

# Alyssa R. Frederick

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## APPOINTMENTS

August 2022 - present	Director, White Abalone Captive Breeding Program Academic Administrator IV (As of April 2023) Bodega Marine Laboratory, UC Davis
November 2019 - March 2023	Postdoctoral Scholar, Bodega Marine Laboratory, UC Davis Research: white abalone gametogenesis, reproductive physiology

## EDUCATION

2019	Ph.D. Biological Sciences Dissertation advisor: Donovan P. German Dissertation: Warming temperatures and disease effects on abalone/pāua: Examining digestive physiology and withering syndrome in <i>Haliotis</i>	University of California, Irvine Dept. Ecology & Evolutionary Biology
2018	M.S. Biological Sciences Advisor: Donovan P. German	University of California, Irvine Dept. Ecology & Evolutionary Biology
2013	Fulbright Fellow Advisor: Dr. Simon Davy	Victoria University of Wellington (NZ) School of Biological Sciences
2012	B.S. Marine Biology Advisor: Dr. Kiho Kim Advisors: Drs. David Baker & Marilyn Fogel Graduated summa cum laude, cumulative GPA 3.98	American University (Washington, D.C.) Project: Nutrient pollution on Guam Project: Quantifying coral mutualism

## EXPERTISE SUMMARY

- Conservation science, restoration aquaculture, and invertebrate physiology science
- Conducting and publishing endangered species and captive breeding research
- Aquaculture science, marine science, and science policy
- Program management with multiple academic, state, federal, and private partners
- Research supervision, multi-institution program coordination
- Building, maintaining, troubleshooting, and designing seawater plumbing and life support systems for research
- Extramural grant proposal writing and grant reporting, grant budgeting and management
- Managing state and federal permits
- Managing data across partner institutions

## RESEARCH INTERESTS

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

## CURRENT RESEARCH GRANTS (AS LEAD/PI\* OR CO-PI)

\*Current PI, originally awarded to previous Director of WACBP

- 2022-24 California Sea Grant 2022 Aquaculture Award, “Developing tools for monitoring the impact of climate change on captive abalone reproduction and digestion” (\$332,461), PI for UCD
- 2022-25 \*Section 6 ESA, “White Abalone Captive Propagation: Increasing Production for Outplanting” (\$3,174,492), Awarded to and administered by CDFW
- 2019-22 \*Section 6 ESA, “Abalone Recovery and Management Plan” (\$3,26,969), Awarded to and administered by CDFW
- 2018-22 \*California Sea Grant Ocean Protection Council Prop 84 Competitive Grants Program, “Assessing the combined effects of ocean acidification and warming on disease susceptibility and restoration success of the critically endangered white abalone” (\$249,912)

## PREVIOUS RESEARCH GRANTS (AS LEAD/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)

## PEER-REVIEWED PUBLICATIONS

- (5) **Frederick, A.R.**, B.A. Wehrle, A.M. Lee, C.C. Catabay, D.R. Rankins, K.D. Clements, and D.P. German. (2022) The abalone digestive system may be able to keep pace with moderate heat stress. *Comparative Biochemistry and Physiology - Part A. Adaptations of Nutrient Supply Organs that Fuel the Fire of Life Special Issue*. 270: Article 111230. <https://doi.org/10.1016/j.cbpa.2022.111230>
- (4) **Frederick, A.R.**, J. Heras, C.S. Friedman, and D.P. German. (2022) Withering syndrome induced gene expression changes and a de-novo transcriptome for the Pinto abalone, *Haliotis kamtschatkana*. *Comparative Biochemistry and Physiology - Part D. Aquaculture Special Issue*. 41: Article 100930 <https://doi.org/10.1016/j.cbd.2021.100930>
- (3) Nguyen-Phuc, B.Q., C. Demetropolous, 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  
\***Co-first authorship**. 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 IN ADVANCED PREP

- (1) 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.
- (2) **Frederick, A.R.**, K.M. Aquilino, E.A. Hubbard, C.A. Catton, S.M. Bashevkin, B.J. Walker, S.K. Kawana, K. Magaña<sup>1</sup>, G.N. Cherr, L. Rogers-Bennett. Optimizing abalone settlement for restoration: Crustose coralline algae increases settlement success of endangered white abalone (*Haliotis sorenseni*)
- (3) Bashevkin, S.M., **A.R. Frederick**, E.A. Hubbard, C.A. Vines, K. Magaña, G.N. Cherr, K.M. Aquilino. Improving red and white abalone aquaculture: KCl induces stronger settlement than GABA or crustose coralline algae, with no negative post-metamorphic effects.

