

HILARY G. CLOSE

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EDUCATION

Ph.D., Harvard University, MA	Earth and Planetary Sciences, <i>Adviser: Ann Pearson</i>	2012
B.A., Oberlin College, OH	Geology (High Honors), <i>Minor in Latin</i>	2006

PROFESSIONAL EXPERIENCE

8/2016-present Assistant Professor, Dept. of Ocean Sciences, RSMAS, University of Miami

2015-2016 Associate Project Scientist, University of California, Santa Cruz

2015-2016 Affiliate, U.S. Geological Survey Pacific Coastal and Marine Science Center

2014-2015 Assistant Researcher, University of Hawai'i

2012-2014 SOEST Young Investigator and NOAA Postdoctoral Fellow, Univ. of Hawai'i

2012 Postdoctoral Researcher, Harvard University

2006-2012 Graduate Research Fellow and Teaching Fellow, Harvard University

2005-2006 NSF RUI Research Assistant, Oberlin College

RESEARCH FUNDING AWARDS

2021-24 NSF-OCE 2124415. *Collab: 2124416, Popp & Seraphin, Hawaii.*
 “Collaborative Research: Isotopic Indicators for Mechanisms of Organic Matter Degradation under High Productivity and High Carbon Flux Conditions (EXPORTS)”

2020-23 BIOS-SCOPE II Investigator, Simons Foundation International

2020-21 University of Miami Provost’s Research Award
 “Distinction of in situ and advective sources of particulate organic carbon in Florida regional waters”

2018-22 NSF-OCE 1830016. *Collab: 1829425, Popp & Seraphin, Hawaii.*
 “Collaborative Research: Isotopic Indicators for Mechanisms of Organic Matter Degradation in the Northeast Pacific (EXPORTS)”

2018-19 BIOS-SCOPE Visiting Scholar, Summer 2018, 2019

2016-21 U.S. Geological Survey Collaborative Agreement
 “Determining the Provenance of Organic Matter in Marine Sediment”

2014-16 NSF-OCE 1333734: J Drazen, H Close, C Hannides, B Popp, K Seraphin

“Evaluating the relative importance of suspended and sinking particles to the meso and bathypelagic food web in the central North Pacific”

- 2014 Chief Scientist Training Program, NSF/UNOLS
- 2012-14 SOEST Young Investigator Award, University of Hawai'i
- 2012-14 NOAA Climate and Global Change Postdoctoral Fellowship
- 2011 Harvard University Graduate School of Arts and Sciences Merit Fellowship
- 2009 ExxonMobil Geoscience Grant

HONORS

- 2015 Raymond L. Lindeman Award, Association for the Sciences of Limnology and Oceanography. “Outstanding paper written by a young aquatic scientist” (Ref. #3).
- 2015 NOPP Excellence in Partnering Award (USGS team)
- 2012 Selected participant, Dissertations in Chemical Oceanography Symposium, DISCO XXIII
- 2011 Shaler Teaching Award, Harvard University Dept. of Earth and Planetary Sciences
- 2011 Harvard University Certificate of Distinction in Teaching
- 2006 James Mills Peirce Fellowship, Harvard University
- 2005-06 Oberlin College: Phi Beta Kappa, Sigma Xi, Wharton Prize (Geology), Classics Alumni Prize

PUBLICATIONS (*Advisee author; Undergraduate author)

- 25. Lohroff TJ, Gillette PR, **Close HG**, Benetti DD, Stieglitz JD (2021) Evaluating the potential bioextractive capacity of South Florida native macroalgae *Agardhiella subulata* for use in integrated multitrophic aquaculture (IMTA). *Aquaculture*, **544**, 737091.
- 24. Vokshoori NL, McCarthy MD, **Close HG**, Demopoulos AWJ, Prouty NG (2021) New geochemical tools for investigating resource and energy functions in deep-sea methane seeps using amino-acid $\delta^{15}\text{N}$ in chemosymbiotic mussels (*Bathymodiolus childressi*). *Geobiology*, DOI: 10.1111/gbi.12458.
- 23. Siegel DA and 70 others (2021) An Operational Overview of the EXport Processes in the Ocean from RemoTe Sensing (EXPORTS) Northeast Pacific Field Deployment. *Elementa, Science of the Anthropocene*, **9** (1), 00107.
- 22. *Doherty SC, Maas AE, Steinberg DK, Popp BN, **Close HG** (2021) Distinguishing fecal pellets as a component of the biological pump using compound-specific isotope analysis of amino acids. *Limnology and Oceanography*, **66**, 2827-2841.
- 21. **Close HG**, PJ Lam, BN Popp (2021) Marine Particle Chemistry: Influence on Biogeochemical Cycles and Particle Export. *ACS Earth and Space Chemistry*, **5** (5), 1210-1211. [Editorial]

