

Philip E. Long, Ph.D.

Geological Project Scientist and Deputy Lead, Sustainable Systems Science Focus Area

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Education

Ph.D. Geology, Stanford University, Stanford, CA 1977
B.S. Geology, University of Washington, Seattle, WA 1970

Research Experience

2011-Present Geological Project Scientist, Lawrence Berkeley National Laboratory
1988-2011 Staff Scientist, Energy and Environment Directorate, Pacific Northwest National Laboratory, Richland, WA. During this time period, Dr. Long also served as Technical Group Manager, Section Manager, Associate Department Manager, and Technical Network Leader for Earth Sciences.
1979 to 1988 Sr. Scientist and Manager, Hydrology Group, Basalt Waste Isolation Project, Westinghouse Hanford Co. Richland, WA
1979 Assistant Professor, Geology, Central Washington University, Ellensburg, WA
1977-1978 Sr. Scientist, Basalt Waste Isolation Project, Rockwell Hanford Operations, Richland, WA
1976-1977 Research Associate, National Research Council, NASA Johnson Space Center, Houston, TX

Research Interests

Dr. Long has extensive research experience in geology and hydrology ranging from studies of gas hydrates in marine sediments to fracture characteristics, cooling histories, and the hydrology of flood basalts. For the last several years, his research has focused on the geohydrologic and geochemical controls on biostimulation of subsurface microorganisms for *in situ* bioremediation of metals and radionuclides and on the abundance, and texture of methane hydrate in marine sediments using IR imaging cameras and other advanced technologies.

Current Projects and Recent Research Activities

Currently Dr. Long is the Deputy Lead, Sustainable Systems Science Focus Area at LBNL. Dr. Long has served for the last several years both at PNNL and LBNL as the Principal Investigator for the Integrated Field Research Challenge Site (IFRC) at Rifle, Colorado. The IFRC Project was awarded in September 2006 to a multidisciplinary team investigating the relationship between protein expression and geochemical changes during biostimulation for *in situ* treatment of uranium contamination. This 5-year field research project is part of the Department of Energy's Subsurface Biogeochemistry Program. Funding is \$1.7M for 2007 and \$3M per year in 2008-2011. Dr. Long pioneered the use of IR imaging to assess gas hydrate abundance in marine sediment cores, most recently applying this technology during a gas hydrate drilling expedition in the Indian Ocean on the Joint Oceanography Institutes Deep Earth Sampling (JOIDES) "Resolution" drill ship sponsored by the Indian Government. Dr. Long has been part of two earlier methane hydrate research expeditions sponsored by the National Science Foundation, Leg 204 (offshore Oregon) and Expedition 311 (off shore Vancouver Island). Dr. Long's participation in this work was funded initially by the National Science Foundation and subsequently by DOE's Office of Fossil Energy.

Professional Licenses

Registered Geologist (#G623), State of Oregon

Licensed Geologist with Hydrogeologist Specialty (#1166), State of Washington

Invited Presentations

Dr. Long has presented multiple invited lectures and presentations at society meetings over the last few years, including international meetings such as Goldschmidt 2012 (Montreal) and 2008 (Vancouver, BC). Another example is for the *Society for General Microbiology* meeting held at the University of Nottingham, UK, 6-9 September 2010. The meeting theme was metals and microbes and Dr. Long presented an invited lecture entitled "Bioremediation of sub-surface aquifers" in a Symposium on Bioremediation of Metals convened by Drs. Geoffry Gadd and Jonathan Lloyd.

Publications

Dr. Long has authored or co-authored more than 70 peer-reviewed publications, and more than 170 abstracts, proceedings papers, technical reports, and government documents.

Recent Peer-Reviewed Papers

Williams, K.H., **Long, P.E.**, Davis, J.A., Steefel, C.I., Wilkins, M.J., N'Guessan, A.L., Yang, L., Newcomer, D., Spane, F.A., Kerkhof, L.J., McGuinness, L., Dayvault, R., Lovely, D.R., 2011. Acetate availability and its influence on sustainable bioremediation of uranium-contaminated groundwater. *Geomicrobiology Journal* 28, 519-539. DOI: 10.1080/01490451.2010.520074. Version of record first published: 26 Jul 2011.

Melissa Barlett, Hee Sun Moon, Aaron A. Peacock, David B. Hedrick, Kenneth H. Williams, **Philip E. Long**, Derek Lovley and Peter R. Jaffe. 2012. Uranium reduction and microbial community development in response to stimulation with different electron donors. *Biodegradation*, 2012. DOI: 10.1007/s10532-011-9531-8. Published online 20 January 2012.

Fox, P. M., J. A. Davis, M. B. Hay, M. E. Conrad, K. M. Campbell, K. H. Williams, and **P. E. Long** (2012), Rate-limited U(VI) desorption during a small-scale tracer test in a heterogeneous uranium-contaminated aquifer, *Water Resour. Res.*, 48, W05512, doi:10.1029/2011WR011472. Published 8 May 2012.

Hongjun Jin, Yanfeng Zhang, Garry W. Buchko, Thomas C. Squier, Susan M. Varnum, Howard Robinson, **Philip E. Long**, 2012, Structure Determination and Functional Analysis of a Chromate Reductase from *Gluconacetobacter hansenii*, *PLoS ONE*, in press.

Kelly C. Wrighton, Brian C. Thomas, Itai Sharon, Christopher S. Miller, Cindy J. Castelle, Nathan C. VerBerkmoes, Michael J. Wilkins, Robert L. Hettich, Mary S. Lipton, Kenneth H. Williams, **Philip E. Long**, and Jillian F. Banfield, 2012, Fermentation, Hydrogen and Sulfur Metabolism in Multiple Uncultivated Bacterial Phyla. *Science* 337, 1661 DOI: 10.1126/science.1224041.

Birgit Luef, Sirine C. Fakra, Roseann Csencsits, Kelly C. Wrighton, Kenneth H. Williams, Michael J. Wilkins, Kenneth H. Downing, **Philip E. Long**, Luis R. Comolli, Jillian F. Banfield, 2012, Iron-reducing bacteria accumulate ferric oxyhydroxide nanoparticle aggregates that may support planktonic growth, *ISME Journal*, (in press).