

Shana K. Goffredi

Occidental College, Biology Dept, Los Angeles, CA 90041
323.259.1470, sgoffredi@oxy.edu

PROFESSIONAL APPOINTMENTS

OCCIDENTAL COLLEGE, LOS ANGELES, CA	2005-pres
Associate Professor (2014-present)	
Assistant Professor (2009-2014)	
Adjunct Professor (2005-2009)	
<i>Microbial symbiosis, environmental microbial diversity, general zoology</i>	
CALIFORNIA INSTITUTE OF TECHNOLOGY, PASADENA, CA	2004-pres
Visiting Scientist (2008-present)	
Senior Research Associate (2004-2008)	
<i>Marine symbiosis, molecular physiology, microbiology</i>	
MONTEREY BAY AQUARIUM RESEARCH INSTITUTE, MOSS LANDING, CA	1998-pres
Adjunct Scientist (2016-present)	
Research Associate / Project Manager (2000-2004)	
<i>Molecular ecology and evolution, symbiosis, larval biology</i>	
Postdoctoral Scholar in Environmental Science and Engineering (1998-2000)	
<i>Physiology and biochemistry of deep-sea bivalves</i>	

EDUCATION

UNIVERSITY OF CALIFORNIA, SANTA BARBARA, CA	1993-1998
Ph.D. Ecology, Evolution, and Marine Biology	
Thesis: "Physiological functioning of the hydrothermal vent tubeworm <i>Riftia pachyptila</i> "	
THE UNIVERSITY OF SAN DIEGO, CA	1989-1993
B.A. Biology/Marine Science	
University of San Diego Presidential Scholarship	

FUNDING AND AWARDS

Donald R. Loftsgordon Memorial Award for Outstanding Teaching (nominated)	2018
Faculty Enrichment Grant (\$3,587)	2018
Kurata Faculty Award for Excellence (\$5,670)	2016
Center for Environmental Microbiology Interactions (California Institute of Technology, \$18,300)	2015
Faculty Enrichment Grant (\$3,000)	2015
Linda and Tod White Teaching Prize, Occidental College	2014
Donald R. Loftsgordon Memorial Award for Outstanding Teaching (nominated)	2013
Faculty Enrichment Grant (\$4,230)	2013
National Science Foundation, Major Research Instrumentation (MRI-1126893, \$336,750)	2011
Faculty Enrichment Grant (\$1,650)	2010
National Science Foundation, Integrative and Organismal Systems (IOS-0923775, \$128,834)	2009
National Science Foundation, Major Research Instrumentation-R2 (MRI-0960254, \$106,205)	2009
National Science Foundation, Microbial Interactions and Processes (MCB-0454860, \$103,620)	2006
Davidow Endowment (California Institute of Technology, \$32,000)	2005
Monterey Bay Aquarium Research Institute Post-doctoral Fellowship	1998
Graduate Division Fellowship (University of California, Santa Barbara)	1998
Regents Fellowship (University of California, Santa Barbara)	1997
Best Paper Award for the Division of Comparative Physiology and Biochemistry (SICB)	1996
Best Student Research Project/Presentation in Biological Sciences -17 th Annual West Coast URC	1992
University of San Diego Presidential Scholarship	1992

PROFESSIONAL COMMUNICATIONS

17 th International Symposium on Microbial Ecology	planned
15 th Deep Sea Biology Symposium	planned
Southern California Academy of Sciences, annual meeting	2018
98 th Annual Meeting of the Western Society of Naturalists	2017
16 th International Symposium on Microbial Ecology	2016
Gordon Conference on Animal-Bacterial Symbioses	2015
Southern California Academy of Sciences, annual meeting	2015
15 th International Symposium on Microbial Ecology	2014
American Society for Microbiology, 114 th General Meeting	2014
14 th International Symposium on Microbial Ecology	2012
American Society for Microbiology, 112 th General Meeting	2012
Goldschmidt Conference of the European Association of Geochemistry	2011
Gordon Conference on Applied and Environmental Microbiology	2011
13 th International Symposium on Microbial Ecology	2010
6 th annual International Symbiosis Society Congress	2009
Gordon Conference on Applied and Environmental Microbiology	2009
12 th International Symposium on Microbial Ecology	2008
American Society for Microbiology, 107 th General Meeting	2007
3rd International Symposium on Hydrothermal Vent and Seep Biology	2005
Society for Integrative and Comparative Biology	2005
The Next Generation of In Situ Sensors in the Ocean (WHOI)	2003
American Physiological Society, Annual Meeting	2002
2nd International Symposium on Deep Sea Hydrothermal Biology	2001
9th Annual Deep Sea Biology Symposium	2000
51st Annual Meeting of the American Institute of Biological Sciences	2000

