

## Leanne E. Elder, Ph.D.

## Curriculum Vitae

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### Current Position

2016 Postdoctoral Associate, Department of Geology and Geophysics  
Yale University, New Haven, Connecticut

### Education

2013 Doctor of Philosophy, Biological Sciences  
University of Rhode Island, Kingston, Rhode Island  
Dissertation title: *Ecophysiology of hyperiid amphipods*, Advisor: Dr. Brad Seibel

2006 Bachelor of Science, Marine Biology  
University of Rhode Island, Kingston, RI  
Independent research: Scaling of enzymatic activity in optic lobe tissue of pelagic cephalopods

2002-2004 University of Connecticut, West Hartford, CT  
Coursework towards B.S. Including Chemistry, Biology, and general education courses

### Publications

Maas, A.E., Elder, L.E., Dierssen, H.M., Seibel, B.A. (2011). Metabolic response of Antarctic pteropods (Mollusca: Gastropoda) to food deprivation and regional productivity. *Marine Ecology Progress Series*. 441: 129-139.

Elder, L.E., Seibel, B.A. (2015). The thermal stress response to diel vertical migration in the hyperiid amphipod *Phronima sedentaria*. *Comparative Physiology and Biochemistry Part A*. 187: 20-26.

Elder, L.E., Seibel, B. A. (2015). Ecophysiological implications of vertical migration into oxygen minimum zones for the hyperiid amphipod *Phronima sedentaria*. *The Journal of Plankton Research*. 37 (5): 897-911.

Hsiang, A.Y, Elder, L.E. and Hull, P.M. (2016). Towards a morphological metric of assemblage dynamics in the fossil record: a test case using planktonic foraminifera. *Philosophical Transactions of the Royal Society B: Biological Sciences*. 371 (1691).

### Manuscripts (Available upon request)

Elder, L.E., Seibel, B.A. (In prep). Effect of ecology, habitat, phylogeny and environmental conditions on rates of metabolism in diverse marine amphipods.

Wang, X., Planavsky, N., Hull, P., Tripathi, A., Zou, H. Elder, L., Henehan, M., (In press). Chromium isotopic composition of core-top planktonic foraminifera. *Geobiology*.

Hull, P.M, Elder, L.E., Dobbins, B., Hsiang, A.Y., Bogdan, K., Butts, S.H., Gall, L., Harrel, M., Laferty, D., Liu, Y., Mulvey, P., Perkowski, J.J., Plagge, C., Ranipeta, A., Rossman, D., Utrup, J. (In prep). Speeding up community morphometrics with open code and data sharing.

Kahanamoku, S., Henehan, M. and Elder, L. (In Prep) Foraminifera fragmentation as a proxy for  $\Omega_{calcite}$ .

Hull, P.M., Bohaty, S., Cameron, A., Coxall, H., D'haenens, S., de Vleeschouwer, D., Elder, L. E. et al. (In press). Data Report: weight percent coarse fraction record for the Eocene megasplice at IODP Sites U1406, U1408, U1409, U1411. In Norris, R.D., Wilson, P.A., Blum, P., and the Expedition 342 Scientists, *Proceedings of the Integrated Ocean Drilling Program, 342*: College Station, Tx (Integrated Ocean Drilling Program)

