

Carina R. Fish

Ph.D. Candidate, Bodega Marine Laboratory
2099 Westshore Road, Bodega Bay, CA 94954
crfish@ucdavis.edu www.carinafish.com

EDUCATION

University of California, Davis

Sept. 2016-anticipated Feb. 2022

Ph.D. Candidate, Department of Earth and Planetary Sciences
Concentrations in Geochemistry, Chemical Oceanography, and Paleoclimate.
Dissertation Title: *Coral Records of a Changing Sea: Surface to Deepwater Archives of Environmental Change.*
Committee: Tessa M. Hill (primary advisor), Dawn Sumner, and John Largier.

Harvard College

Class of 2013

Artium baccalaureus, joint concentration in Earth and Planetary Sciences, and Environmental Science and Engineering.
Thesis Title: *Coral Stressors: A Site Comparison Study and 100-Year Projection.*
Advisor: Andrew H. Knoll.

POSITIONS HELD

Ph.D. Candidate, University of California, Davis	08/2018 – present
Intern, Point Blue Conservation Science	05/2017 – present
Visiting Scholar, Lawrence Livermore National Laboratory	04/2019 – 12/2019
Ph.D. Student, University of California, Davis	09/2016 – 07/2018
Research Staff Assistant, Lamont Doherty Earth Observatory	07/2014 – 07/2016
Bridge to the PhD Fellow, Columbia University	08/2014 – 06/2016
Research Fellow, Harvard University	06/2013 – 01/2014

FUNDING AND AWARDS

Total funding received: \$257,750

2020	Sigma Xi Grants in Aid of Research - \$1000.
2020	Cordell Durrell Fund - \$1000.
2018-2022	National Oceanic and Atmospheric Administration Dr. Nancy Foster Scholarship - \$178,000.
2018-2021	Ford Foundation Predoctoral Fellowship - \$72,000.
2018	Cordell Durrell Fund - \$1,000.
2017	Cordell Durrell Fund - \$500.
2017	UC Davis Grad Slam Third Place - \$750.
2017	UC Davis Graduate Studies Graduate Student Travel Award - \$1,000.
2017	IsoCamp NSF participant award - \$2,000.
2013	Harvard Society of Black Scientists and Engineers Black and Brilliant Award.
2011	Harvard David Rockefeller Center International Experience Award - \$1,500.

PUBLICATIONS

Submitted (in review/in revision)

Hönisch B, **Fish CR**, Phelps S, Haynes LL, Dyez K, Holland K, Fehrenbacher J, Allen KA, Eggins SM, Goes JL. *Symbiotic photosynthetic competency and its effect on boron proxies in planktic foraminifera*. (in review at *Paleoceanography and Paleoclimatology*).

Published

Lipski, D, Williams G, Howard D, Stock J, Roletto J, Cochrane G, **Fish CR**, and Graiff K. 2018. *Discovering the Undersea Beauty of Cordell Bank National Marine Sanctuary*, in Raineault, N.A, J. Flanders, and A. Bowman, eds. 2018. *New frontiers in ocean exploration: The E/V Nautilus, NOAA Ship Okeanos Explorer, and R/V Falkor 2017 field season*. *Oceanography* 31(1), supplement, 126 pp..

Haynes LL, Hönisch B, Dyez KA, Holland K, Rosenthal Y, **Fish CR**, Subhas AV, Rae JWB. 2017. *Calibration of the B/Ca proxy in the planktic foraminifer *Orbulina universa* to Paleocene seawater conditions*. *Paleoceanography*, 32. DOI: 10.1002/2016PA003069.

Martinez RV, Branch JL, **Fish CR**, Jin L, Shepherd RF, Nunes RDM, Suo Z, Whitesides GM. 2013. *Robotic tentacles with three-dimensional mobility based on flexible elastomers*. *Adv. Mater.* 25(2):205–212. DOI: 10.1002/adma.201203002

Martinez RV, **Fish CR**, Chen X, Whitesides GM. 2012. *Elastomeric Origami: Programmable Paper-Elastomer Composites as Pneumatic Actuators*. *Adv. Funct. Mater.* 22(7)1376-1384. DOI: 10.1002/adfm.201102978

PATENTS

Title: *Flexible Robotic Actuators: Systems and methods for providing flexible robotic actuators*.

