Cartagena, Colombia **2017**
"Multiple Spatially Distinct Introductions in a Marine Invasive Species"

Department Seminar, Biology Department, Woods Hole Oceanographic Institution **2016**
"Population genomics of the rapidly invading lionfish, *Pterois volitans*"

Conference Presentation, International Congress on Conservation Biology, Montpellier, France **2015**
"Population genomics of the invasive lionfish, *Pterois volitans*: impacts of drift and selection on genetic diversity during rapid range expansions"

Poster Presentation, Invasion Genetics: The Baker Stebbins Legacy, Asilomar, CA **2014**

Conference Presentation, International Deep Sea Biology Symposium, New Zealand **2012**
"Implications of deep-sea genetic connectivity patterns for the management of benthic ecosystems in the New Zealand region: recent work and future directions" ***Best student talk**, runner-up.

Department Seminar, Biology Department, Woods Hole Oceanographic Institution **2012**
"Patterns of deep-water connectivity in the New Zealand region: implications for management of deep-sea habitats"

Conference Presentation, New Zealand Marine Science Society, New Zealand **2011**
"Patterns of genetic connectivity among benthic fauna on the Chatham Rise and the Challenger Plateau"

Department Seminar, Biology Department, Oberlin College, Oberlin, OH **2009**
"Under Pressure: An introduction to deep sea biology at hydrothermal vents."

SELECT HONORS

Fulbright Scholar Award through the Fulbright Arctic Initiative for $40,000 **2018-2019**

NOAA Knauss Marine Policy Fellowship, NOAA Office of International Affairs **2017**

Fulbright Fellowship awarded by the U.S. Department of State and Fulbright New Zealand **2011**

NSF Graduate Research Fellowship for ~$120,000 towards graduate research **2010 - 2015**

MIT Emerson Music Fellowship to fund private study and annual recitals **2012 - 2015**

Hope Hibbard Memorial Scholarship in Biology awarded by Oberlin College **2009**

Oberlin Conservatory of Music Dean's Scholarship **2004 - 2009**

MENTORING AND TEACHING EXPERIENCE

Mentor and Supervisor for REU student **Summer 2018**
Mentored an REU student working on beluga epigenetics. I trained her in molecular biology and bioinformatics methods. She successfully completed a final paper and presentation.

Guest Lecturer, *Lehigh University* **2018**
Guest lecturer for Introduction to Oceanography, a course primarily for non-majors. Lecture was about ocean policy and science undertaken by the National Oceanic and Atmospheric Administration.

Visiting Teacher at Bering Sea Days, *St. Paul Island School, St. Paul, Alaska* **2017**
Developed an Arctic Council lesson plan for high school juniors and seniors that featured a simulation of an Arctic Council negotiation focused on invasive species regulations.

Mentor and Supervisor for undergraduate student intern **2015**
Mentored a student from Mount Holyoke College working on shrimp population genetics.

Guest Lecturer, *New England Aquarium* **2014**
Invited to guest lecture on fish genetics and evolution for the New England Marine Science Consortium Fish Biology Course held at the *New England Aquarium*.

Guest Lecturer, *Sea Education Association, Marine Biodiversity and Conservation Course* **2013 - 2016**
Invited to guest lecture multiple years. Lectures focused on invasive marine species, population genetics, and marine policy.

Teaching Assistant and **Biology Tutor**, *Oberlin College Biology Department* **2006 - 2009**
Led laboratory classes and special help sessions for Biology 120 (Genetics, Evolution, and Ecology) and Biology 119 (Organismal Biology Lab).

COMMUNICATION AND OUTREACH

MATE ROV Regional Competition Judge for Middle School Age Class **May 2018**

Non-Resident Fellow writer for "Sense and Sustainability" policy blog **2016**
Wrote online content on subjects pertaining to biodiversity and environmental management.

Science Writing Course at the *Marine Biological Laboratory*, *Woods Hole MA* **2015**

Scientist with **"***Synergy: An Experiment in Art and Science Collaboration"* **2013**
Communicated science through art while collaborating with artist Laurie Kaplowitz. Final exhibition shown at the Museum of Science, Boston, including public presentation and discussion panel.