### Grants, Awards, and Honors

- 2016 Bermuda Institute of Ocean Sciences Grants-in-Aid of research (\$3,710)
- 2013 SICB student travel award to present at complementary session for symposium:  
Physiological responses to simultaneous shifts in multiple environmental stressors (\$250)  
Graduate Student Union grant for conference travel, URI (\$250)
- 2012 University-National Oceanic Laboratory System: Chief Scientist training cruise (\$1500)  
The Crustacean Society Graduate Student Fellowship (\$1500)  
College of The Environment and Life Sciences student travel award, URI (\$250)  
Graduate student funds for conference travel, URI, Department of Biology (\$175)
- 2011 URI Biology Department Graduate Student Teaching Excellence Award  
Company of Biologists travel grant (\$653)  
2<sup>nd</sup> place Discovery@ URI research poster presentation (\$400 prize)  
Graduate Student Union grant for conference travel, URI (\$500)  
Graduate Student Association scholarship, URI (\$500)  
Graduate student funds for conference travel, URI, Department of Biology (\$325)  
College of the Environment and Life Sciences student travel award, URI (\$150)  
Nominated for URI graduate student fellowship
- 2010 Enhancement of Graduate Research Grant, URI (\$1000)  
Society of Integrative and Comparative Biology, Student Support (\$100)  
Graduate student association scholarship, URI (\$150)  
Graduate student funds for research travel, URI, Department of Biology (\$175)
- 2009 American Association for the Advancement of Science 2 year membership award
- 2008 Journal of Experimental Biology (JEB) Traveling Fellowship Award (\$1200)
- 2007 Dean's Scholarship funds for research travel, URI (\$200)  
Graduate student funds for research travel, URI, Department of Biology (\$500)

### Research Experience

- 2016 Postdoctoral Associate, Dr. Pincelli Hull's lab, Yale University  
Trends in body size of foraminifera across the Cretaceous Paleocene extinction; ecophysiology of eutrophication: physiological response of Long Island Sound invertebrates and protists to environmental stress.
- 2014-2016, Research Associate, Dr. Pincelli Hull's lab, Yale University  
Impacts of climate change, both past and present, on planktonic foraminifera; developed high-throughput methods to image microfossils and extracted community level trends in morphology; supervised an average of 10 undergraduate research assistants per semester, four high school interns each summer, and mentored Yale senior thesis students.
- 2007-2013, Graduate Assistant, Dr. Brad Seibel's lab, URI  
Incorporated physiological, biochemical and molecular techniques to measure the responses of marine invertebrates to naturally and anthropogenically induced environmental stress; focused on amphipods living in Oxygen Minimum Zones and their response to thermal and hypoxic stress as well as the influence of transparency and phylogeny on metabolic rate. Also worked with Dr. Niall Howlette learning western blot methods.

### Research Experience (continued)

- 2008 **Journal of Experimental Biology Traveling Fellow**, Dr. Patrick Walsh's lab, University of Ottawa  
Learned molecular techniques for a project quantifying the expression of carbonic anhydrase in response to ocean acidification; created a cDNA library for two species of Antarctic pteropod, PCR and qPCR.
- 2006- 2007, **Laboratory Technician**, Dr. Brad Seibel's lab, URI  
Designed and conducted experiments on respiratory physiology of pelagic cephalopods, specifically impacts of ocean acidification on pteropod mollusks; coordinated logistics for research on three UNOLS cruises and at McMurdo Station, Antarctica.
- 2005, **Laboratory Assistant**, Dr. Scott Nixon's lab, URI.  
Assembled mesocosm experiments, measured dry weight of fish and seagrass material, and entered data to support research on nutrient cycling in Narragansett Bay, RI.
- 2005, **Laboratory Assistant**, Dr. Brad Seibel's lab, URI.  
Collected specimen on research cruise in the Gulf of California, conducted laboratory experiments using oxygen electrodes, and analyzed results on scaling of enzymatic activity in optic lobe tissue of pelagic cephalopods.