20. **Close HG, *Henderson LC** (2020) Open-ocean minima in $\delta^{13}\text{C}$ values of particulate organic carbon in the lower euphotic zone. *Frontiers in Marine Science*, **7**, 540165. DOI: 10.3389/fmars.2020.540165.
19. Kharbush JJ, **Close HG**, Van Mooy BAS, Arnosti C, Smittenberg RH, Le Moigne FAC, Mollenhauer G, Scholz-Bottcher B, Obrecht I, Koch BP, Becker K, Iversen MH, Mohr W (2020) Particulate organic carbon deconstructed: Molecular and chemical composition of particulate organic carbon in the ocean. *Frontiers in Marine Science*, **7**, 518. DOI: 10.3389/fmars.2020.00518.
18. Romero-Romero S, Ka`apu-Lyons CK, Umhau BP, Benitez-Nelson CR, Hannides CCS, **Close HG**, Drazen JC, Popp BN (2020) Deep zooplankton rely on small particles when particle fluxes are low. *Limnology and Oceanography Letters*, **5**, 410-416. DOI: 10.1002/lol2.10163.
17. Wang K, **Close HG**, Tuller-Ross B, Chen H (2020) Global average potassium isotope composition of modern seawater. *ACS Earth and Space Chemistry*, **4**(7), 1010-1017.
16. Prouty NG, Campbell-Swarzenski PL, **Close HG**, Biddle JF, Beckmann S (2020) Molecular indicators of methane metabolisms at cold seeps along the United States Atlantic Margin. *Chemical Geology*, **543**, 119603.
15. Motta LC, Blum JD, Popp BN, Drazen JC, **Close HG** (2020) Mercury stable isotopes in flying fish as a monitor of photochemical degradation of methylmercury in the Atlantic and Pacific Oceans. *Marine Chemistry*, **223**, 103790. DOI: 10.1016/j.marchem.2020.103790.
14. Hannides CCSH, Popp BN, **Close HG**, Benitez-Nelson CR, Ka`apu-Lyons CA, Gloeckler K, Wallsgrove N, Umhau B, Drazen JC (2020) Seasonal dynamics of midwater zooplankton and relation to particle cycling in the North Pacific Subtropical Gyre. *Progress in Oceanography*, **182**, 102266.
13. Umhau BP, Benitez-Nelson CR, **Close HG**, Hannides CCS, Motta L, Popp BN, Blum JD, Drazen JC (2019) Seasonal and spatial changes in carbon and nitrogen fluxes estimated using ^{234}Th : ^{238}U disequilibria in the North Pacific Subtropical Gyre. *Marine Chemistry*, **217**, 103705, 14 pp.
12. Hurley SJ, **Close HG**, Elling FJ, Jasper CE, Gospodinova K, McNichol AP, Pearson A (2019) CO_2 -dependent carbon isotope fractionation in Archaea, Part II: The marine water column. *Geochimica et Cosmochimica Acta*, **261**, 383-395.
11. Motta LC, Blum JD, Johnson MW, Umhau BP, Popp BN, Washburn SJ, Drazen JC, Benitez-Nelson CR, Hannides CCS, **Close HG**, Lamborg CH (2019) Mercury cycling in the North Pacific Subtropical Gyre as revealed by mercury stable isotope ratios. *Global Biogeochemical Cycles*, **33**, 777-794.
10. **Close HG** (2019) Compound-specific isotope geochemistry in the ocean. *Annual Review of Marine Science*, **11**, 27-56. [Invited contribution]
9. Gloeckler K, Choy CA, Hannides CCS, **Close HG**, Goetze E, Popp BN, Drazen JC (2018) Stable isotope analysis of micronekton around Hawaii reveals suspended particles are an important nutritional source in the lower mesopelagic and upper bathypelagic zones. *Limnology and Oceanography*, **63**, 1168-1180.

