

Curriculum vitae, Peter Riad Girguis

Positions

- 2005-present Assistant professor, Microbiology
Dept. of Organismic and Evolutionary Biology
Harvard University
- 2005-present Adjunct research scientist, Research and Development
Monterey Bay Aquarium Research Institute
- 2004-present *Acting assistant professor, biological oceanography*
University of Washington
- 2003-2005 Associate research scientist, Research and Development
Monterey Bay Aquarium Research Institute
- 2001-2003 *Postdoctoral fellow*
Monterey Bay Aquarium Research Institute
Postdoctoral supervisor: Dr. Edward DeLong

Professional Preparation

- 2000 Ph.D. in Ecology, Evolution and Marine Biology
University of California, Santa Barbara,
- 1994 B.Sc., with Honors in Physiology and Marine Biology
University of California, Los Angeles

Publications

- Girguis, P.R.** and Childress, J.J. 2006. Metabolite uptake, stoichiometry and chemoautotrophic function of the hydrothermal vent tubeworm *Riftia pachyptila*: responses to environmental variations in substrate concentrations and temperature. *Journal of Experimental Biology* 209(Pt 18): 3516-28.
- Girguis, P.R.** and Lee, R.W. 2006. Thermal tolerance and preference of alvinellids. *Science*, April 14, 312(5771): 231.
- Reimers, C.*, **Girguis, P.R.***, Stecher, H., Westall, J. 2006. Geochemical and genomic insights into microbial fuel cell energy from ocean cold seeps. *Geobiology* 4: 123–136. (* = authors contributed equally).
- McBride, L. R.*, **Girguis, P.R.*** and Reimers, C.E. 2006. Power Storage and Conversion from an Ocean Microbial Energy Source. In: *Proceedings of the Marine*

Technology Society/Institute of Electrical and Electronics Engineers Oceans Conference, Boston, MA. (* = authors contributed equally).

Girguis, P.R., Cozen, A., and DeLong, E.E. 2005. Growth rates of methane-oxidizing archaeal-bacterial consortia in deep-sea marine sediments: insights into the physiology of microbially-mediated anaerobic methane oxidation. *Applied and Environmental Microbiology* 71: 3725-3733.

Childress J.J., Fisher C.R., Felbeck, H., and **Girguis, P.R.** 2003. On the edge of a deep biosphere: true animals in extreme environments. In *The Subseafloor Biosphere at Mid-Ocean Ridges*, (eds. W.D. Wilcock, D.S. Kelley, J.A. Baross, E. DeLong, C. Cary), American Geophysical Union Monographs. Volume 144, 408 p.

Girguis, P.R., Orphan, V.J., Hallam, S.J., DeLong, E.F. 2003. Growth and methane oxidation rates of anaerobic methanotrophic archaea in a continuous flow bioreactor. *Applied and Environmental Microbiology* 69: 5472-5482.

Hallam, S.J., **Girguis, P.R.**, Preston, C.M., Richardson, P.M., DeLong, E.F. 2003. Identification of Methyl Coenzyme M Reductase A (mcrA) genes in Methane Oxidizing Archaea. *Applied and Environmental Microbiology* 69: 5492-5502.

Girguis, P.R., Childress, J.J., Freytag, J.A., Klose, K.A., and Stuber, R. 2002. Effects of metabolite uptake on proton-equivalent elimination by two species of deep-sea vestimentiferan tubeworm, *Riftia pachyptila* and *Lamellibrachia cf. luymesii*. *Journal of Exp. Biology* 205: 3055-3066.

Freytag, J.K., **Girguis, P.R.**, Birkquist, D.A., Fisher, C.R., and Childress, J.J. 2001. A paradox resolved: Sulfide acquisition by roots of seep tubeworms sustains net chemoautotrophy. *Proceedings of the National Academies of Science* 98 (23): 13408–13413.

