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EDUCATION AND TRAINING

1998 Ph.D., Geochemistry; Virginia Polytechnic Institute and State University
1994 M.S., Geochemistry; Virginia Polytechnic Institute and State University
1992 B.S., Geochemistry; California State Polytechnic University, Pomona

RESEARCH AND PROFESSIONAL EXPERIENCE

2010-present, **Laboratory Fellow**, Physical Sciences Division, PNNL. *Conducts research on Fine Scale Biogeochemical Processes involving redox reactions of Hanford minerals with radioactive contaminants Tc(VII) and Cr(VII). Authored articles in JACS, PNAS, and Journal of the Royal Society Interface on electron transfer processes relevant to the Hanford subsurface. Leads multi-investigator teams and Lab-level research initiatives for major internal R&D investments.*

2006-present, **Associate Director for Geochemistry**, Physical Sciences Division, PNNL. *Leads and manages a 25-person Geochemistry Technical Group, addressed individual coaching/mentorship for staff development and performance assessments requirements within approved overhead budgets. The Geochemistry Group provides expertise and helps equip PNNL SFA research along with the Microbiology and Hydrology Groups.*

1998-2006, **Senior Scientist**, Physical Sciences Division, PNNL. *Research on elucidating relationships between the atomic and electronic structure of crystalline materials, biologic components, metal species, and organic molecules, with their reactivity and chemical or functional behavior. Led teams to develop computational molecular modeling approaches for Marcus electron transfer theory to assess self-exchange rate trends in metal hexaqua complexes, at redox-active mineral-water interfaces, and in biomolecules.*

SELECTED PUBLICATIONS (*h-index of 32 from 200 publications*)

Breuer M, KM Rosso, J Blumberger, and JN Butt. 2015. "Multi-haem cytochromes in *Shewanella oneidensis* MR-1: Structures, functions and opportunities." *Journal of the Royal Society Interface*, 12, 20141117.

Breuer M, KM Rosso, and J Blumberger. 2014. "Electron Flow in Multi-heme Bacterial Cytochromes is a Balancing Act Between Heme Electronic Interaction and Redox Potentials." *Proceedings of the National Academy of Sciences*. doi:10.1073/pnas.1316156111.

Smith DMA, and KM Rosso. 2013. "Possible dynamically gated conductance along heme wires in bacterial multiheme cytochromes." *Journal of Physical Chemistry B*, 118, 8505-8512.

Alexandrov VY, and KM Rosso. 2013. "First-Principles Insights into the Mechanism of Fe(II) Adsorption and Oxidation at Fe-Clay Mineral Surfaces." *Journal of Physical Chemistry C*, 117, 22880-22886. doi:10.1021/jp4073125.

Alexandrov VY, A Neumann, M Scherer, and KM Rosso. 2013. "Electron Exchange and Conduction in Nontronite from First-Principles." *Journal of Physical Chemistry C* 117(5):2032-2040. doi:10.1021/jp3110776.

Latta D, CI Pearce, KM Rosso, KM Kemner, and MI Boyanov. 2013. "Reaction of U-VI with titanium-substituted magnetite: Influence of Ti on U-IV speciation." *Environmental Science & Technology* 47(9):4121-4130. doi:10.1021/es303383n.

Liu J, CI Pearce, C Liu, Z Wang, L Shi, E Arenholz, and KM Rosso. 2013. " $\text{Fe}_{3-x}\text{Ti}_x\text{O}_4$ Nanoparticles as Tunable Probes of Microbial Metal Oxidation." *Journal of the American Chemical Society* 135(24):8896-8907. doi:10.1021/ja4015343.

- Shi L, Rosso KM, Zachara JM, Fredrickson JK. 2012. "Mtr Extracellular Electron Transfer Pathways in Fe(III)-Reducing or Fe(II)-Oxidizing Bacteria: A Genomic Perspective." *Biochemical Society Transactions*, 40(6):1261-1267. doi:10.1042/BST20120139.
- Breuer M, PP Zarzycki, L Shi, T Clarke, M Edwards, JN Butt, DJ Richardson, JK Fredrickson, JM Zachara, J Blumberger, and KM Rosso. 2012. "Molecular Structure and Free Energy Landscape for Electron Transport in the Deca-Heme Cytochrome MtrF." *Biochemical Society Transactions* 40(6):1198-1203.
- Breuer M, PP Zarzycki, J Blumberger, and KM Rosso. 2012. "Thermodynamics of Electron Flow in the Bacterial Deca-heme Cytochrome MtrF." *Journal of the American Chemical Society* 134(24):9868-9871. doi:10.1021/ja3027696.
- Lilova KI, CI Pearce, CA Gorski, KM Rosso, and A Navrotsky. 2012. "Thermodynamics of the Magnetite-Ulvöspinel ($\text{Fe}_3\text{O}_4\text{-Fe}_2\text{TiO}_4$) Solid Solution." *American Mineralogist* 97:1330-1338.
- Liu J, Z Wang, SM Belchik, M Edwards, C Liu, DW Kennedy, ED Merkle, MS Lipton, JN Butt, D Richardson, JM Zachara, JK Fredrickson, KM Rosso, and L Shi. 2012. "Identification and Characterization of MtoA: a Decaheme c-Type Cytochrome of the Neutrophilic Fe(II)-oxidizing Bacterium *Sideroxydans lithotrophicus* ES-1." *Frontiers in Microbiological Chemistry* 3:37. doi:10.3389/fmicb.2012.00037.
- Liu J, CI Pearce, O Qafoku, E Arenholz, SM Heald, and KM Rosso. 2012. "Tc(VII) Reduction Kinetics by Titanomagnetite ($\text{Fe}_{3-x}\text{Ti}_x\text{O}_4$) Nanoparticles." *Geochimica et Cosmochimica Acta* 92:67-81. doi:10.1016/j.gca.2012.06.004.
- Pearce CI, O Qafoku, J Liu, E Arenholz, SM Heald, RK Kukkadapu, CA Gorski, CMB Henderson, and KM Rosso. 2012. "Synthesis and Properties of Titanomagnetite ($\text{Fe}_{3-x}\text{Ti}_x\text{O}_4$) Nanoparticles: A Tunable Solid-state Fe(II/III) Redox System." *Journal of Colloid and Interface Science* 387:24-38.

SYNERGETIC ACTIVITIES

- Visiting Professor, SEAES, University of Manchester
- Eminent Visiting Scholar, Faculty of Engineering, University of New South Wales
- Life Fellow – Mineralogical Society of America
- Named Laboratory Fellow of the Pacific Northwest National Laboratory 2010
- The 2008-2009 Outstanding Recent Alumnus Award, College of Science, Virginia Tech
- The 2004 Mineralogical Society of America Award
- The Laboratory Director's Award - Pacific Northwest National Laboratory, 2004