### Oral Presentations (some under maiden name: Birden)

- 2015 Elder, L.E., Hull, P.M., Hsiang, A.Y., Kahanamoku, S., *High-throughput imaging of recent microfossils from the Atlantic Ocean*. Geological Society of America (GSA). Baltimore, Maryland
- 2015 Hsiang, A.Y., Elder, L.E. and Hull, P.M., *Automatic extraction of 2D and 3D morphological data from high-throughput dark-field microscopy images of foraminifera*. GSA. Baltimore, Maryland
- 2015 Elder, L.E., *Physiological and morphologic adaptations to survive hypoxia in the open ocean*. Geology Department Postdoctoral Seminar Series. Yale University, New Haven, CT
- 2014 Elder, L.E., *The ecological physiology of hyperiid amphipods: Impacts of environmental stress and transparency*. URI Biological and Environmental Sciences Colloquium Series. Kingston, RI
- 2013 Elder, L.E. and Seibel, B.A., *The effects of thermal stress and hypoxia on the hyperiid amphipod Phronima*. The Society for Integrative and Comparative Biology. San Francisco, CA
- 2012 Bush, S.L., Elder, L.E., Seibel, B.A., *Physiology of deep-Sea invertebrates: Predicting responses to climate change*. Smithsonian Institute Seminar. Washington, D.C.
- 2011 Elder, L.E. and Seibel, B.A., *Physiological adaptations of the hyperiid amphipod, Phronima, to oxygen minimum zones*. Society for Experimental Biology (SEB). Glasgow, Scotland
- 2011 Elder, L.E. and Seibel, B.A., *Physiological adaptations of the hyperiid amphipod, Phronima*. Biology department colloquium. URI, Kingston, RI
- 2011 Schneider, J.L., Elder, L.E., Rosa, R, Maas, A.E., Hancock, L. and Seibel, B.A., *Hypoxia induced metabolic suppression in migratory zooplankton living in oxygen minimum zones*. 5<sup>th</sup> International Zooplankton Symposium. Pucon, Chile
- 2008 Seibel, B.A., Rosa R., Maas, A.E., Birden, L.E., *Metabolic responses to ocean acidification*. Ocean Acidification: Causes and impacts on biogeochemical processes, biota and climate. American Society of Limnology and Oceanography: Ocean Sciences Meeting (ASLO). Orlando, Florida
- 2007 Trueblood, L.A., Rosa R., Birden, L.E., Seibel, B.A., *Scaling of aerobic metabolism in epipelagic squid*. Society for Integrative and Comparative Biology (SICB). Phoenix, AZ

### Poster Presentations (some under maiden name: Birden)

- 2016 Elder, L.E., Hull, P.M., Hsiang, A.Y., Kahanamoku, S., *An ecometric study of recent microfossils using high-throughput imaging*. Ocean Sciences Meeting. New Orleans, LA
- 2015 Wang, X., Planavsky, N., Hull, P., Tripathi, A., Zou, H. Elder, L., Henehan, M., *Evaluating foraminifera as an archive for seawater chromium isotopic composition*. American Geophysical Union. San Francisco, CA

#### Poster Presentations (continued)

- 2014 Liu, F., Hull, P., Elder, L.E., *Morphological and functional diversity of planktonic foraminifera in the Atlantic Ocean*. Northeastern Geobiology Symposium New Haven, Connecticut
- 2011 Elder, L.E. and Seibel, B.A., *Implications of global climate change and declining oceanic oxygen levels for the hyperiid amphipod Phronima*. Discovery@URI event. Kingston, RI
- 2011 Maas, A.E., Elder, L.E., Dierssen, H.M., Seibel, B.A. *The response of Antarctic pteropods to food deprivation*. 5<sup>th</sup> International Zooplankton Symposium. Pucon, Chile
- 2011 Elder, L.E. and Seibel, B.A., *Vertical migration in oxygen minimum zones: the physiological consequences for the hyperiid amphipod Phronima*. SICB annual meeting. Salt Lake City, Utah
- 2008 Maas, A.E., Birden, L.E., Fabry, V.F., Seibel, B.A., *The ecological importance of pteropod physiology*. ASLO: Ocean Sciences meeting. Orlando, Florida

#### Teaching Experience

2008-2013 Teaching assistant, University of Rhode Island

##### Course Co-Instructor:

*Invertebrate Zoology of Southern New England* (Bio 355), 2011 - 2013: Designed course curriculum, organized and led collections trips, trained students to identify and preserve specimens, lectured on ecology and taxonomy

##### Laboratory Coordinator/Instructor:

*Invertebrate Zoology* (Bio 354), 2012 - 2013: Designed laboratory exercises, developed invertebrate museum collection, mentored student research projects, wrote and administered practical exams