Girguis, P.R. 2000. Metabolite flux of the hydrothermal vent tubeworm *Riftia pachyptila*: stoichiometric balance of the chemoautotrophic symbiosis and the potential rates of primary production. Dissertation, University of California, Santa Barbara.

Girguis, P.R., Lee, R.W., Childress, J.J., Pospesel, M., Desaulniers, N.T., Zal, F., Felbeck, H. 2000. Fate of Nitrate acquired by the hydrothermal vent tubeworm *Riftia pachyptila*. *Applied and Environmental Microbiology* 66(7): 2783-27909.

Goffredi, S.K., **Girguis, P.R.**, Childress, J.J., Desaulniers, N.T. 1999. Physiological Functioning of Carbonic Anhydrase in the hydrothermal vent tubeworm *Riftia pachyptila*. *Biological Bulletin* 196:257-264.

Girguis, P.R., Childress, J.J. 1998. Proton equivalent elimination rates by the vestimentiferan tubeworm *Riftia pachyptila*: Ramifications for metabolite flux. *Cahiers de Marine Biologie* 39:285-296.

Publications submitted and in preparation

Girguis, P.R., and Childress, J.J. Rates of net primary productivity by the chemoautotrophic symbioses *Riftia pachyptila* and *Tevnia jerichonana*. To be submitted to *Nature*.

Girguis, P.R., Cozen, A.A., DeLong, E.F., and Stakes, D. Quantitative microbial community analyses of sediments along the Mendocino Fracture Zone: Microbial proxies for geochemical processes. Submitted to *Environmental Microbiology*.

Girguis, P.R., Frederich, G., and Erickson, J. Development of a small, highly sensitive in situ mass spectrometer for oceanic water and sediment dissolved gas analysis. Submitted to *Environmental Science and Technology*.

Invited Presentations

- Oct 2006 Invited talk, Pennsylvania State University
 “Approaches to studying the physiology of uncultivable microbes”
- Sept 2006 Invited talk, RIDGE 2000 Distinguished Lecturer
 Skidmore College (Saratoga Springs, NY)
 “Carbon and Nitrogen Biogeochemical Cycling by Hydrothermal Vent
 Chemoautotrophic Symbioses
- Sept 2006 Invited talk, University of Massachusetts (Boston, MA)
 “Quantifying the ‘bio’ in biogeochemistry”
- June 2006 Invited talk, RIDGE theoretical Institute (Mammoth Lakes, CA)
 “Biogeochemical cycles at Hydrothermal vents”
- May 2006 Invited talk, American Society of Microbiology (Atlanta, GA)
 “Something old, something new: using traditional and contemporary
 approaches towards understanding the ecological physiology of anaerobic
 methane oxidizing archaea”
- Apr. 2006 Invited talk, RIDGE 2000 Distinguished Lecturer
 Berea College (Berea, KY)
 “Life on the edge: thermal biology of vent organisms”
- Apr. 2006 Invited talk, Boston University (Boston, MA)
 “Peering into the private lives of microbes”
- Dec. 2005. Invited talk, University of South Florida (St. Petersburg, FL)
 “The ongoing mystery of anaerobic methane oxidation.”