INVITED PROFESSIONAL SEMINARS

California State Fullerton, CA	2017
Marine Biological Laboratories – Microbial Diversity course (Woods Hole, MA), Roger Milkman Endowed Lecturer	2017
Harvey Mudd College, CA	2017
University of Nevada, NV	2016
Marine Biological Laboratories – Microbial Diversity course (Woods Hole, MA)	2015
University of Costa Rica (El Centro de Investigación en Ciencias del Mar y Limnología)	2013
Australian Institute of Marine Science, Australia	2013
University of Queensland, Australia	2013
University of Athens, GA	2012
University of Vienna, Austria	2012
University of Arizona, AZ	2009
Scripps Institution of Oceanography, CA	2008
Microbial Interactions and Processes – Annual National Science Foundation meeting	2007
San Diego Microbiology Group, CA	2006
Society for Industrial Microbiology	2005
Gordon Conference on Applied and Environmental Microbiology	2005
University of Southern California, CA	2004
Fourth International Symbiosis Society Congress (see <i>Science</i> 301:1467)	2003
Woods Hole Oceanographic Institution	2002
University of San Diego, CA	2002
United States Geological Survey	2001

PROFESSIONAL SERVICE

Panelist 'Out and Accomplished' and Workshop leader 'Being LGBTQ in Academia' <i>Out to Innovate</i> conference, run by the National Organization of Gay and Lesbian Scientists	2017
Attended SACNAS, the National Diversity in STEM conference	2016
Panelist, Murdock Trust's Natural Sciences–Life Sciences Grants	2016+
Member, Board of Directors - Southern California Academy of Sciences	2016+
Associate Editor for <i>Frontiers in Microbial Symbiosis</i>	2013-'17
Advisor for a special session at the annual meeting of the American Society for Microbiology entitled <i>Microbiology Career Choices: What's Available and How to Succeed</i> .	2012
Panelist and Moderator for <i>Out to Innovate</i> , a conference at Ohio State University, run by the National Organization of Gay and Lesbian Scientists and Technical Professionals	2012
RIDGE Education and Outreach Advisory Committee	2000-'04
Monterey Bay Aquarium Research Institute open house – biology coordinator	2000-'04
Monterey Bay Aquarium Research Institute – Staff Council	2000-'02
Peer reviewer for 20 journals in the fields of Marine Biology, Microbiology and general sciences	ongoing
Peer reviewer for 3 funding agencies (NSF, NOAA, NASA)	ongoing

CAREER MENTORING

The following students participated in 2-6 semesters of research in my lab, prior to graduate/medical school

<u>Student</u>	<u>Grad Year</u>	<u>Position following graduation</u>
Adam Kantor	2010	UC Irvine (MD - Medical School)
Ann Gregory	2010	Ohio State University (PhD, Environ. Science)
Marisa Pulcrano	2011	Georgetown University (MS - Medical Science)
Walter Woodside	2011	Univ. of Georgia (PhD, Microbiology)
CJ Grigoriadis	2011	Boston University (MS - Medical Science)
Jane Klann	2012	UC San Diego (PhD, Immunology)
Norma Morella	2012	Berkeley (PhD, Microbiology)
Gene Jang	2013	USC (MD - Medical School)
Izzy Struve	2013	UC Davis (MD - Medical School)
Kenji Quides	2013	UC Riverside (PhD, Ecol Evol Organismal Bio)
Carin Montelongo	2013	USC (Physicians Assistant Program)
Reid Sakamoto	2013	USC (MD - Medical School)
Kalia Bistolas	2014	Cornell (PhD, Microbiology)
Diego Torres	2015	USF (Medical School – Post bac program)
Alex Urry	2016	Columbia University (MBA, Business, Biochemistry)
Lexie Filkins	2016	USC (MD - Medical School)
Hannah Munkacsi	2016	City of Hope (Staff Scientist)
Heidi Aronson	2016	USC (PhD, Microbiology)
Dana Michels	2016	Cal Poly, SLO (MS, Marine Microbiology)
Chelsea Blankenchip	2017	City Year – Biology (Sacramento)
Julia DeRogatis	2018	UC Irvine (PhD, Molecular Biology)

