

# Alyssa R. Frederick

Bodega Marine Laboratory  
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## APPOINTMENT

November 2019 - Present                      Postdoctoral Scholar, Bodega Marine Laboratory, UC Davis  
Research: white abalone gametogenesis, reproductive physiology

## EDUCATION

2019    Ph.D. Biological Sciences (Dec 2019)                      University of California, Irvine  
Dissertation advisor: Donovan P. German                      Dept. Ecology & Evolutionary Biology  
Dissertation: Warming temperatures and disease effects on abalone/pāua: Examining  
digestive physiology and withering syndrome in *Haliotis*

2018    M.S. Biological Sciences    University of California, Irvine  
Advisor: Donovan P. German    Dept. Ecology & Evolutionary Biology

2013    Fulbright Fellow    Victoria University of Wellington (NZ)  
Advisor: Dr. Simon Davy    School of Biological Sciences  
Research topic: The role of nitrogen in cnidarian symbiosis and bleaching

2012    B.S. Marine Biology    American University (Washington, D.C.)  
Advisor: Dr. Kiho Kim    Project: Nutrient pollution on Guam  
Advisors: Drs. David Baker & Marilyn Fogel                      Project: Quantifying coral mutualism  
Graduated summa cum laude, cumulative GPA 3.98

## RESEARCH INTERESTS

- Ecophysiology as a tool in aquaculture, fisheries, and conservation science
- Human impacts on coastal ecosystems and resources
- Climate change impacts on threatened species biology and physiology
- Interface of society, environmental change, and policy

## RESEARCH GRANTS

2021            California Sea Grant 2022 Aquaculture Awards (\$243,000), Co-PI

2017            UCI Microbiome Pilot Project Award

2017            Sea and Sage Audubon Society Bloom-Hays Research Grant (\$500)

2017            Western Society of Malacologists Research Grant (\$750)

2017            National Geographic Young Explorers Grant (\$5000)

2016            Graduate Student Fellowship, UCI's Newkirk Center for Science and Society (\$7985)

2016            Conchologists of America Academic Grant (\$2500)

2016            Southern California Academy of Sciences Research Grant (\$2000)

2016            UCI OCEANS Graduate Student Fellowship (\$7000)

2016            Grant in Aid of Research, Society for Integrative and Comparative Biology (\$1000)

2015            Melbourne R. Carriker Student Research Award, American Malacological Society (\$1000)

- 2011 Scholars & Artists Research Fellowship (\$4000), Dean's Undergraduate Research Award (\$4500), American University

## SCHOLARSHIPS, AWARDS & HONORS

- 2019 Knauss Fellowship (offered, but declined for postdoctoral position)  
 2019 ORISE Fellowship, EPA, Office of Water (offered, but declined for postdoctoral position)  
 2018 UCI Public Impact Fellowship  
 2018 Grover C. Stephens Memorial Fellowship Award  
 2017 Society for Integrative and Comparative Biology (SICB) Student Journalism Internship  
 2016 Achievement Rewards for College Scientists (ARCS) Foundation Scholarship (\$15,000)  
 2015-16 Climate Action Training Program (UCI)  
 2014 National Science Foundation Graduate Research Fellowship (\$138,000)  
 2014 National Defense Science and Engineering Graduate Fellowship (offered, but declined)  
 2014 Graduate Recruitment Fellowship\* (UCI, \$15,000)  
 2013 Fulbright Scholarship, Fulbright New Zealand  
 2013 Victoria Fulbright Master's (by thesis) Scholarship  
 2013 Kathleen Stewart Postgraduate Award, Victoria University of Wellington  
 2008–12 Presidential (tuition) Scholarship, University Honors Program, American University

## PEER-REVIEWED PUBLICATIONS

- (3) Nguyen-Phuc, B.Q., C. Demetropoulos, S. Stewart, P. Saffarinia, J.D. Bastian-Salgado, E. Hawkins, **A.R. Frederick**, D.P. German. (2020) Nutritional physiology of Santa Ana Sucker, *Catostomus santaanae*: a threatened freshwater fish endemic to southern California. *Acta Zoologica*. 102: 105–11.
- (2) Santos, A.\*, **A.R. Frederick\***, B. Higgins, A. Carrillo, A. Carter, K.M. Dickson, D.P. German, and M.H. Horn. (2018) Egg cannibalism in fishes: the beach-spawning *Leuresthes tenuis* eats and digests its own eggs. *Journal of Fish Biology* 93: 282-289. DOI: 10.1111/jfb.13734  
 \*These authors contributed equally to this work.
- (1) MacAvoy, S.E., **A. Braciszewski**, E. Tengi, and D.W. Fong. (2016) Trophic plasticity among spring versus cave populations of *Gammarus minus*: examining functional niches using stable isotopes and C/N ratios. *Ecological Research* 31: 589.