- Apr. 2005 Invited talk, Stanford University (Palo Alto, CA)
"Population dynamics of anaerobic methane oxidation."
- Feb. 2005 Invited talk, University of California Irvine (Irvine, CA)
"Peering into their private lives: anaerobic methane oxidation"
- Dec. 2004 National Academy of Sciences New Frontiers symposium (Oxford, UK)
"Microbial and geological linkages."
- June 2004 Gordon Conference on bioinorganic chemistry (Connecticut)
 Invited participant, *"Methanogens, methanotrophs and mutagenesis: the ongoing mystery of anaerobic methane oxidation."*
- May 2004 Invited speaker, University of Washington (Seattle, WA)
"Physiological and biochemical insights into anaerobic methane oxidation: from pushcores to proteomics."
- April 2004 Invited speaker, Harvard University (Cambridge, MA)
"Physiological and biochemical insights into anaerobic methane oxidation: from pushcores to proteomics."
- Feb. 2004 Invited speaker, AAAS general meeting (Seattle, WA)
"New technologies for exploring the oceans"
- Feb. 2004 Invited speaker, Georgia Institute of Technology (Atlanta, GA)
"Peering into the private lives of microbes: carbon and nitrogen cycling by uncultivable marine archaea and bacteria"
- Feb. 2003 National Academy of Sciences workshop (Irvine, CA)
"Sequestration of greenhouse gases and the effects of carbon sequestration on microorganisms."
- Nov. 2002 Invited talk, National Academy of Sciences New Frontiers (Irvine, CA)
 Session chair, *"Gas Hydrates."* *"Carbon cycling in the deep ocean via anaerobic methane oxidation."*
- Jul. 2002 Invited participant, Gordon Conference: molecular basis for C₁ microbial metabolism. (Connecticut)
"Ecological physiology of anaerobic methane oxidation."
- Jun. 2002 Invited talk, University of Washington (Seattle, WA)
"Biogeocontinuum: coupling biology and geology in the deep oceans."
- Apr. 2000 Invited talk, University of California, Los Angeles (Los Angeles, CA)
"Carbon cycling in deep ocean chemoautotrophic communities."

Other presentations

McBride, L. R., **P. Girguis**, C. E. Reimers (2006). Power Storage and Conversion from an Ocean Microbial Energy Source. In: Proceedings of the Marine Technology Society/Institute of Electrical and Electronics Engineers Oceans Conference, Boston, MA.

Reimers, C., **Girguis, P.R.**, Westall, J., Newman, D., Stecher, H, Howell, K., and Alleau, Y. 2005. Using electrochemical methods to study redox processes and harvest energy from marine sediments. Goldschmidt Conference, Oxidation-Reduction Reactions in Marine Sediments.

Clare E. Reimers, Hilmar A. Stecher III, Peter Girguis, Leonard M. Tender. 2005. Electrochemical power generation and microbial communities at seafloor seeps. American Chemical Society meeting.

Kelley, D., Baross, J., Delaney, J., **Girguis, P.**, and Schrenk, M. 2004. Towards Determining the Upper Temperature Limits to Life on Earth: An In-situ Sulfide-Microbial Incubator. American Geophysical Union general meeting.

Sessions, A. L., Pearson, A., Hayes, J. M., Delong, E. F., and **Girguis, P.** 2002. Connecting genomics and biogeochemistry via the carbon-isotopic composition of ribosomal RNA. American Geophysical Union general meeting.

Girguis, P.R., and Childress, J.J. 1999. Metabolite flux of the hydrothermal vent tubeworm *Riftia pachyptila*: a model of extreme adaptations. American Society of Limnology & Oceanography meeting.

Girguis, P.R., Desaulniers, N., and Childress, J.J. Proton equivalent elimination by the tubeworm *Riftia pachyptila*. 1996. American Society of Zoology, in *American Zoologist* 36(5):119.

Girguis, P.R., and Childress, J.J. 2001. Nitrate reduction to ammonia by the chemoautotrophic bacteria in the tubeworm *Riftia pachyptila*. American Society of Limnology & Oceanography meeting.

Girguis, P.R., Cozen, A.E., and DeLong, EF. 2005. Growth And Population Dynamics Of Methanotrophic Archaea And Sulfate Reducing Bacteria In A Continuous Flow Bioreactor. American Society of Limnology & Oceanography meeting.

Posters

Girguis, P.R., and Childress, J.J. 2001. Potential Rates of Primary Productivity by the hydrothermal vent tubeworm *Riftia pachyptila*. American Society of Microbiology general meeting.

Girguis, P.R., Lee, R.W., and Childress, J.J. 1997. Nitrate assimilation and utilization by the Tubeworm *Riftia pachyptila*. Deep Sea Biology Symposium.