SELECTED COLLEGE SERVICE

Member, Search Committee for a new TT Analytical Chemistry position in Chemistry	2017
Member, Advisory Council	2016-2018
Chair, Search Committee for a new TT Marine Environmental position in Biology	2016
Biology Area Coordinator, URC Summer Research Program	2016/2018
Member, Interim Dean's Search Committee	2016
Member, Dean's Tenure and Promotion Process Task Force	2016
Member, Institutional Biosafety Committee	2014-pres
Member, Intellectual Culture and Academic Climate Task Force	2013

PUBLIC AND K-12 OUTREACH

Caltech Center for Diversity - STEMinar speaker series	2018
Girls in Ocean Sciences Teen Weekend - Ocean Institute (Dana Point, CA)	2018
Featured in <i>LA Times</i> http://www.latimes.com/science/sciencenow/la-sci-monterey-canyon-extremophiles-20180420-story.html	2018
Featured in <i>Scientific American</i> www.scientificamerican.com/article/bizarro-life-forms-inhabiting-deep-sea-vents-may-be-at-risk/	2017
Featured in <i>Atlas Obscura</i> (http://www.atlasobscura.com/articles/whale-fall-carcass)	2017
Neighborhood Partnership Program, participant (http://www.oxy.edu/neighborhood-partnership-program)	2016
Canyon Oaks High School – Guest speaker on the human microbiome	2015
Featured in <i>Wired Magazine</i> (www.wired.com/2015/02/absurd-creature-of-the-week-scaly-foot-snail/)	2015
More MOSTe Workshop for middle school and high school girls of UR minorities in STEM	2015
Cabrillo Marine Aquarium -Young Scientist Symposium (panelist)	2015
Featured in <i>Women in Oceanography: A Decade Later</i>	2014
Cabrillo Marine Aquarium Discovery Series – featured speaker http://www.cabrilloomarineaquarium.org/events-news/events-details.asp?id=1203	2014
GearUp LA Neighborhood Partnership Program	2013
LA County Science Olympiad, Event Captain	2012
Ocean Institute (Dana Point, CA) – Girls in Science Conference	2012
Aquarium of the Pacific – featured speaker for <i>Night Dives</i> program	2012
LA County Science Olympiad, Event Captain	2011
Newport Harbor Nautical Museum, “Alvin Experience” video	2010
Ocean Institute (Dana Point, CA) – Girls in Science Weekend	2007
California State University, Long Beach - Women and Careers Day	2006
Ocean Institute (Dana Point, CA) – exhibit on ‘deep sea life’	2006
California State University, Monterey Bay - Young Women in Science – workshop leader	2002
Discover magazine – article on exploring for hydrothermal vents in the Indian Ocean	2001
Discover magazine – article on adaptations to pressure	2001
Science Communication and Marine Public Information network – science liaison	2000
Santa Cruz Science Fair – scientific judge	2000
Super Science – scholastic journal for 4 th -6 th graders – article on deep-sea biology	2000
Discovery Channel / The Learning Channel – “Raiders of the Deep” television program	2000

REFEREED PUBLICATIONS

(**bold #**) indicates corresponding / lead author, (*) indicates Oxy undergraduates, (^) Oxy masters student