## MANUSCRIPTS SUBMITTED AND IN ADVANCED PREP

- (3) Lee, A.M., M.J. Herrera, D. P. German, A.R. Frederick. Digestive biochemistry from opposite ends of the Pacific: red abalone and pāua show differences in digestive enzyme activities, microbial diversity, and levels of gastrointestinal fermentation. (in prep)
- 2) Frederick, A.R., B.A. Wehrle, A.M. Lee, C.C. Catabay, and D.P. German. Abalone digestive system may be able to keep pace with moderate heat stress. (in prep)
- (1) Frederick, A.R., J. Heras, C.S. Friedman, and D.P. German. Withering syndrome induced gene expression changes and a de-novo transcriptome for the Pinto abalone, *Haliotis kamtschatkana*. (in revision review)

## PREVIOUS PROFESSIONAL EXPERIENCE

- 2019 **Christine Mirzayan Science and Technology Policy Fellow**  
*National Academies of Science, Engineering, and Medicine (Washington, D.C.)*

*Previous Professional Experience (Continued)*

- Worked with the Board on Life Sciences to support the development of an evidence-based consensus report analyzing the history of biological collections supported by NSF, challenges, and long-term suggestions for supporting collections.
- Analyzed literature participated in team activities to support a committee of experts tasked with addressing challenges for biological collections.

**2016 Graduate Intern***NOAA National Marine Fisheries Service (Long Beach, CA)*

- Created a conceptual models to incorporate climate change as a threat for a marine invertebrate into management policy. Served on ESA-listed Black Abalone Recovery team, and integrated climate change threats.
- Incorporated climate change data into Black Abalone Recovery Outline and Plan, documentation required under the Endangered Species Act.

**SELECT PUBLIC COMMUNICATIONS**

- Frederick, A. (2020) “How to defend a PhD remotely.” *Nature Career Column*. (<https://www.nature.com/articles/d41586-020-00971-z>)
- Frederick, A. (2019) “Bat wing muscles specialize for different temperature ranges.” Authored press release for *SICB*. (<https://bit.ly/2FWruDm>)
- Frederick, A., and S. Mana`oakamai Johnson. (2018) “Climate Change Is Strengthening Typhoons, Hurricanes and Cyclones. The US Isn’t Paying Attention.” *Union of Concerned Scientists Blog*. (<https://bit.ly/2USy0zW>)
- Frederick, A. (2018) “New immunotherapy technique can specifically target tumor cells, UCI study reports.” Authored press release for *UCI News*. (<https://bit.ly/2GpgLmR>)
- Frederick, A. (2018) “Augmenting Reality to Make Science More Inclusive” *Society for Integrative and Comparative Biology Student Journalism*. (<https://bit.ly/2Er6l3k>)
- Cat, L.A., A. Frederick, M. Herrera, E. Valdez-Ward (2018) “Diverse ecosystems require diverse ecologists” *Rapid Ecology*. ([goo.gl/YiQyNX](http://goo.gl/YiQyNX))
- Interviewed in: Kuo, M. (2018) “Celebrating women in science” *Science Careers*. (<https://bit.ly/2CcE3VK>)
- Frederick, A.R. (2017) “From abalone to advocacy.” Working Life piece in *Science* 357: 6349. (<http://science.sciencemag.org/content/357/6349/422>)
- Frederick, A., A. Oetmen, R. Delaney, J. Goldberg (2011) “Repopulating Pinta.” Production team for film for Galapagos Conservancy. (<https://youtu.be/C1w-T0ZMcsE>)

**INVITED SEMINARS & LECTURES**

- “Women in Science Alumni Panel” American University, Women in Science club panel on careers in science. (February 2019)
- “There and Back Again: Turning Field Failures into Successes” Western Society of Naturalists, annual meeting opening plenary panelist. Tacoma, WA, USA. (November 2018)
- “From Abalone to Advocacy: Science to support climate change resiliency, community engagement, and coastal management” Invited seminar, Cawthron Institute, Nelson, New Zealand. (May 2018)
- “Hydrothermal Vents” Physiology of Extreme Environments Course guest lecture, UC Irvine. (2017)
- “Contacting your elected officials; expert panel on D.C. climate policy” Climate Solutions course guest lecture, UC Irvine. (2017)
- “Abalone decline through the ages: Overfishing, climate change, and disease, oh my!” Brews and Brains at UC Irvine. (2017)