Inventors: Morin SA, Shepherd RF, Stokes A, Ilievski F, Martinez RV, Branch JL, **Fish CR**, Jin L, Nunes RMD, Suo Z, Whitesides GM.

Application: US 2015/0283699 A1 (WO/2013/148340 A2, WO/2013/148340 A3, EP2834047A2).

SELECT TEACHING EXPERIENCE

Course Designer & Lead, University of California Davis, 2020.

- GEL232: Oceans and Climate – Pitched, developed, and led graduate-level course on biogenic calcite. Format included discussion of papers, invited guest lectures, and student-led virtual lessons. Guided course participants in developing their pedagogy to implement innovative virtual lessons. Facilitated class discussions and workshopped participants' final projects.

Guest Lecturer, Bodega Marine Laboratory and University of California Davis, 2020

- ESP152: Coastal Oceanography – introduced physical/chemical oceanographic interannual variability as well as data collection process particularly on research vessels.

Teaching Assistant, University of California, Davis, 2016–2018.

- GEL 1: Developed weekly introductory Earth sciences lesson plans. Taught students techniques to write two scientific essays. Facilitated class discussions and presented material based on current Earth issues (water resources, hazards management, climate change, etc.).

- GEL 116: Led 19 (2017) and 17 (2018) upper-division undergraduates in weekly oceanography discussions. Redesigned and implemented section activities. Evaluated group projects, presentations, exams, and essays.
- GEL 108: Fielded student questions pertaining to paleoclimate research and research essays. Graded 53 essays on various paleoclimate research topics, and proctored and graded mid-term exam.

PRINCESS DIVERS, & MONKEY DIVES LODGE, *Divemaster* Thailand, & Malaysia. 2014

- Taught PADI Scuba Review courses for certified divers.
- Explained dive protocols and led customers, supervised scuba diving activities.
- Demonstrated skills and assisted instructors by working one-on-one with Open Water Certification students in need of further underwater instruction to master skills. Assisted instructors with first-time SCUBA divers (Discover SCUBA Dive customers).

MENTORING EXPERIENCE

Heran Arefaine (Santa Rosa Junior College, now UC Davis '22) Summer 2020

Mentored student in a remote/virtual 8-week project. Trained in image analysis (Fiji/Image J) to analyze calcite thin sections of bamboo corals. Taught to code (R) for the first time for data analysis and visualization. Quantitative analysis of dark/light banding compared to light microscopy visual band counts and organic node chronologies.

Lindsay Rodgers (Santa Rosa Junior College, now UC Davis '22) Summer 2019

Mentored REU student in designing and completing a 10-week independent project. Phytoplankton species identification and spectrophotometer Chl. *a* of seawater. Isotopic fractionation between plankton and a deep sea coral (both its organic material and its polyps). Coral chronology via bomb-spike radiocarbon. Mentee presented her work as a poster at Ocean Sciences Meeting 2020.

Shelby Bacus (University of California, Davis '18) 2018

Mentored UC Davis undergraduate senior 8 hours per week in R with WOCE, seaWIFS, and MODIS data, Ocean Data Viewer, and independent work in ArcGIS.

Lin Ni (Harvard College '19) January 2018

Organized and led 10-day shadowship for winter intern. Introduced to marine sediments and marine policy.

Mary Litzenberg (Sonoma Valley High School '18) 2017-2018

Mentored Sonoma Valley High School student in a 20-hour senior project. Introduced to marine sediments.

INVITED TALKS

2021 Caltech, Geoclub geology seminar series.

2020 NOAA, Greater Farallones National Marine Sanctuary Advisory Council

TRAINING and WORKSHOPS

2020/08: Davis, CA. Sierra Rescue International Wilderness First Aid.

2019/12: San Francisco, CA. UNOLS DeSSC New User Program, workshop.