PROFESSIONAL ACTIVITIES

Advisory Committee for the Society for Women in Marine Science **2018 - Present**

Steering Committee for the Society for Women in Marine Science **2015 - 2017**

Secretary, MIT-WHOI Joint Program Student Representative Body **2013 - 2014**

Student Representative, WHOI Diversity Committee **2012 - 2014**

Peer Reviewer, PLoS ONE and Deep-Sea Research **2013 - Present**

OTHER SCIENCE POLICY EXERIENCE

Certificate in Science, Technology, and Policy from MIT **2012 – 2016**
Coursework pertaining to science policy (all but capstone)

Science Policy Boot Camp, an intensive January course at MIT **2012**

Congressional Visit Day with MIT Science Policy Initiative **2012, 2016**

Future Partners Forum Participant, US-NZ partnership forum**,** Christchurch, NZ **February 2011**

NON-ACADEMIC PUBLICATIONS AND OTHER MEDIA

"Of Genes and Vacuums" **May 2016**
A **blog** post on Sense and Sustainability's website about gene drive technologies.

"When to Surrender and When to Fight" **April 2016**
A **blog** post on Sense and Sustainability's website about invasive species regulation, the difficulty of defining an invasive species, and the importance of different definitions for policy decisions

"Weighty Water" **January 2016**
A **blog** post on Sense and Sustainability's website (www.SenseandSustainability.net) on ballast water regulation and technology forcing

"A Future That is Hard to Predict" **September 2015**
A **blog** post on Invasivore.org highlighting my research on rapid evolution in invasive lionfish.

"This is the shore to ship, over" **July 2012**
A **blog** post for StrictlyFishwrap.com about telepresence expeditions in oceanography.

"Exploring the deep unknown: working towards habitat assessment and protection" **July 2010**
Cruise log entry for a telepresence cruise to Indonesia with NOAA's *Okeanos Explorer*

RESEARCH EXPEDITIONS AND FIELD WORK

Scientist and Data Logger **2014**
NOAA Survey Vessel Henry Bigelow, ROV ROPOS. Dates: June and July 2014. Location: Northwest Atlantic Ocean, canyon habitats.

Shore-based Scientist and Event Logger (participation via telepresence) **2013**
R/V Okeanos Explorer, ROV Deep Discoverer, "EX1304 Leg 2: Northeast US Canyons Expedition 2013." Dates: August, 2013. Location: Northwest Atlantic Ocean.

Lead Biologists and Watch Leader **2012**
E/V Nautilus, ROV Hercules. "NA022: Exploration of the Anaximander Seamounts." Date: July-August, 2012. Location: Northeast Mediterranean Sea.

Shore-based Scientist and Event Logger (participation via telepresence) **2012**
R/V Okeanos Explorer, ROV Little Hercules, "EX1202 leg 2 and 3: GoMEX 2012, Gulf of Mexico Expedition." Location: Gulf of Mexico

Field Assistant **2011**
R/V Tangaroa, "TAN1113 Biophys 22." Location: Chatham Rise, New Zealand

Shore-based Scientist and Event Logger (participation via telepresence) **2010**
R/V Okeanos Explorer, ROV Little Hercules, "EX1004 leg 2 and 3: INDEX-SATAL 2010, Indonesia-USA exploration of the Sangihe Telaud Region." Location: Indonesia

Biologist **2009**
R/V Kilo Moana, HROV Nereus, "Engineering Field Trials for the Hybrid ROV Nereus." Dates: May-June, 2009. Location: Mariana Trench, Western Pacific Ocean.

PERSONAL ACTIVITIES AND INTERESTS

Sailing Crew, *Yaquina Bay Yacht Club, Newport, OR*	2018
Sailing Crew, *Woods Hole Yacht Club Summer and Fall Knockabout Racing Series*	2009 - 2017
PADI Advanced Open Water SCUBA diver	2010 - Present
WHOI Scientific Diver (course completed but requiring check-out dives)	2012
MIT Chamber Music Society	2010 - 2016
Principal Cellist, *Quincy Symphony, Quincy, MA*	2009
Contemporary Music Ensemble, *Oberlin Conservatory of Music*	2008 - 2009
Founding Member, *Isis String Quartet*	2005 – 2007
US Sailing certified skipper for 25-foot keelboats	2004 - Present