8. Hurley SJ, Lipp JS, **Close HG**, Hinrichs K-U, Pearson A (2018) Distribution and export of isoprenoid tetraether lipids in suspended particulate matter from the water column of the Western Atlantic Ocean. *Organic Geochemistry*, **116**, 90-102.
7. Ohkouchi N, Chikaraishi Y, **Close HG**, Fry B, Larsen T, Madigan DJ, McCarthy MD, McMahon KW, Nagata T, Naito YI, Ogawa NO, Popp BN, Steffan S, Takano Y, Tayasu I, Wyatt ASJ, Yamaguchi YT, Yokoyama Y (2017) Advances in the application of amino acid nitrogen isotopic analysis in ecological and biogeochemical studies. *Organic Geochemistry*, **113**, 150-174.
6. Fassbender AJ & 73 others (2017) Perspectives on Chemical Oceanography in a changing environment: Participants of the COME ABOARD Meeting examine the field in the context of 40 years of DISCO. *Marine Chemistry*, **196**, 181-190.
5. Jarman CL, Larsen T, Hunt T, Lipo C, Solsvik R, Wallsgrove N, Ka'apu-Lyons C, **Close HG**, Popp BN (2017) Diet of the prehistoric population of Rapa Nui (Easter Island, Chile) shows environmental adaptation and resilience. *American Journal of Physical Anthropology*, **164**, 343-361.
4. **Close HG**, Wakeham SG, Pearson A (2014) Lipid and ¹³C signatures of submicron and suspended particulate organic matter in the Eastern Tropical North Pacific: Implications for the contribution of Bacteria. *Deep-Sea Research Part 1*, **85**, 15-34.
3. **Close HG**, Shah SR, Ingalls AE, Diefendorf AF, Brodie EL, Hansman RL, Freeman KH, Aluwihare LI, Pearson A (2013) Export of submicron particulate organic matter to mesopelagic depth in an oligotrophic gyre. *Proceedings of the National Academy of Sciences of the USA*, **110**, 12565-12570.
2. **Close HG**, Bovee R, Pearson A (2011) Inverse carbon isotope patterns of lipids and kerogen record heterogeneous primary biomass. *Geobiology*, **9**, 250-265.
1. Pearson A, Leavitt WD, Saenz JP, Summons RE, Tam MC-M, **Close HG** (2009) Diversity of hopanoids and squalene-hopene cyclases across a tropical land-sea gradient. *Environmental Microbiology*, **11**, 1208-1223.

OTHER WORKS:

Aronson EL, Bristol S, Burgess AB, Chandrasekar V, **Close H**, van Eyken T, Ferrini V, Gomez B, Kinkade D, Kelbert A, Martin RL (2015) Geoscience 2020: Cyberinfrastructure to reveal the past, comprehend the present, and envision the future. EarthCube Working Paper, ECWP-2015-1, 19 p. DOI: 10.7269/P3MG7MDZ.

Close HG (2012) Size-related isotopic heterogeneity in lipids from the marine water column. Dissertation, Harvard University. <http://nrs.harvard.edu/urn-3:HUL.InstRepos:9789420>

SELECTED ORAL PRESENTATIONS (*Invited)

July 2021 **Goldschmidt 2021**, virtual meeting. *Carbon isotope ratios of particulate organic carbon in the lower euphotic zone.*

Dec. 2020 ***Geotopics Seminar**, Department of Marine Geosciences, University of Miami, Miami, FL. *Digging through the organic toolbox.*

