

Liyuan Liang

Distinguished R&D Research Staff
Group Leader, Earth and Aquatic Sciences
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Education and Training

1988 California Institute of Technology, Environmental Engineering, PhD
1983 California Institute of Technology, Environmental Engineering, MS
1982 Northeastern University, Civil Engineering, BS

Research and Professional Experience

2007-Present Distinguished R&D Staff and Group Leader, Oak Ridge National Laboratory (ORNL).
Lead subsurface science focus area research for the DOE Office of Biological and Environmental Research, developing collaborative research programs with a focus on mercury contamination in ecosystems. Lead ~50 scientific staff and postdoctoral researchers in fundamental and applied R&D in aquatic and Earth systems

2006-2007 Chief Scientist, Environmental Sciences Division, ORNL.
Coordinating activities between Environmental Sciences Division and ORNL's Spallation Neutron Source (SNS) to advance joint research projects developing neutron applications.

2005-2007 Rotational position, Office of Strategic Planning, ORNL.
Chair, Seed Money Review Committee, Laboratory Directed Research and Development fund, budget \$5M/yr
Advising Laboratory Director's Office on initiatives related to 'Science to Energy and the Environment'

2001-2005 Director, Cardiff Foundation of Environmental Research, Cardiff University, Wales, UK.

1999-2005 Senior Staff Scientist, ORNL (part-time 2001-2005)

1997-1999 Senior Lecturer, School of Earth Sciences, Cardiff University, Wales, UK

1993-1997 Staff Scientist and Group Leader, Environmental Sciences Division, ORNL

1990-1993 Research Assistant Professor, University of Tennessee, Knoxville and ORNL

1988-1990 Assistant Professor, Department of Environmental Health, University of South Carolina, Columbia

Publications (Cumulative Number of Articles Peer Reviewed Journals: ~100)

1. Parks, J.M., A. Johs, M. Podar, R. Bridou, R. A. Hurt, S.D. Smith, S.J. Tomanicek, Y. Qian, S.D. Brown, C.C. Brandt, A.V. Palumbo, J.C. Smith, J.D. Wall, D.A. Elias, L. Liang. 2013, The Genetic Basis for Bacterial Mercury Methylation. *Science In press*
2. Riccardi, D., H-B Guo, J.M. Parks, B.Gu, L. Liang, and J.C. Smith. 2013. Cluster-Continuum Calculations of Hydration Free Energies of Anions and Group 12 Divalent Cations. *J. Chem. Theory Comput.* 9, 555-569.
3. Miller, C.; Liang, L.; Gu, B. 2012. Competitive ligand exchange reveals mercury reactivity change with dissolved organic matter (DOM). *Environ. Chem.* 9, 495-501.
4. Guo, Hao-Bo, H. Feng, B. Gu, L. Liang, and J.C. Smith. 2012. Time-Dependent Density Functional Theory Assessment of UV Absorption of Benzoic Acid Derivatives. *Phys. Chem. A* 2012, 116, 11870-11879.
5. Cui, Q., Wang, W., Gu, B., and L. Liang. 2012. A combined physical-chemical polymerization process for fabrication of nanoparticle-hydrogel sensing materials. *Macromolecules* 45: 8382-8386.
6. He, F.; W Wang, J-W Moon, J Howe, E.M. Pierce and L. Liang, 2012. Rapid Removal of Hg(II) from Aqueous Solutions Using Thiol Functionalized Zn-doped Biomagnetite Particles, *ACS Applied Materials & Interfaces*, 4(8):4373-4379.
7. He, F., W. Zheng, L Liang, B Gu. 2012. Mercury photolytic transformation affected by low-molecular-weight natural organics in water. *Science of the Total Environment*, 416: 429-435.
8. Tomanicek, S. J., Johs, A., Sawhney, M.S., Shi, L., Liang, L. Crystallization and preliminary X-ray crystallographic studies of the outer membrane cytochrome OmcA from *Shewanella oneidensis* MR-1, *Acta Cryst.* (2012). F68, 53-55.
9. Zheng W., L. Liang, and B. Gu. 2012. Mercury reduction and oxidation by reduced natural organic matter in anoxic environments, *Environ. Sci. Technol.* 46: 292-299.
10. Johs, A., I. M. Harwood, J. M. Parks, R. Nauss, J. C. Smith, L. Liang, , S. M. Miller, 2011. Structural characterization of intramolecular Hg²⁺ transfer between flexibly-linked domains of mercuric ion reductase. *Journal of Molecular Biology*, (2011) 413, 639-656.