2019/10: San Juan, Puerto Rico. Engaging Scholarship, workshop.
 2019/10: Davis, CA. Python & Git, bootcamp.
 2019/07: St. Paul, Minnesota. Effectively Communicating Science Workshop-Expert Witness Training Academy.
 2019/02: Bodega Bay, CA. Paleo to Policy, workshop.
 2018/08: Alpena, MI. NOAA science communication, training.
 2018/02: Davis, CA. Alan Alda Center for Communicating Science, training.
 2018/01: Davis, CA. Software Carpentry: bash/R/git, workshop.
 2017/09: Davis, CA. Introduction to Data Science Using R, workshop.
 2017/06: Salt Lake City, UT. IsoCamp SIRFER, short course.
 2017/03: Davis, CA. Grad Slam science communication training.
 2014/03: PADI divemaster certification.

FIELD EXPERIENCE

2019/09: R/V Fulmar. ACCESS #57 – Cordell Bank & Greater Farallones National Marine Sanctuaries (CBNMS/GFNMS) oceanography: CTD casts, bottle carbonate chemistry, and plankton tows (hoop nets and tucker trawl for phyto- and zooplankton).
 2019/07: R/V Mussel Point – one day cruise to Cordell Bank for plankton tows and CTD cast.
 2018/10: NOAA Shimada. EXPRESS – ROV and AUV benthos survey and oceanography of California margin.
 2018/09: R/V Fulmar. ACCESS #54 – CBNMS/GFNMS oceanography.
 2018/07: NOAA Shimada. ACCESS #53 – oceanographic survey of CBNMS/GFNMS.
 2017/09: R/V Fulmar. ACCESS #51 – oceanographic survey of CBNMS/GFNMS.
 2017/08: E/V Nautilus. NA085 – CBNMS ROV benthos survey, specimen collection, and oceanography.
 2017/07: R/V Fulmar – ROV benthos survey of CBNMS.
 2017/07: R/V Fulmar. ACCESS #50 – oceanographic survey of CBNMS/GFNMS.
 2017/05: R/V Fulmar. ACCESS #49 – oceanographic survey of CBNMS/GFNMS.
 2016/09: R/V Fulmar. ACCESS #48 – oceanographic survey of CBNMS/GFNMS.
 2015/03: Isla Magueyes, PR. Live Foraminifer Culture Experiments.
 2013/08: SSV Cramer. C248f – biological oceanography of George’s Bank (gravity core, titration, phytoplankton count, Neuston tow, Fisher scoops, Shipek bottom grab, CTD carousel).
 2012/07: Sulawesi, Indonesia. Belt and transect site comparison underwater survey.
 2012/05: R/V Knorr. KN207-02: dredging and rock coring for geochemical signature comparison of symmetric vs. asymmetric segments of the Mid-Atlantic Ridge.
 2011/07: Zakynthos, Greece – *Caretta caretta* nesting beaches monitoring, excavating, and tagging.
 2011/01: Vidal, CA – Geological field mapping of the Riverside Mountains.

SERVICE

Coastal and Marine Sciences Institute (in partnership with Cooperative Institute for Marine Ecosystems and Climate Change [CIMEC]) Environmental and Climate Justice seminar series, <i>Coordinator</i> .	2020/08 – present
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------

American Geophysical Union Ocean Sciences Section Executive Committee, <i>Graduate Student member-at-large.</i>	2020/05 – present
Cordell Marine Sanctuary Foundation, <i>Board member.</i>	2019/06 – present
Bodega Marine Sciences Association, <i>President.</i>	2018/12 – 2020/12
Bodega Marine Laboratory Seminar Committee, <i>Treasurer.</i>	2018/12 – 2020/12
Pitched and secured funding for honoraria to be implemented, pitched and secured funding for a new annual named lecture.	
Fifth Ocean Climate Summit, <i>Session moderator</i> - 1B: “Ocean Acidification: Impacts and Responses”.	04/2019
Ocean Sciences Meeting, <i>Session Convener</i> - PC11A: “Utilizing Ecological and Oceanographic Records to Understand Ecological Responses to Modern Climate Change”.	02/2018
UC Davis faculty search (earth life interactions), <i>Graduate Student Liaison.</i>	Fall 2017
Harvard Admissions Office, Undergraduate Minority Recruitment Program, <i>African-American Division Coordinator.</i>	2012 – 2013

SELECT OUTREACH and SCIENCE COMMUNICATION

2020/04/23: Oakland, CA. The College Preparatory School. *Earth Day 50th anniversary*. Invited speaker.