- Oct. 2020 ***University of Southern Mississippi Marine Science Seminar**, conducted remotely. *Microbial and metazoan pathways of organic matter degradation recorded in natural stable isotopes of marine particles.*
- March 2020 ***UC Santa Barbara IGPMS Seminar**, Santa Barbara, CA. *Mechanisms of organic matter degradation recorded in natural stable isotopes of marine particles.*
- Aug. 2019 **Goldschmidt 2019**, Barcelona, Spain. *Dynamics of particulate organic composition, microbial community, and zooplankton contributions in an oligotrophic water column.*
- April 2019 ***Hanse-Wissenschaftskolleg Workshop on Marine Organic Biogeochemistry**, Delmenhorst, Germany. *Persistent questions about microbial particle origins and dynamics: Directions and challenges from the world of isotopes.*
- April 2019 ***EAOS Seminar, Florida State University**, Tallahassee, FL. *Distinguishing the roles of microbial and metazoan heterotrophy in the ocean carbon cycle.*
- Feb. 2019 **ASLO 2019 Aquatic Sciences Meeting**, San Juan, PR. *Novel compound-specific isotopic fingerprints of methane metabolism and dietary relationships in *Bathymodiolus* at seafloor cold seeps.*
- Aug. 2018 **Goldschmidt 2018**, Boston, MA. *Microbial roles in marine carbon export: Insights from compound-specific isotope analysis.*
- July 2018 ***BIOS Seminar, Bermuda Institute of Ocean Sciences**, Bermuda. *Roles of microbes and zooplankton in marine carbon export: Insights from compound-specific isotope analysis.*
- Aug. 2017 ***MBARI Seminar**, Moss Landing, CA. *Detritus, degradation, and diet: using isotopes to trace the fate of ocean biomass.*
- Feb. 2017 **ASLO 2017 Aquatic Sciences Meeting**, Honolulu, HI. *Heterotrophic influence on organic matter at epipelagic vs. mesopelagic depths reflected in compound-specific stable isotope patterns.*
- Jan. 2017 ***The Third Xiamen Symposium on Marine Environmental Sciences (XMAS-III)**, Xiamen, China. *Degradative status, microbial influence, and export potential of small size classes of particulate organic matter in open ocean water columns.*
- Sept. 2016 ***University of South Carolina MSCI Seminar**, Columbia, SC. *Trophic processing, extracellular degradation, and particle dynamics: which components of the biological pump can we divine from stable isotope ratios of marine organic matter?*
- June 2016 **USGS Pacific Coastal and Marine Science Center Seminar**, Santa Cruz, CA. *Digging through the organic toolbox: a multifaceted exploration of organic sources contributing to submarine canyon sediments.*
- Feb. 2016 **2016 Ocean Sciences Meeting**, New Orleans, LA. *Sorting of terrestrial and marine organic matter along a marginal submarine canyon: Radiocarbon and biomarker signatures of surface sediments.*
- Jan. 2016 ***CAMS Seminar, Lawrence Livermore National Laboratory**, Livermore, CA. *Degradative transformations of organic compounds and stable isotope ratios in the marine water column: role of microbial biomass vs. metabolic activity.*
- Oct. 2015 ***Ocean Sciences Department Seminar**, University of California, Santa Cruz, CA. *Degradative transformations of organic compounds and stable isotope ratios in the marine water column: role of microbial biomass vs. metabolic activity.*

- July 2015 ***Chemical Oceanography 2015 Gordon Research Conference**, Holderness, NH. *Degradative transformations of organic compounds and stable isotope ratios in the marine water column: role of microbial biomass vs. metabolic activity.*
- Mar. 2015 ***Ocean Sciences Department Seminar**, RSMAS, University of Miami, Miami, FL. *Records of marine biosynthesis and degradation: Stable isotope approaches for revealing the hidden world of microbial carbon cycling.*
- Feb. 2015 ***ASLO 2015 Aquatic Sciences Meeting Award Acceptance**, Granada, Spain. *Submicron particulate organic matter: Export and updates.*
- Feb. 2015 **ASLO 2015 Aquatic Sciences Meeting**, Granada, Spain. *Degradative transformations of stable isotope ratios in sinking and suspended organic matter, from surface to upper bathypelagic depths, Station ALOHA.*
- Feb. 2014 **2014 Ocean Sciences Meeting**, Honolulu, HI. *Compound-specific $\delta^{13}\text{C}$ values as indicators of biosynthesis and degradation in marine particles, from submicron to sinking, Station ALOHA.*
- Feb. 2013 **ASLO 2013 Aquatic Sciences Meeting**, New Orleans, LA. *Lipid and isotopic signatures of a plankton community gradient in the Northeast Pacific Ocean.*
- Dec. 2011 **AGU Fall Meeting**, San Francisco, CA. *Lipid and ^{13}C signatures of picoplankton in marine organic matter export.*
- May 2010 ***Harvard-MIT Geobiology Symposium**, Cambridge, MA. *^{13}C -enriched bacterial lipids in the modern ocean: an analogue to the Proterozoic record.*
- June 2009 **Goldschmidt 2009**, Davos, Switzerland. *C-13-enriched bacterial lipids in the modern ocean: an analogue to the Proterozoic record.*

TEACHING (*Semesters taught §New course designed whole or in part by HGC)