Girguis, P.R., Cozen, A.E., and DeLong, E.F. 2004. Growth, reproduction and community structure of methane-utilizing microbial communities in a continuous flow bioreactor. Gordon conference on C₁ metabolism.

Hallam, S.J., **Girguis, P.R.**, Preston, C.M., Richardson, P.M., DeLong, E.F. 2003. Construction and Analysis of Shotgun and Fosmid Genomic Libraries of Anaerobic Methane-oxidizing Archaea from Deep-sea Methane Seeps. American Society of Microbiology general meeting.

Girguis, P.R., Orphan, V.J., Hallam, S.J., DeLong, E.F. 2002. Anaerobic enrichment of methane-oxidizing archaeal/bacterial consortia in deep-sea marine sediments. American Society of Microbiology general meeting.

Articles

Batteries Not Included - Circuits Of Slime. 2006. *Nature* 441, 277-279. (by Schubert, C. and Girguis, P.R.)

Living Batteries. July 1, 2006. *The Scientist*.

Symbionts' body buffers. 2006. *Journal of Experimental Biology*. 209: 3481.

Into Hot Water: Lab test shows that worms seek heat. 2006. *Science News* 169(15): 228.

Deep Sea Tubeworms are Champion Proton Pumpers. 2002. *Journal of Experimental Biology*. 205:1902.

Primary productivity in the deep oceans. April 2002. *New Scientist*.

Random Samples (tubeworm farming). May 1998. *Science* 279 (5351):663.

Bringing tubeworms back alive. May 1998. *Discover* magazine, p. 22.

Meeting briefs (Proton elimination rates). Jan. 10, 1996. *Science* 275 (5315):305.

Teaching experience

Co-instructor for upper division ecological physiology course, U.C. Santa Barbara. 2000.

Lead teaching assistant for ecological physiology laboratory course, U.C. Santa Barbara. 1997-2000.

Teaching assistant, introductory biology for majors, U.C. Santa Barbara. 1994.

Teaching assistant, Introduction to the Oceans for non-majors. U.C.L.A. 1994.

Research Expeditions

VISIONS 2005. 10-1-05 to 11-4-05. Co-principal investigator. Juan de Fuca ridge *via* R/V *Thompson* and ROV *JASON*.

“Virtual” Lost City 2005. 9-15-05 to 9-25-05. Participant. Lost City hydrothermal field *via* R/V *Ronald H. Brown* and the Institute for Exploration's ROV *Argus* and *Hercules*.

MBARI-KECK 2004. 8-16-04 to 8-29-04. Chief Scientist/principal investigator. Juan de Fuca ridge *via* R/V *Western Flyer* and ROV *Tiburon*.

Monterey Bay Hydrocarbon seep cruises. Various date between 1-00 and 5-05. Chief Scientist of over 30 expeditions, visiting various seep sites in the Monterey canyon *via* the R/V *Point Lobos* and the ROV *Ventana*.

LARVE '98. November 16th to December 6th, 1998. 9 Degrees North, East Pacific Rise. R/V *New Horizon*, R/V *Atlantis/ALVIN*.

HOT '97. November 21 to December 26th, 1997. 9 degrees North, East Pacific Rise. R/V *New Horizon*, R/V *Atlantis/ALVIN*.

HOT '96. February 10 to March 25, 1996. 9 and 13 degrees North, East Pacific Rise. R/V *New Horizon*, R/V *Nadir/Nautile*.

Santa Barbara/Hyperion sewage outfall cruise, June 15-17, 1995. *Solemya* and *Lucinoma* dredging. R/V *Sproul*.

Midwater trawl, San Clemente basin, March 20-27, 1995. R/V *New Horizon*.

EPR '94 cruise. November 1-December 5, 1994. 9 and 13 degrees North, East Pacific Rise. R/V *New Horizon*, R/V *Atlantis II/ALVIN*.