*Marine Biology* (Bio 360), 2008 - 2013: Developed laboratory manual, designed and wrote lab exercises, trained and supervised teaching assistants, wrote and graded lecture exams

##### Laboratory Instructor:

*General Biology* (Bio 101), 2011: Wrote weekly quizzes, graded exercises and quizzes, proctored exams

2008-2013 Guest Lecturer, University of Rhode Island

*Invertebrate Zoology* (Bio 354)

"Gastropod Mollusks" 2013

"The open ocean: adaptations of pelagic invertebrates" 2012

"Taxonomy and Physiology of the hyperiid amphipod *Phronima*" 2011

*Marine Environmental Physiology* (Bio 345)

"Fuel and Energy" 2012

"Heat Shock Proteins" 2011

*Topics in Marine Biology* (Bio 130)

"I'm on a boat: midwater research" 2013

"Career paths and opportunities for students with a BS in marine biology" 2011, 2010

Marine Biology (Bio 360)  
"Marine Invertebrates" 2012  
"Intertidal zonation" 2008, 2009, 2010

Student Mentoring

- 2016 Tom Boag, PhD student Stanford University: *Physiology of Ediacaran relevant biota*  
Romy Carpenter, undergraduate Yale, Peabody intern: *Ecophysiology of eutrication*  
Mathias Feldtmann, PhD student University of Bremen, Germany: *Planktonic foraminiferal morphology in the Eocene and Oligocene*  
Anieke Brombacher, PhD student University of South Hampton, England: *Morphology of G.puncticulata*
- 2015 Casey Culligan, Amity Regional High School: *Morphology of Cenozoic microfossils (continued in 2016)*  
Sara Kahanomoku-Snelling, undergraduate Yale: *Macroecology of limpets and Foraminifera fragmentation as a proxy for calcite saturation*  
Ahmad Keita, Diego Ospina, Juhi Nath, and Janae McMillan, Yale Peabody Museum EVOLUTIONS (EVoking Learning and Understanding Through Investigations of Natural Sciences) High School interns
- 2014 Frances (Yuchen) Lui, Undergraduate Yale: *Morphological and Functional diversity of Atlantic foraminifera* (currently: graduate student, Stanford)  
Zariah Altman, George Baldwin, Meeshali Patel and Sywia Zambrycka Yale Peabody Museum EVOLUTIONS high school interns
- 2013 Kallie Longval, undergraduate URI: *Comparison of metabolic enzymes CS and LDH in amphipods* (currently: Law student at Roger Williams University)  
Nicole Marone, Kallie Longval, undergraduate URI: *Anaerobic metabolism of Pleuroncodes (pelagic crab)*
- 2011 Nathan Coolidge, undergraduate URI: *Respiratory physiology of pelagic shrimp* (currently: MA student, Teacher Certificate Program, URI)
- 2007 Rachel Wigton, undergraduate URI: *Respiratory physiology and Biology of pelagic cephalopods* (currently: PhD candidate, Old Dominion University)

Outreach

- 2015 Supervisor: Yale Peabody Museum EVOLUTIONS Program: Supervised four high school interns from June-September. Interns from inner city schools and underrepresented groups in STEM.
- 2014 Supervisor: Yale Peabody Museum EVOLUTIONS Program: Supervised four high school interns from June-September. Interns from inner city schools and underrepresented groups in STEM.
- 2013 Instructor: Freshwater Ecosystems workshop for Rhode Island Technology Enhanced Science (RITES) program. Updated curriculum and activities to meet state Grade Span Expectations (GSEs) for grades 5-12, and taught associated 2.5 day workshop for 5-12 teachers  
Volunteer: Seine net station Chariho middle school 6th grade barrier beach field trip
- 2012 Instructor: Freshwater Ecosystems workshop for RITES program. Designed curriculum and activities to meet state GSEs for grades 5-12, taught associated 2.5 day workshop for 5-12 teachers  
<https://sites.google.com/a/ritesproject.net/sites2/summer-short-courses>