48. Blankenchip, C.L.*, Michels, D.E.*, Braker, E.N., and S.K. Goffredi (2018) Diet breadth and exploitation of exotic plants shift the core microbiome of *Cephaloleia*, a group of tropical herbivorous beetles. *Peer J.* 6:e4793 <https://doi.org/10.7717/peerj.4793>.
47. Otero-Bravo, A., S.K. Goffredi, Z. Sabree, (2018) Cladogenesis and Genomic Streamlining in Extracellular Endosymbionts of Tropical Stinkbugs. *Genome Biology and Evolution.* doi.org/10.1093/gbe/evy033.
46. Rouse, G, S.K. Goffredi, S.J. Johnson, R.C. Vrijenhoek. (2018.) An inordinate fondness for *Osedax* (Siboglinidae: Annelida): Fourteen new species of bone worms from California. *Zootaxa.* 4377 (4): 451–489.
45. **Goffredi, S.K.**, S. Johnson, V. Tunnicliffe, D. Caress, D. Clague, E. Escobar, L. Lundsten, J.B. Paduan, G. Rouse, D.L. Salcedo, L.A. Soto, R. Spelz-Madero, R. Zierenberg, R. Vrijenhoek (2017). Hydrothermal vent fields discovered in the Gulf of California reveal the role of habitat in augmenting regional diversity. *Proc Royal Society B.* 20170817. <http://dx.doi.org/10.1098/rspb.2017.0817>.
44. Aronson, H.S.*, A.J. Zellmer, **Goffredi, S.K.** (2017). The specific and exclusive microbiome of the deep-sea bone-eating snail, *Rubyspira osteovora*. *FEMS Microbiology Ecology.* 93(3): fiw250

43. Pasulka, A.L., S.K. Goffredi, P.L. Tavormina, K.S. Dawson, L.A. Levin, G.W. Rouse, V. J. Orphan. (2017). Colonial tube-dwelling ciliates influence methane cycling and microbial diversity within methane seep ecosystems. *Frontiers in Marine Science - Aquatic Microbiology*. 3:276. doi: 10.3389/fmars.2016.00276.
42. Klann, J.*, A. McHenry*, C. Montelongo*, **Goffredi, S.K.**, (2016). Decomposition of plant-sourced carbon compounds by heterotrophic Betaproteobacteria isolated from the tank of a tropical Costa Rican bromeliad. *MicrobiologyOpen*. doi:10.1002/mbo3.344.
41. **Goffredi, S.K.**, G. Jang*, M. Haroom. (2015) Transcriptomics in the tropics: Total RNA-based profiling of Costa Rican bromeliad-associated communities. *Computational and Structural Biotechnology Journal*. 13: 18-23.
40. Rahman, N.A., D.H. Parks, D.L. Willner, A.L. Engelbrekton, S.K. Goffredi, F. Warnecke, R.H. Scheffrahn and P. Hugenholtz. (2015). A molecular survey of Australian and North American termite genera indicates that co-evolution is the primary force shaping termite gut microbiomes. *Microbiome*. 3:5 doi:10.1186/s40168-015-0067-8
39. **Goffredi, S.K.**, H. Yi, Q. Zhang, J. Klann*, I. Struve*, R.C. Virjenhoek, C. Brown. (2014). Genomic versatility and functional variation between two dominant heterotrophic symbionts of deep-sea *Osedax* worms. *The ISME Journal*. 8: 908-924.
38. Ferguson, M A, ME Núñez, H-J Kim, S.K. Goffredi, E Shamskhou, L Faudree, E Chang, R M Landry, A Choi, N Thomas, J Schmitt, E M Spain. (2014) Spatially organized films from *Bdellovibrio bacteriovorus* prey lysates. *Applied and Environmental Microbiology*. doi:10.1128/AEM.02423-14