Louisiana slope cold seep cruise, September 1994. Louisiana slope and escarpment. Brine pool. R/V *Edwin Link/Johnson Sea-Link*.

Juan de Fuca vent cruise, July 10- July 31, 1994. Juan de Fuca and Explorer Ridge sites. R/V *Atlantis II/ALVIN*

Extracurricular activities

2003-present. Vice President, Chief Operations Officer of OceansWide (www.oceanswide.org), a non-profit organization which provides K-12 students, teachers and the community the chance to experience first-hand remotely operated vehicle (ROV) exploration of the seafloor.

1994-1999. A group leader in the California Alliance for Minority Participation (C.A.M.P.) at the University of California Santa Barbara.

1997-present. One of four founding members of <http://www.scienceline.ucsb.edu> an NSF-funded science question and answer website for K-12 students and educators. 1997-present.

1996-1998. One of eight founding members of <http://www.room103.com>, a science question and answer website. Featured in the Wall Street Journal, Los Angeles Times, National Portuguese radio, Arizona news-press.

Honors and Awards

2006	RIDGE R2K Distinguished Lecturer
2006	Metropolitan Who's Who Society (Cambridge, MA)
2006	International Who's Who Society
2006	Co-Chair, Indian-American Frontiers of Science
2006	Merck Co. Innovative Research Award
2005	Ridge 2000 Steering Committee (STCOM)
2002	Recipient of the Department of Energy's E.C.-U.S. biotechnology fellowship to promote international biotechnology research.
2000-2002	Recipient of the Monterey Bay Aquarium Research Institute Postdoctoral Fellowship.
2000	Recipient of the U.C. Regents Fellowship by the University of California Santa Barbara.
2000	Recipient of the University of California Graduate Division Affiliates fellowship for outstanding teaching and research.
1999	Recipient of the UCSB graduate division fellowship.
1997-1998	Twice nominated for the U.C. Academic Senate distinguished teaching assistant award.

Grants

* JGI-DOE Community Sequencing Project: "What Sustains *Riftia* Primary Productivity: A Community Genomics Analysis" PI. 2006.

1) DARPA. Oceanic microbial energy generation assessment, phase II. co-PI. 5/2006-12/2007. \$340,000.

- 2) NSF OCE-0550549. Probing Korarchaeal ecophysiology via statistical analysis of quantitative molecular and geochemical data. 1/2006-12/2009. P.I. \$128,778.
- 3) NSF OCE-0426109. Determining the Limits to Life in Submarine Hydrothermal Systems: Active Sulfide Deposits as Natural Laboratories. 9/2003-10/2006. Co-PI. \$179,300.
- 4) Merck Foundation. Functional analysis of microbial fuel cell-hosted communities. PI. \$20,000.
- 2004-2006 DARPA. Proposal HR0011-04-1-0023: The Ocean Microbial Energy Generation Assessment. Co-P.I. \$440,000 for FY2004-FY2006 (\$2.3 million budget for FY2006-2008 pending approval)
- 2001-2004 Packard Foundation. Proposal P900213: Development of an *in situ* mass spectrometer for use in deep ocean dissolved gas analysis. \$115,000.
- 2005 JAMSTEC. Proposal: chemoautotrophic carbon cycling in Sagami bay and approaches to sustaining uncultivable organisms. \$90,000.

Other Experience and Professional Memberships

Feb 2007	ASLO Session Chair ('Physiology of the Deep Subsurface Biosphere')
Mar 2006	ORION Design & Implementation Workshop, Co-Chair, Regional Working Group (Salt Lake City, UT)
2005-2006	NSF-RIDGE steering committee
2004-2006	Acting Vice president, OceansWide (www.oceanswide.org)
2003-2004	Steering committee, National Academy of Sciences New Frontiers symposium
1994-2006	Member, American Society for Limnology and Oceanography
2000-2006	Member, American Society for Microbiology
1999-2006	Member, American Geophysical Union