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EDUCATION AND TRAINING

1986 Ph.D., Soil Chemistry, Washington State University
1979 M.S., Soil/Watershed Chemistry, University of Washington
1973 B.S., Chemistry, Bucknell University

RESEARCH AND PROFESSIONAL EXPERIENCE

2010-present, **Battelle Fellow**, Fundamental & Computation Sciences Directorate, Pacific Northwest National Laboratory. *Research on subsurface contaminant biogeochemistry and hydrology.*

2002-present, **Senior Chief Scientist** for Environmental Chemistry, Physical Sciences Division, PNNL. *Research on molecular forms of contaminants in Hanford sediments and applications to risk.*

1993-2002, **Associate Director** for Environmental Dynamics and Simulation, Environmental Molecular Sciences Laboratory and Laboratory Fellow, PNNL. *Manager of EMSL environmental research emphasizing user program development and new instrumental applications to environmental science.*

1993-1996, **Laboratory Fellow**, Interfacial Geochemistry, PNNL. *Research on surface chemical interactions in soils, subsoils and groundwater influencing organic and inorganic sorbate movement.*

1979-1993, **Research and Chief Scientist**, Environmental Sciences, PNNL. *Research on the environmental fate and transport of synthetic fuel components, and fossil energy waste residuals.*

SELECTED PUBLICATIONS *(h-index of 57 from 270 publications)*

Wang Z., Shi Z., Shi L., White G.F., Richardson D.J., Clarke T.A., Fredrickson J.K., and Zachara J.M. (2015) Effects of soluble flavin on heterogeneous electron transfer between surface-exposed bacterial cytochromes and iron oxides. *Geochimica et Cosmochimica Acta* (Submitted).

Lee J.-H., Zachara J. M., Fredrickson J. K., Heald S. M., McKinley J. P., Plymale A. E., Resch C. T., and Moore D. A. (2014) Fe(II)- and sulfide-facilitated reduction of $^{99}Tc(VII)O_4^-$ in microbially reduced hyporheic zone sediments. *Geochimica et Cosmochimica Acta*, 136, 247-264.

Liu C., J. Y. Shang, H. Shan, and J. M. Zachara. (2014) Effect of subgrid heterogeneity on scaling geochemical reactions: A case of U(VI) desorption. *Environmental Science & Technology*, **48**, 1745-1752.

Ma R., C. Zheng, C. Liu, J. Greskowiak, H. Prommer, and J. Zachara. (2014) Assessment of controlling processes for field-scale uranium reactive transport under highly transient flow conditions. *Water Resources Research*, **50**, 1006-1024, doi:10.1002/2013WRO13835.

Shang J. Y., C. Liu, Z. Wang, and J. Zachara. (2014) Long-term kinetics of U(VI) desorption from sediments. *Water Resources Research*, **50**, 855-870, doi:1002/2013WR0113949.

Wang Z., J. Zachara, J. Shang, C. Jeon, J. Liu, and C. Liu. (2014) Investigation of U(VI) adsorption in quartz-chlorite mineral mixtures. *Environmental Science & Technology*, **48**, (14) 7766-7773.

Chen X., G. E. Hammond, C. Murray, M. Rockhold, V. R. Vermeul, and J. M. Zachara. (2013) Applications of ensemble-based data assimilation techniques for aquifer characterization using tracer data at Hanford 300 Area. *Water Resources Research*, **49**, doi:10.1002/2012WR013285.

Liu C., Shang J., Kerisit S., Zachara J. M., and Zhu W. (2013) Scale-dependent rates of uranyl surface complexation reaction in sediments. *Geochimica et Cosmochimica Acta* 105, (0) 326-341.

Murray C. J., Zachara J. M., McKinley J. P., Ward A., Bott Y.-J., Draper K., and Moore D. (2013) Establishing a geochemical heterogeneity model for a contaminated vadose zone — Aquifer system. *Journal of Contaminant Hydrology* 153, 122-140.

Stoliker D. L., Liu C., Kent D. B., and Zachara J. M. (2013) Characterizing particle-scale equilibrium adsorption and kinetics of uranium(VI) desorption from U-contaminated sediments. *Water Resources Research* 49, 1-15.