Contributor: "Marine life in Narragansett Bay" display, America's Cup World Series, Newport, Rhode Island

Photograph contributor: The Current, Rhode Island NSF EPSCoR publication, summer issue

2011 Participant: COSEE Ocean Systems and NEOSEC workshop: Strategies for Engaging in Broader Impacts Programs, Waquoit Bay National Estuarine Research Reserve, Waquoit, MA

2010 Invited speaker: Thompson Brook School, Avon, CT, presentation for sixth graders, "Antarctic Research: past and present"

### Outreach (continued)

2009 Lab demonstration organizer: NSF EPSCoR's marine life sciences and engineering high school visits, URI spring and fall semesters

Photograph contributor: The world ocean census: a global survey of marine life, by Crist, Darlene Trew, Gail Scowcroft and James M Harding, Jr., New York: Firefly Books, Inc.

2008 Invited speaker: The School of the Future, New York, New York, Career day

2005 Docent/Educator: Mystic Aquarium, Mystic, Connecticut

### Press

2012 Article: The Ecdysiast, newsletter of The Crustacean Society, "TCS Fellowship Winners" Volume 31, November 2, 2012, page 20.

2011 Article: QuadAngles, URI alumni magazine, "Discovery@URI, 2011 Best Student Research Awards" summer 2011, Volume 18, No. 4, page 25.

2011 Article: The Narragansett Times, "URI Student Studies Link Between Zooplankton and Climate Change" July 15, Volume 148, No. 56, page 4-A.

2011 Article and photograph: Cranston Patch, "Cranston Resident Studying Interaction of Zooplankton and Global Warming" July 12.

2011 Press release and photo: Society for Experimental Biology "Climate Change Could Turn Oxygen-free Seas from a Blessing to a Curse for Zooplankton" featured on over 20 websites including: Sciencedaily, FirstScience, Physorg, ScienceCodex, EcoRI, URI today, URI homepage. <http://www.sciencedaily.com/releases/2011/06/110630220007.htm>

2011 Article: The Good 5¢ Cigar (URI newspaper), "Poster display showcases student research projects" April 14, Volume 60, Issue 42, page 1.

2008 Interview: Go Earth care!, Bay FM Community Radio, Byron Shire, NSW, Australia, titled: "The Impact of Ocean Acidification on Sea Butterflies."

### Service

2015 Reviewer: Journals of Marine Biology and Plankton Research; NSF Ocean Sciences division

2014 Session Chair, SICB meeting Hypoxia/Oxidative Stress

2011-2012 Member at large, Graduate Assistants United, URI

2011 Graduate student representative, tenure-track professor candidate search, URI

2010- 2012 Graduate student representative, URI Department of Biology faculty meetings

2010-2011 Steward, Graduate Assistants United, URI

- 2010            Contributed to white paper titled: URI Research Needs in Genome Biology  
2008            Author of the URI Marine Biology Laboratory Manual, revised 2009, 2010, and 2012

### Professional Development Courses

Through Yale University Organizational Effectiveness and Staff Development program

- 2015    Mastering Difficult Conversations  
2015    Navigating Conflict  
2014    Leading with influence

### Professional Affiliations

American Geophysical Union  
Geological Society of America  
American Academy of Underwater Sciences  
Society for Experimental Biology  
Society for Integrative and Comparative Biology  
The Crustacean Society

### Certifications

8-hour Marine Fishing Vessel Safety Course (Coast Guard Marine Safety Instructor)  
American Academy of Underwater Sciences (AAUS), Research Diver  
PADI NITROX certification (instructor: Mark Gustafson, URI)  
PADI open water diver  
DAN first aid for professional divers

### References

*Postdoctoral supervisor*

#### **Dr. Pincelli Hull**

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*Graduate advisor*

#### **Dr. Brad Seibel**

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*Collaborator*

#### **Dr. Patrick Walsh**

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*Graduate committee member*

#### **Dr. Karen Wishner**

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*Graduate committee member*

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