- 2017-present *3 §Marine Organic Geochemistry, OCE 612, graduate-level, 2-5 students
- 2019-present *2 §Microbial Geochemistry of the Ocean, MSC 419, undergraduate, 4-6 students
- 2018-present *3 Chemical Oceanography, MSC 215, undergraduate, required, 42-50 students
- 2019 *1 Chemical Oceanography Laboratory, MSC 216, undergraduate, 7 students
- 2020 *1 §Seminar in Marine Science, MSC 180, 1st semester undergraduate, 8 students
- 2019-present *5 Undergraduate Research/Thesis, MSC 411/412, 1 student per semester
- 2014-2021 Guest lectures, Univ. of Hawaii, UC Santa Cruz, Univ. of Miami: geology, oceanography, geochemistry, marine chemistry, mass spectrometry
- 2007-2011 Teaching Fellow, Harvard University: History of the Earth; Introduction to Geological Sciences; How to Build a Habitable Planet
- 2005 Elementary Latin, Oberlin College Winter Term

MENTORSHIP & ADVISING

Ph.D. advisees

Shannon Doherty	2016-2021 (Ocean Sciences, RSMAS)
Lillian Henderson	2019-present (Ocean Sciences, RSMAS)
Paul Wojtal	2019-present (Ocean Sciences, RSMAS)
Elizabeth Yanuskiewicz	2021-present (Ocean Sciences, RSMAS)

Ph.D. committees

Kaycie Lanpher	2018-2021 (Ocean Sciences, RSMAS)
Evan Moore	2020-present (Marine Geosciences, RSMAS)
Jeffrey White	2020-present (Biology, U. Miami)

M.S. committees

Morgan Short	2020-2021 (Marine Science, Nova Southeastern)
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Undergraduate theses

Chase Glatz	2021-present (Marine Science, U. Miami)
Suzanne Stremmer	2018-2021 (Marine Science, U. Miami)
Isabella Horstmann	2019-2020 (Marine Science, U. Miami)

Other undergraduate research

Gaelle Duchatellier	2020-2021 (Marine Science, U. Miami)
Nicola Paul	2017-2018 (Honors Program, U. Miami)
Sophia Schiaroli	summer 2019 (Visiting from Franklin & Marshall)
Shannon Doherty	summer 2015 (USGS intern)
Laura Fontanills	2011-2012 (Harvard College)

Undergraduate thesis committees

Toni Lohroff	2020 (Marine Science, U. Miami)
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Visiting graduate students

Michael Gualtieri	2018-2020 (Anthropology, U. Miami)
Sarah Wenger	2020-present (Anthropology, U. Miami)

SYNERGISTIC ACTIVITIES

Reviewing & Editorship

- Ad hoc reviewer, >50 reviews: *Biogeochemistry*; *Deep-Sea Research Part 1*; *The Depositional Record*; *Earth and Planetary Science Letters*; *Earth System Science Data*; *Estuaries and Coasts*; *Estuarine, Coastal and Shelf Science*; *Frontiers in Marine Science*; *Geobiology*; *Geochemistry, Geophysics, and Geosystems*; *Geochimica et Cosmochimica Acta*; *Global Change Biology*; *Limnology and Oceanography*; *Marine Chemistry*; NSF-CAREER; NSF FRES; NSF-MG&G; NSF MRI; NSF-OCE; *Organic Geochemistry*; *Palaeogeography, Palaeoclimatology, Palaeoecology*; *Paleoceanography*; *PNAS*
- Panel reviewer: NSF-OCE; New York SeaGrant, U. Miami Provost's Research Awards
- Guest editor: *ACS Earth and Space Chemistry*

University Service

- Chair (2018-2020), member (2017-present), RSMAS Diversity, Equity and Inclusion Committee
- RSMAS Academic Integrity Committee (2020-present)
- Chemistry rotation leader, UM undergraduate research cruises, R/V *F.G. Walton Smith* (2019-present)
- Selection Committee, 2017 Rosenstiel Award

Other Leadership & Groups

- Chief Scientist, 9-day research cruise, May 2015. Leader, *in situ* pumping/particle sampling team, 11 cruises, 3-46 days. Total 19 cruises, 159 days at sea (2008-2021).
- Discussion Leader, 2019 Chemical Oceanography Gordon Research Conference
- IsoBank, Environmental Isotope Committee, 2019-present
- NSF EarthCube Science Standing Committee & working group member, 2014-2018