White G. F., Shi Z., Shi L., Wang Z., Dohnalkova A. C., Marshall M. J., Fredrickson J. K., Zachara J. M., Butt J. N., Richardson D. J., and Clarke T. A. (2013) Rapid electron exchange between surface-exposed bacterial cytochromes and Fe(III) minerals. *Proceedings of the National Academy of Sciences* 110, (16) 6346-6351.

Zachara J. M., Ilton E. S., and Liu C. (2013) Reactive transport of the uranyl ion in soils, sediments, and groundwater systems. In, *Uranium - Cradle to Grave*. 255-300. Burns, P. C. and Sigmon, G. E. Eds. Published by the Mineralogical Association of Canada (MAC), Québec, Canada.

Zachara J. M., Long P. E., Bargar J., Davis J. A., Fox P., Fredrickson J. K., Freshley M. D., Konopka A. E., Liu C., McKinley J. P., Rockhold M. L., Williams K. H., and Yabusaki S. B. (2013) Persistence of uranium groundwater plumes: Contrasting mechanisms at two DOE sites in the groundwater–river interaction zone. *Journal of Contaminant Hydrology* 147, (0) 45-72.

Peretyazhko T. S., Zachara J. M., Kukkadapu R. K., Heald S. M., Kutnyakov I. V., Resch C. T., Arey B. W., Wang C. M., Kovarik L., Phillips J. L., and Moore D. A. (2012) Pertechnetate (TcO_4^-) reduction by reactive ferrous iron forms in naturally anoxic, redox transition zone sediments from the Hanford Site, USA. *Geochimica et Cosmochimica Acta* 92, 48-66.

Clarke T. A., Edwards M. J., Gates A. J., Hall A., White G. F., Bradley J., Reardon C. L., Shi L., Beliaev A. S., Marshall M. J., Wang Z. M., Watmough N. J., Fredrickson J. K., Zachara J. M., Butt J. N., and Richardson D. J. (2011) Structure of a bacterial cell surface decaheme electron conduit. *Proceedings of the National Academy of Sciences of the United States of America (PNAS)* 108, 9384-9389.

Hay M. B., Stoliker D. L., Davis J. A., and Zachara J. M. (2011) Characterization of the intragranular water regime within subsurface sediments: Pore volume, surface area, and mass transfer limitations. *Water Resources Research* 47.

Plymale A. E., Fredrickson J. K., Zachara J. M., Dohnalkova A. C., Heald S. M., Moore D. A., Kennedy D. W., Marshall M. J., Wang C. M., Resch C. T., and Nachimuthu P. (2011) Competitive reduction of pertechnetate ($^{99}TcO_4^-$) by dissimilatory metal reducing bacteria and biogenic Fe(II). *Environmental Science & Technology* 45, 951-957.

Shang J. Y., Liu C. X., Wang Z. M., and Zachara J. M. (2011) Effect of grain size on uranium(VI) surface complexation kinetics and adsorption additivity. *Environmental Science & Technology* 45, 6025-6031.

SYNERGISTIC ACTIVITIES

- Fellow of the American Association for the Advancement of Science (AAAS).
- Recipient of the US Department of Energy's Ernest Orlando Lawrence Award for Environmental Science and Technology, 2007.
- Principal scientist for the DOE/BER, Subsurface Science Program (1994 to 1998).
- Associate editor of the Journal of Contaminant Hydrology (1995-2000).
- Member of the NAS/NRC study panel on "Intrinsic Remediation of Groundwater" (1997 to 1999).
- Lead scientist for the Hanford Groundwater-Vadose Zone Integration Project (1999 to 2007).
- Member of the DOE/BER NABIR Scientific Advisory Panel (1999 to 2003).
- Co-coordinator of EMSL/PNNL's science grand challenge in biogeochemistry (2004 to 2007).
- Stanford University Synchrotron Radiation Laboratory (SSRL) peer review panel (1994-2007). Current panel Chair for molecular environmental and interfacial sciences (MEIS) (2008 to present).
- Member of the DOE/Basic Energy Sciences (BES) Earth Sciences Council (2008-present).