37. Bistolos, K.I.S.*, R. Sakamoto*. J.A.M. Fernandes, **Goffredi, S.K.**, (2014). Symbiont polyphyly, co-evolution, and necessity in pentatomid stinkbugs from Costa Rica. *Frontiers in Microbiology*. 5:349 doi: 10.3389/fmicb.2014.00349
36. Larson, H.K., Goffredi, S.K., Parra, E.L., Vargas, O., Pinto, A., McGlynn, T.P. (2014). Distribution and dietary regulation of an associated facultative Rhizobiales-related bacterium in the omnivorous Giant Tropical Ant, *Paraponera clavata*. *Naturwissenschaften*. 101(5): 397-406.
35. **Goffredi, S.K.**, W.J. Jones, A. Gregory*, N. Morella*, R. Sakamoto*. (2014). Ontogenetic variation in epibiont community structure in the deep-sea yeti crab, *Kiwa hirsuta*: Convergence among crustaceans. *Molecular Ecology*. 23:1457-1472.
34. **Goffredi S.K.**, N. Morella*, M. Pulcrano*. (2012). Affiliations between bacteria and marine fish leeches (Piscicolidae), with emphasis on a new deep-sea species from Monterey Canyon, CA. *Environmental Microbiology*. 14:2429-2444.
33. Levin LA, Orphan VJ, Rouse GW, Rathburn AE, Ussler W III, Cook GS, Goffredi S.K., et al. (2012). A hydrothermal seep on the Costa Rica margin: middle ground in a continuum of reducing ecosystems. *Proc. R. Soc. B*. 279: 2580-2588.
32. Martin^, A.M. and **S.K. Goffredi**. (2012). "*Pliocardia*" *krylovata*, a new species of vesicomid clam from cold seeps along the Costa Rica Margin. *Journal of the Marine Biological Association UK*. 92:1127-1137.
31. **Goffredi S.K.**, G. Jang*, W. T. Woodside* and W. Ussler III. (2011). Bromeliad catchments as habitats for methanogenesis in tropical rainforest canopies. *Frontiers in Microbiology*. 2:256. doi: 10.3389/fmicb.2011.00256.
30. Martin^, A.M. G. M. Martin, R. Butler, and **S.K. Goffredi**. (2011). Synthesis of keyhole limpet hemocyanin by the rhogocytes of *Megathura crenulata*. *Invertebrate Biology*. 130: 302-312.
29. Rouse, G.W., S.K. Goffredi, S. B. Johnson, and R. C. Vrijenhoek (2011) Not whale-fall specialists, *Osedax* worms also consume fishbones. *Biol. Lett.* 7:736-739.
28. **Goffredi S.K.**, A.H. Kantor*, W.T. Woodside* (2011). Aquatic microbial habitats within a neotropical rainforest: bromeliads and pH-associated trends in bacterial diversity. *Microbial Ecology*, 61: 529-542.
27. **Goffredi S.K.** (2010). Indigenous ectosymbiotic bacteria associated with diverse hydrothermal vent invertebrates. *Environ. Microbiol. Reports*. 2: 479-488.
26. **Goffredi S.K.**, V. J. Orphan. (2010). Bacterial community shifts in taxa and diversity in response to localized organic loading in the deep sea. *Environ. Microbiol.* 12: 344-363.
25. Rouse, G. W., N. G. Wilson, S.K. Goffredi, S. B. Johnson, T. Smart, C. Widmer, C. M. Young and R. C. Vrijenhoek (2009) Spawning and development in *Osedax* boneworms. *Marine Biology* 156: 395-405.
24. **Goffredi S.K.**, W. J. Jones, H. Erlich, A. Springer, R. C. Vrijenhoek. (2008). Epibiotic bacteria associated with the recently discovered Yeti crab, *Kiwa hirsuta*. *Environ. Microbiol.* 10: 2623-2634.