Short Courses & Workshops

- NAGT *On the Cutting Edge* Early-Career Geoscience Faculty workshop, U. Maryland, 2018
- Proposal-writing workshop by Dallas Murphy, RSMAS, Jan. 2018
- COME ABOARD: The Chemical Oceanography MEeting: A BOttom-up Approach to Research Directions, University of Hawaii, Oct. 2016
- UNOLS Chief Scientist Training, Moss Landing Marine Laboratories, CA, Oct. 2014
- NSF EarthCube End-User Workshop: Ocean Ecosystem Dynamics Community, WHOI, 2013
- Radiocarbon in Ecology and Earth System Sci., UC Irvine/Keck AMS Facility, 2007

Outreach

- Developer and presenter of chemistry activity for middle-school girls, RSMAS Exploring Marine Science Day, annually since 2017 (conducted remotely in fall 2020).
- Contributor/interviewee, 10 TV episodes, Voice of the Sea (Hawaii KFVE), 2015-20
- Panelist, RSMAS Career Panel for graduate students and postdocs, 2019, 2020
- At-sea blog contributions, judge of student posters/presentations, talks and demonstrations to 2nd and 4th graders at public schools in Ohio & Massachusetts, city “NerdNite” events.

Memberships

- American Geophysical Union
- Association for the Sciences of Limnology and Oceanography
- Geochemical Society

FIELD WORK – DETAILS

Research cruises, at sea

#	UNOLS ID	Project	Ship	Location	Year	Sea days	Main responsibilities
19	AE2114	BIOS-SCOPE	R/V Atlantic Explorer	BATS site	2021	4	McLane pumps/particle sampling
18	WS19286	FLOTSUM IV	R/V F.G. Walton Smith	Florida Straits	2019	1	Undergraduate training
17	AE1916	BIOS-SCOPE	R/V Atlantic Explorer	BATS site	2019	4	McLane pumps/particle sampling
16	WS19110	FLOTSUM III	R/V F.G. Walton Smith	Florida Straits	2019	1	Undergraduate training
15	WS19062	FLOTSUM II	R/V F.G. Walton Smith	Florida Straits	2019	1	Co-chief Scientist /UG training
14	WS19061	FLOTSUM I	R/V F.G. Walton Smith	Florida Straits	2019	1	Undergraduate training
13	AE1819	BIOS-SCOPE	R/V Atlantic Explorer	BATS site	2018	4	McLane pumps/particle sampling
12	n/a	HAP4	R/V Paragon	Monterey Bay	2017	3	McLane pumps/particle sampling
11	KM1506	Deep water food web	R/V Kilo Moana	Station ALOHA	2015	9	Chief Scientist /McLane pumps
10	PS1415	Chief Scientist Training	R/V Point Sur	Monterey Bay	2014	4	CTD/particle sampling
9	KM1418	Deep water food web	R/V Kilo Moana	Station ALOHA	2014	13	McLane pumps/particle sampling
8	KM1407	Deep water food web	R/V Kilo Moana	Station ALOHA	2014	9	McLane pumps/particle sampling
7	KM1309	C-MORE HOE PhoR I	R/V Kilo Moana	Station ALOHA	2013	14	McLane pumps/particle sampling
6	KN210-04	DEEP DOM	R/V Knorr	Western Atlantic	2013	46	McLane pumps/particle sampling
5	KM1222	C-MORE HOE-DYLAN XI	R/V Kilo Moana	Station ALOHA	2012	3	CTD/particle sampling
4	KM1220	HOT 246	R/V Kilo Moana	Station ALOHA	2012	4	CTD/particle sampling
3	TN280	GeoMICS	R/V Thomas G. Thompson	Line P	2012	7	McLane pumps/particle sampling
2	KN195-02	Oxycline biogeochemistry	R/V Knorr	ETNP	2008-09	30	McLane pumps/particle sampling
1	n/a	Methane seeps	R/V Point Lobos	Monterey Bay	2008	1	ROV sampling/methane seeps

Research cruises, MOB/DEMOB logistical support

RB1903	DEEP SEARCH	R/V Ronald H. Brown	Atlantic Canyons	2019	Setup/training- McLane pumps, CTD particle sampling
OC1808C	DOM/Gels cruise	R/V Oceanus	Newport Line	2018	Gear setup
RR1813, SR1812	EXPORTS	R/Vs Roger Revelle and Sally Ride	Station Papa	2018	Gear setup, sample transport, outreach filming

Land-based sampling

2007: San Salvador, Bahamas. Microbial mat, water, and soil sampling. 1 week.

2005: Tepee Buttes, Colorado. Paleontological/sedimentological sampling and descriptive surveys. 3 weeks.