## SELECT SCHOLARSHIPS, AWARDS & HONORS

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|---------|--|
| 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                                      |

## PREVIOUS PROFESSIONAL EXPERIENCE

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

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|----------------|---|
| 2023 - present | Member of the BML DEI Committee   |
|                | <ul style="list-style-type: none"> <li>• Core member working towards DEI goals for BML</li> <li>• Co-led initiative to create a Pride Display in the BML Library</li> </ul> |

2022 - present	<p>Menstrual and Sexual Health Program Manager</p> <ul style="list-style-type: none"> <li>• Initiated the sexual and menstrual health supply program at BML by leading a trial program to bring menstrual and sexual health supplies to all restrooms</li> <li>• Coordinating efforts between BML, housing, main campus, and community members to ensure continuous supplies for everyone</li> </ul>
Jan 2020 - Jan 2022	<p>Bodega Marine Laboratory Seminar Committee Member &amp; Chair</p> <ul style="list-style-type: none"> <li>• Served for one year as day-of-coordinator and one year as committee chair</li> <li>• Solicited nominations and organized committee meetings to curate a list of diverse and engaging seminar speakers at BML</li> <li>• Incorporated DEI ask into seminar invitations</li> </ul>
Nov 2017-2019	<p>“Turn of the Tide” Podcast, Creator/Director and Co-host</p> <ul style="list-style-type: none"> <li>• 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 <a href="https://turnofthetide.weebly.com">https://turnofthetide.weebly.com</a></li> <li>• Interviewed multiple stakeholders, from scientific community to Native coastal tribes in California, to highlight public policy failures in Indigenous fishing rights</li> </ul>
Dec 2017-Jun 2018	<p>UCI Ecology and Evolutionary Biology Department Diverse Educational Community and Doctoral Experience (DECADE) Representative</p>
Nov 2017-Mar 2018	<p>Associate Editor, Journal of Science Policy and Governance</p>
July 2017-Feb 2018	<p>UCI Associated Graduate Students Council Member</p> <ul style="list-style-type: none"> <li>• Elected official of graduate student government, Served on external affairs committee, co-wrote and passed two pieces of legislation</li> </ul>
June 2017-Aug 2018	<p>Crystal Cove Conservancy, Crystal Cove State Park, Abalone Outreach</p> <ul style="list-style-type: none"> <li>• Created abalone outreach project at Crystal Cove State Park</li> <li>• Worked with public every week to educate about abalone and scientific research</li> </ul>
Aug 2014-Aug 2018	<p>Targeted Instruction Generating Excitement about Research and Science (TIGERS), Placentia, CA</p> <ul style="list-style-type: none"> <li>• 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)</li> </ul>
2016-2017	<p>Climate Action Training Program (UCI)</p> <ul style="list-style-type: none"> <li>• 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</li> <li>• Organized meetings with AAAS, American Meteorological Society, and American University climate policy experts</li> <li>• Hosted webinar with 500 Women Scientists on how to organize and prepare for Congressional visits</li> </ul>
2016-2017	<p>Graduate Representative, UCI Ecology and Evolution Department, Irvine, CA</p> <ul style="list-style-type: none"> <li>• Represented the graduate students in the EEB department at faculty meetings</li> </ul>

- 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

## INVITED SEMINARS & LECTURES

- “NightSchool: Underwater Forests” invited speaker, California Academy of Sciences. (March 2022)
- “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)
- “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)

## ABSTRACTS & PRESENTATIONS

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

**Frederick, A.R.**, L.W. Ashlock, A.A. Deutsch, L. Dixit, N.J. Frank, P. Shukla, C.A. Burge, B.C. Marshman S.P. German, N.Z. Hood, and K.M. Aquilino. (2023) “Tools for saving a species: Using ecophysiology to improve endangered white abalone production.” International Abalone Symposium, Auckland, New Zealand.

**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>

## SELECT PUBLIC WRITING

- 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. Manakam 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))
- 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>)

## OTHER PROFESSIONAL SERVICE

**Mentored UCI undergraduates:** Ariana Lee (currently an MS student), 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