23. Pernthaler, A., A. E. Dekas, C. Titus Brown, S.K. Goffredi, T. Embaye, and V. J. Orphan (2008). Diverse syntrophic partnerships from deep-sea methane vents revealed by direct cell capture and metagenomics. *Proc. Natl. Acad. Sci.* 105: 7052-7057.
22. **Goffredi S.K.**, R. Wilpiseski, R. W. Lee, V. J. Orphan. (2008). Temporal evolution of methane cycling and phylogenetic diversity of archaea in sediments from a deep-sea whale fall in Monterey Canyon (CA). *Inter. Soc. Microbial Ecol. Journal.* 2: 204-220.
21. Ciche T. and Goffredi S.K. (2007). General Methods to Investigate Microbial Symbioses. *In: Reddy, C. A. (ed) Methods for General and Molecular Microbiology*, 3rd ed. ASM Press. Washington, D.C. pp 394-420.
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19. Osborn K.J., Rouse G.W., Goffredi S.K., and Robison B.H. (2007). Description and relationships of *Chaetopterus pugaporcinus*, an unusual pelagic polychaete (Annelida, Chaetopteridae) *Biological Bulletin* 212:40-54.
18. **Goffredi S.K.**, Jones W.J., Scholin C.A., Marin R., and Vrijenhoek R.C. (2006). Molecular detection of marine invertebrate larvae. *Marine Biotechnology.* 1: 1-12.
17. **Goffredi S.K.**, Orphan V.J., Rouse G.W., Jahnke L., Embaye T., Turk K., Lee R. and Vrijenhoek R.C. (2005). Evolutionary innovation: A bone-eating marine symbiosis. *Environmental Microbiology.* 7: 1369-1378.
16. Seibel, B.A., S.K. Goffredi, J.J. Childress, E.V. Thuesen, R. Sherlock, and B.H. Robison. (2004). Ammonium content and buoyancy in midwater cephalopods. *Journal of Experimental Marine Biology and Ecology.* 313:375-387.
15. Rouse G.W.*, **Goffredi S.K.*** and Vrijenhoek R.C. (2004). *Osedax*: bone-eating marine worms with dwarf males. *Science.* 305:668-671. (*co-1st authors).
14. **Goffredi S.K.**, Hurtado L.A., Paull C., and Vrijenhoek R.C. (2004). Unusual benthic fauna associated with a whale fall in Monterey Canyon, CA. *Deep Sea Research I.* 51:1295-1306.
13. **Goffredi S.K.**, Warén A., Orphan V., Van Dover C.L. and Vrijenhoek R.C. (2004). Novel forms of structural integration between microbes and a vent gastropod from the Indian Ocean. *Applied and Environmental Microbiology* 70:3082-3090.
12. **Goffredi S.K.**, Barry J.P., and Buck K.R. (2004). Vesicomid symbioses from Monterey Bay (Central California) cold seeps. *Symbiosis* 36:1-27.
11. Warén A., Bengtson S., Goffredi S.K. and Van Dover C.L. (2003). A hydrothermal-vent gastropod with iron sulfide biomineralized dermal sclerites. *Science* 302: 1007.
10. **Goffredi S.K.**, Hurtado L.A., Hallam S., and Vrijenhoek R.C. (2003). Evolutionary relationships of deep-sea vent and cold seep clams (Mollusca: Vesicomidae) of the '*pacifica/lepta*' species complex. *Marine Biology* 142:311-320.
9. Drazen J.C., Goffredi S.K., Schlining B. and D.S. Stakes. (2003). Aggregations of egg brooding deep-sea fish and cephalopods on the Gorda Escarpment: a reproductive hotspot? *Biological Bulletin* 205:1-7.
8. Orphan V.O., Goffredi S.K., Boles, J.R. and Delong E. (2003). Geochemical influence on diversity and microbial processes in high temperature petroleum reservoirs. *Geomicrobiology Journal* 20:1-17.
7. **Goffredi S.K.** and Barry J.P. (2002). Species-specific variation in sulfide physiology between closely related Vesicomid clams. *Marine Ecology Progress Series* 225:227-238.
6. **Goffredi S.K.**, and Childress J.J. (2001). Activity and inhibitor sensitivity of ATPases in the hydrothermal vent tubeworm *Riftia pachyptila*. *Marine Biology* 138:259-265.
5. Pasteris J., Freeman J. Goffredi S., and Buck K. (2001). Raman spectroscopic and laser scanning confocal microscopic analysis of sulfur in living sulfur-precipitating marine bacteria. *Chemical Geology* 180:3-18.
4. **Goffredi S.K.**, Childress J.J., Girguis P.R., and Desaulniers N.T. (1999). The physiological functioning of carbonic anhydrase in the hydrothermal vent tubeworm *Riftia pachyptila*. *Biological Bulletin* 196:257-264.
3. **Goffredi S.K.**, Childress J.J., Lallier F.H., and Desaulniers N.T. (1999). The ionic composition of the hydrothermal vent tubeworm *Riftia pachyptila*: Evidence for the elimination of SO₄²⁻ and H⁺ and for a Cl/HCO₃⁻ shift. *Physiological and Biochemical Zoology* 72:296-306.

2. **Goffredi S.K.**, Childress J.J., Desaulniers N.T., and Lallier F.H. (1997). Sulfide acquisition by the vent worm *Riftia pachyptila* appears to be via uptake of HS^- , rather than H_2S . *Journal of Experimental Biology* 200:2609–2616.
1. **Goffredi S.K.**, Childress J.J., Desaulniers N.T., Lee R.W., Lallier F.H., and Hammond D. (1997). Inorganic carbon acquisition by the hydrothermal vent tubeworm *Riftia pachyptila* depends upon high external PCO_2 and upon proton elimination by the worm. *Journal of Experimental Biology* 200:883–896.