11. Jeffra K. Schaefer, Sara S. Rocks, Wang Zheng, Liyuan Liang, Baohua Gu, and François M. M. Morel, 2011. Active transport, substrate specificity, and methylation of Hg(II) in anaerobic bacteria, *Proc. Natl. Acad. Sci. USA* 108:8714-8719.
12. Gu, B.; Dong, W.; Liang, L.; Wall, N. A. 2011. Dissolution of technetium(IV) oxide by natural and synthetic organic ligands under both reducing and oxidizing conditions. *Environ. Sci. Technol.*, 45 (11), pp 4771–4777
13. Dong, W., Y. Bian, L. Liang, B. Gu, 2011. Binding Constants of Mercury and Dissolved Organic Matter Determined by a Modified Ion Exchange Technique. *Environ. Sci. Technol.*, 45 (8), pp 3576–3583
14. Gu, B., Y. Bian, C.L. Miller, W. Dong, X. Jiang, and L. Liang. 2011. Mercury reduction and complexation by natural organic matter in anoxic environments. *Proceedings of the National Academy of Science USA*. 108, 1479-1483.
15. Porat, I., T. A. Vishnivetskaya, J. J. Mosher, C. C. Brandt, Z. Yang, S. C. Brooks, L. Liang, M. M. Drake, M. Podar, S. D. Brown, and A. V. Palumbo. 2010. Characterization of Archaeal Community in Contaminated and Uncontaminated Surface Stream Sediments. *Microbial Ecology* 60: 784-795.
16. Johs A., L. Shi, T. Droubay, J.F. Ankner, and L. Liang. 2010. Characterization of the decaheme c-type cytochrome OmcA in solution and on hematite surfaces by small angle X-Ray scattering and neutron reflectometry. *Biophysics Journal* 98(2) 12: 3035-3043.
17. Guo H.-B., A. Johs, J.M. Parks, A.O. Summers, S.M. Miller, L. Liang, and J.C. Smith. 2010. Structure and conformational dynamics of the metalloregulator MerR upon binding of Hg(II). *Journal of Molecular Biology* 398:555-568.
18. Dong, D., Liang, L., Brooks, S. C., Southworth, G., Gu, B. 2010. Roles of dissolved organic matter in the speciation of mercury and methylmercury in a contaminated ecosystem in Oak Ridge, Tennessee, *Environ. Chem.* 2010, 7, 94–102. doi:10.1071/EN09091
19. Miller, C., Southworth, G., Brooks, S. C., Liang, L., Gu, B. 2009. Kinetic controls on the complexation between mercury and dissolved organic matter in a contaminated environment. *Environ. Sci. Technol.*, 43, 8548–8553.
20. Parks, J.M., Guo, H., Momany, C., Liang, L., Miller, S.M., Summers, A.O., Smith, J.C. 2009. Mechanism of Hg-C protonolysis in the bacterial organomercurial lyase MerB. *J. Am. Chem. Soc.* 131, 13278–13285.
21. Wang, W., Liang, L., Johs, A., Gu, B., 2008. Thin Films of Uniform Hematite Nanoparticles: Controls on Surface Hydrophobicity and Self-Assembly. *Journal of Materials Chemistry* 18, issue 47, 5770 – 5775.
22. Wang, W., Gu, B., Liang, L. 2007. Effect of anionic surfactants on synthesis and self-assembly of silica colloidal nanoparticles. *J Coll. Inter. Sci.* 313 (1), 169-173.
23. Hofmann, A., Liang, L. 2007. Mobilization of colloidal ferrihydrite particles in porous media – an inner-sphere complexation approach. *Geochim Cosmochim. Acta* 71, 5847–5861.
24. Kamolpornwijit, W., Liang, L. 2006. Investigation of gas production and entrapment in granular iron medium. *J. Cont. Hydrology* 82, 338-356.
25. Liang, L., Moline, G.R., Kamolpornwijit, W., West, O.R. 2005. Influence of hydrogeochemical processes on zero-valent iron reactive barrier performance: a field investigation. *J. Cont. Hydrology* 78, 291-312.
26. Riding R., Liang, L. 2005. Geobiology of microbial carbonates: metazoan and seawater saturation state influences on secular trends during the Phanerozoic. *Palaeogeography, Palaeoclimatology, Palaeoecology* 219, 101-115.
27. Kamolpornwijit W., Liang, L., Moline, G.R., Harts, T., West, O.R. 2004. Identification and quantification of mineral precipitates in Fe0 fillings from a column study. *Environ. Sci. Technol.* 38, 5757-5765.
28. Lee, S.Y., Liang, L., Riestenberg, D., West, O.R., Tsouris, C., Adams, E. 2003. CO2 hydrate composite for ocean carbon sequestration. *Environmental Science and Technology* 37, 3701-3708.
29. Liang, L., Sullivan, A.B., West, O.R., Kamolpornwijit, W., R. Moline. 2003. Predicting the precipitation of mineral phases in permeable reactive barriers. *Environmental Engineering Science* 20 (6), 635-653.
30. Liang, L, Korte, N., Gu, B., Puls, R., Reeter, C. 2000. Geochemical and microbial reactions affecting the long-term performance of in situ iron barriers. *Advances in Environ. Res.* 4, 273-286.
31. Liang, L, Hofmann, A., Gu, B. 2000. Ligand-induced dissolution and release of ferrihydrite colloids. *Geochim. Cosmochim. Acta.* 64(12), 2027-2037.
32. Liang, L, NE Korte, JD Goodlaxson, J Clausen, Q Fernando, R Muftikian, 1997. Byproduct formation during reduction of TCE by zero-valence iron and palladized iron. *Ground Water Monitoring & Review*, Winter: 122-127
33. Gu, B, J Schmitt, Z Chen, L Liang and JF McCarthy, 1995. Interactions of the Fractionated Natural Organic Matter with Iron Oxide, *Geochim. Cosmochim. Acta*, 59 (2): 219-229
34. Liang, L, JA McNabb, JM Paulk, B Gu and JF McCarthy, 1993. Kinetics of Fe(II) Oxygenation at Low Partial Pressure of Oxygen in the Presence of Natural Organic Matter, *Environ. Science and Technol.*, 27(9): 1864-1870