## SELECT OUTREACH & LEADERSHIP EXPERIENCE

### ONGOING PROJECTS

Jan 2020 - present     Bodega Marine Laboratory Seminar Committee Member, Chair since Jan 2021

### PREVIOUS PROJECTS

- Nov 2017-2019     “Turn of the Tide” Podcast, Creator/Director and Co-host
- Created a science podcast featuring early career women in science and other fields doing research and meaningful work around climate change, oceans, and environmental justice <https://turnofthetide.weebly.com>
  - Interviewed multiple stakeholders, from scientific community to Native coastal tribes in California, to highlight public policy failures in Indigenous fishing rights
- Dec 2017-Jun 2018     UCI Ecology and Evolutionary Biology Department Diverse Educational Community and Doctoral Experience (DECADE) Representative
- Nov 2017-Mar 2018     Associate Editor, Journal of Science Policy and Governance
- Jan 2018                 2018 UCI Climate Solutions Summit Scientist Volunteer
- July 2017-Feb 2018     UCI Associated Graduate Students Council Member
- Elected official of graduate student government, Served on external affairs committee, co-wrote and passed two pieces of legislation
- June 2017-  
Aug 2018                 Crystal Cove Conservancy, Crystal Cove State Park, Abalone Outreach
- Created abalone outreach project at Crystal Cove State Park
  - Worked with public every week to educate about abalone and scientific research
- Aug 2014-Aug 2018     Targeted Instruction Generating Excitement about Research and Science (TIGERS), Placentia, CA
- Worked in partnership with the German lab and local Valencia High School to design inquiry-based lessons that we perform with the students one day each month. The goal is to get students excited about science, to improve scientific literacy, and create a life-long love of learning (especially about science)
- Mar 2017                 Student Lobbying Conference and Lobby Day, Sacramento, CA
- 2016-2017                 Climate Action Training Program (UCI)
- Led a team of 4 graduate students from UCI’s Climate Action Training Program to discuss effective climate change policy with the offices of twelve Congressional members
  - Organized meetings with AAAS, American Meteorological Society, and American University climate policy experts
  - Hosted webinar with 500 Women Scientists on how to organize and prepare for Congressional visits
- 2016-2017                 Graduate Representative, UCI Ecology and Evolution Department, Irvine, CA
- Represented the graduate students in the EEB department at faculty meetings
  - Organized new student orientation and quarterly graduate student meetings
  - Created departmental pathways for improving graduate student housing

- Advocated for women and students with disabilities in the department
- Served on recruitment committee for incoming PhD students

2014-2016 Orange County Society for Conservation Biology, Irvine, CA

2013-2014 Remutaka Forest Trust Volunteer, Wellington, New Zealand

## ABSTRACTS & PRESENTATIONS

(ORAL PRESENTATIONS UNLESS NOTED, SOME PRESENTATIONS WITH MARRIED SURNAME BRACISZEWSKI)

**Frederick, A.R.**, C. Catabay, K. D. Clements, B. A. Wehrle\*, and D. P. German. (2019) “Will abalone survive climate change? Comparative digestive physiology and the effect of temperature stress on abalone across the Pacific Ocean” Society for Integrative and Comparative Biology, Tampa, FL. \*Co-author added after abstract submission

**Frederick, A.R.**, M. Neuman, S. Wang, and D. P. German. (2018) “A Snail's Pace: Can policy and physiological research protect abalone/pāua from climate change?” Pacific Climate Change Conference, Wellington, New Zealand.

**Frederick, A.R.**, K. I. Ramin and S. D. Allison. (2018) “Training tomorrow’s climate leaders: University of California Irvine’s Climate Action Training Program.” Pacific Climate Change Conference, Wellington, New Zealand.

**Frederick, A.R.**, C. S. Freidman and D. P. German. (2018) “Withering-syndrome induced gene expression changes in pinto abalone, *Haliotis kamtschatkana*.” Society for Integrative and Comparative Biology, San Francisco, CA.