2019/11/12: Virtual. EarthEcho. *STEMexplore Virtual Career Connections*. Invited speaker. (27 students)

2019/10/18: Los Angeles, CA. Ocean Planet Conference. Invited speaker and panelist.

2019/08/15: San Francisco, CA. Exploratorium. *After Dark*. Invited speaker.

2019/06/29: Bodega Bay, CA. Bodega Marine Laboratory. *UC Davis Young Scholars Program*.
Tour guide.

2019/06/06: San Francisco, CA. California Academy of Sciences. *NightLife*. Invited speaker.

2019/04/04: Santa Rosa, CA. Piner High School. *STEM Café at the SPARQ Center*. Invited speaker.

2018/11/26: Bodega Bay, CA. Quest Forward Academy. Career mentor.

2018/09/05: Bodega Bay, CA. Science Uncorked. Invited speaker.

2018/06/01: New York, NY. Columbia University. *10th Anniversary Bridge to Ph.D. Program in the Natural Sciences Symposium*. Panelist.

2018/03/21: Sacramento, CA. UC Office of the President. *9th Annual Graduate Research Day at the State Capitol*. Invited speaker.

2017/11/04: Bodega Bay, CA. Bodega Marine Laboratory. *Open House*. Activity leader.

2017/08/09: E/V Nautilus–Seacoast Science Center. *Ship to Shore*. Science correspondent.

2017/07/29: Davis, CA. *Science Through Story*. Panelist.

2017/04/28: Lower Lake, CA. *Kids Into Discovering Science*. Group leader.

2017/04/22: Davis, CA. University of California Davis. *Picnic Day*. Activity leader.

2017/04/14: Davis, CA. University of California Davis. *GradSlam*. Contest participant.

SELECT CONFERENCE ABSTRACTS

2020/02/21: San Diego, CA. Ocean Sciences Meeting. *PC52A: Marine Heat Waves and Ocean Biogeochemical Extremes II*. Oral.

2019/12/11: San Francisco, CA. American Geophysical Union Fall Meeting. *PP31B: Development and Application of Coral Proxies for Ocean Change I*. Oral.

2019/04/06: Berkeley, CA. NorCal Paleo. Lightning talk.

2018/10/20: Irvine, CA. Conference of Ford Fellows. Session: Physical Sciences. Oral.

2018/02/15: Portland, OR. Ocean Sciences Meeting *OC41A: Changing Ocean Biogeochemistry in a High CO₂ World: Observations Across Time and Space*. Oral.

2017/12/12: New Orleans, LA. AGU Fall Meeting. *GC23B: Monitoring Coastal Change: Physical, Biological, and Chemical Dynamics on the Coast*. Poster.

2017/11/12: Woods Hole, MA. MIT-WHOI Graduate Climate Conference. *Paleoclimate*. Poster.

2015/12/18: San Francisco, CA. AGU Fall Meeting. *PP53B: Decoding Paleoenvironmental Proxies: Developments, Challenges, Refinements, and Mechanisms*. Poster.

MEDIA HIGHLIGHTS

2019/09: SF Chronicle. ACCESS - <https://www.sfchronicle.com/bayarea/article/Scientists-assess-waters-off-San-Francisco-and-14474523.php>

2019/08: Sierra Club - <https://www.sierraclub.org/sierra/paleo-climate-change-california-coral>

2019/06/19: South Florida PBS - Changing Seas episode 1101 - <https://www.changingseas.tv/season-11/1101/>

2018/12: NOAA Sanctuaries - <https://sanctuaries.noaa.gov/news/dec18/tree-rings-deep-sea-corals-foster-scholar-carina-fish.html>

2018/08/07: UC Davis - <https://biology.ucdavis.edu/news/bodega-marine-laboratory-students-receive-noaas-dr-nancy-foster-scholarship>

SOCIETY MEMBERSHIPS

American Geophysical Union, Sigma Xi – Associate, Bodega Marine Sciences Association, Ford Foundation, Association for Women Geoscientists, Professional Association of Diving Instructors, Harvard Black Alumni Association.

SKILLS

Proficient: R, bottle carbonate chemistry, vacuum lines, Microsoft office, cloud storage, teleworking.

Limited working proficiency: Git, Bash, virtual machines, Fiji/ImageJ.

Introductory: QGIS, Mapbox, C, Python.