**Frederick, A.R.** and D. P. German. (2017) “Differential disease resistance patterns in eastern Pacific Haliotids.” Euromal: 8th European Congress of Malacological Studies. Polish Malacological Society, Kraków, Poland. **Awarded 2nd Best PhD Student Presentation**

**Frederick, A.R.** (2017) A Snail’s Pace: “Can policy save ecosystems in the face of global climate change?” University of California Student Lobbying Conference, Sacramento, CA.

**Braciszewski, A.R.**, M. Neuman, S. Wang, and D. P. German. (2017) (Poster) “Climate change and the recovery of Endangered Black Abalone.” ARCS Award Symposium, Irvine, CA.

**Braciszewski, A.R.** and D. P. German. (2017) “Relatedness and differential disease resistance in Eastern Pacific Haliotids.” Society for Integrative and Comparative Biology, New Orleans, LA. & (2016) American Malacological Society and Western Malacological Society Joint Meeting, Ensenada, Baja California, Mexico.

**Braciszewski, A.R.** and D. P. German. (2016) (Poster) “Relatedness and differential disease resistance in California Haliotids.” Southern California Academy of Sciences Meeting, Los Angeles, CA.

**Braciszewski, A.R.**, A. Carrillo, M.H. Horn, A. Carter, and D.P. German. (2015) “How do you like your eggs? Cannibalism and digestibility in the California grunion, *Leuresthes tenuis* (Teleostei: Atherinopsidae).” Society for Integrative and Comparative Biology, West Palm Beach, FL.

**Braciszewski, A.R.**, A. Carrillo, M.H. Horn, A. Carter, and D.P. German. (2014) (Poster) “How do you like your eggs? Cannibalism and digestibility in the California grunion, *Leuresthes tenuis* (Teleostei: Atherinopsidae).” American Physiological Society Intersociety Meeting, San Diego, CA & Comparative Biology Southwest Organismal Biology Meeting, Irvine, CA

**Frederick, A.R.**, and K. Kim. (2012) (Poster) “Measuring Base Line Health of Mangrove Forests as an Indicator of Nutrient Pollution in Guam Using Stable Nitrogen Isotope Analysis.” Benthic Ecology Meeting, Norfolk, VA.

**Frederick, A.R.,** K. Kim, D.M. Baker, and M.L. Fogel. (2011) “Quantifying Mutualism in Tropical Reef Corals.” Carnegie Institution of Washington, Geophysical Laboratory. Washington, D.C. Work highlighted here: <https://goo.gl/V1KnNn>

## **TEACHING EXPERIENCE**

### **Graduate TA, Department of Ecology and Evolutionary Biology, University of California, Irvine**

- Foundation for Physiology and Exercise Sciences (2019)
  - Editing and providing guidance to students writing manuscript-like papers
- Human Physiology Laboratory. (2014, 2015)
  - Led laboratory lecture, functions, quizzes, lab reports, and grades
- Biology: From Organism to Ecosystems Discussion (2015)
  - Designed and led weekly discussion sections to review concepts from lecture. Emphasis placed on incorporating art and creative presentation into discussion activities
- Genetics Discussion (2014)
  - Led weekly discussion sections to review problems and concepts from lecture

**Tutoring, The College Trail,** Corona del Mar, CA. Tutoring middle school and high school students weekly in basic algebra. (2014-2015)

**Graduate TA, Victoria University of Wellington,** New Zealand. Introductory Marine Biology. Aided students with in-laboratory activities and identifications (2013)

**SAT Preparatory Course Instructor, Kaplan,** Philadelphia, PA. Prepared weekly lessons for SAT prep course, administered SAT practice tests, and presented at SAT events for students and parents (09-12/2012)

**Education Summer Intern, Atlantic City Aquarium,** NJ. Constructed educational programs about marine environments, especially intertidal zones; performed diving shows, exotic animal shows, and presented touch tanks to school groups (Summers 2009, 2010, 2012)

**Undergraduate TA, American University,** Washington, D.C. General Biology II. Prepared films for class, organized review sessions, and assisted with student presentations (2010)

## **OTHER PROFESSIONAL SERVICE**

**Mentored UCI undergraduates:** Ariana Lee, Priscilla San Juan (currently a PhD student at Stanford), Steven Huynh, David Perez (currently an MS student), Avneet Kaur (currently an MS student), Harits Abdurrohman, Caitlyn Catabay, Myguel Angelo M. Del Mundo

**Peer Review:** Comparative Biochemistry and Physiology - B Biochemistry, Hydrobiologia, Marine Pollution Bulletin