

# Maxim I. Boyanov

---

<b>Address:</b>	Biosciences Division Argonne National Laboratory 9700 S. Cass Ave Argonne, IL, U.S.A.	<b>Phone:</b>	+1 (630) 252-8242
		<b>Fax:</b>	+1 (630) 252-9793
		<b>Email:</b>	<a href="mailto:mboyanov@anl.gov">mboyanov@anl.gov</a>
		<b>WWW:</b>	<a href="http://www.nd.edu/~mboyanov/">http://www.nd.edu/~mboyanov/</a>

---

## EDUCATION

**Ph.D.:** **Physics**, University of Notre Dame, IN, U.S.A. 1996-2003  
*Dissertation:* "XAFS spectroscopy studies of metal-ligand interactions at organic surfaces and in solution"  
*Advisor:* Prof. Bruce Bunker

**B.Sc., M.Sc.:** **Physics**, University of Sofia, Bulgaria. 1991-1995  
Illinois Institute of Technology, Chicago, IL, U.S.A. 1990-1991  
*M.Sc. Thesis:* "Two new analytical solutions to the inverse ellipsometric problem"  
*Advisor:* Prof. Stoyan Russev  
*Graduated:* Magna Cum Laude

## PROFESSIONAL EXPERIENCE

**Staff Physicist: Molecular Environmental Science Group**, Biosciences Division, 2008 - current  
Argonne National Laboratory, U.S.A.  
*Project Co-PI:* Argonne Subsurface Science Focus Area project, funded by the U.S. Department of Energy through the Subsurface Biogeochemical Research Program (\$4.5M, 3-year renewable project)

**Assistant Professor: Condensed Matter Physics**, Department of Physics, University of Sofia, Bulgaria 2007-2008  
*Funded Projects:* "Optical and fluorescence microscopy studies of solid phase deposition dynamics in drying suspension drops", Research grant from the University of Sofia, 2008-2009  
"Coupled Microbial, Geochemical, and Mineralogical Controls on Biogenic Fe Speciation and Reactivity", Argonne National Laboratory subcontract to the University of Sofia, 2007-2010  
*Classes taught:* Electricity and Magnetism, Information theory and applications, Experimental methods in Physics (optical microscopy), Scanning electron microscopy for the non-physicist, Surface phenomena in dispersed systems, Numerical methods, Radiochemistry

**Postdoctoral: X-ray Physical-Chemistry**, Environmental Research Division, Argonne National Laboratory, IL, U.S.A. 2003-2006  
*Projects:* "Adsorption and reduction of aqueous U(VI) by Fe(II) at carboxyl surfaces", "Reduction of U(VI) by green rust phases", and "X-ray elemental analysis of single bacterial cells"  
*Supervisor:* Dr. Kenneth Kemner

## RESEARCH EXPERIENCE

- Combined acid-base titration, metal adsorption, and XAFS experiments
  - $H^+$ ,  $Fe^{2+}$ , and  $UO_2^{2+}$  sorption to bacteria, minerals, latex spheres
  - Analysis using chemical equilibrium models, including DL electrostatics
  - $UO_2^{2+}$  -  $Fe^{2+}$  redox transformations
- Working with anoxic and radiological samples,  $Fe^{2+}$  and  $UO_2^{2+}$
- Complete operation of synchrotron beamlines (Advanced Photon Source)
- XAFS sample chamber designs; XAFS data analysis and software development

- Synchrotron X-ray Fluorescence (micro)analysis
  - Elemental content maps of single bacterial cells with 0.15 micron resolution
  - Metal transformations inside and near bacterial surfaces and relation to metabolic processes
  - Elemental content of petrified wood
- Synchrotron X-ray Tomography analysis
  - 3D porosity analysis of soil samples under different conditions, at 2 micron resolution
- Scanning electron microscopy of iron oxide phases
- XAFS of uranium reduction by biotically and abiotically produced iron oxide phases
  - Determination of uranium valence state and retention mechanisms in mixed-valence iron oxides-hydroxides (green rusts), magnetite, adsorbed Fe<sup>II</sup>
- GI-XAFS of aqueous Pb adsorbed underneath a Langmuir monolayer
  - Grazing incidence Pb-L<sub>III</sub> XAFS measurements on a solution surface. Provided the structure of the adsorbed complex and a model explaining the peculiar effect of Pb on monolayer bulk properties.
- EXAFS applied to metal adsorption onto cell wall biomass
  - Studied Cd ions bound to *B. subtilis* cell-wall biomass as a function of pH. Provided metal binding site speciation and geometry in the 3.4-7.8 pH range.
- XAFS and X-ray Reflectivity on III-V semiconductors and II-VI superlattices
  - Reflectivity and Reflection-mode XAFS on wet-thermally oxidized AlGaAs to characterize the interfacial region structure. Polarization dependent XAFS of II-VI superlattices.
- Ellipsometry applied to protein layers; new analytical solutions to the ellipsometric equation
  - Kinetics and extent of protein adsorption at the air/water interface studied by ellipsometry. Two analytical inversions of the non-linear minimization problem.

## HONORS AND AWARDS

Bayer Predoctoral Fellowship in Environmental Science	2001-2002
Bayer Summer Fellowship	2001
Presidential Fellowship, University of Notre Dame, IN	1996-2000
Annual Academic Excellence Stipend, University of Sofia, Bulgaria	1992-1995
Dean's List, Illinois Institute of Technology, Chicago, IL	1991

## RESEARCH INTERESTS

I am interested in the molecular-scale interactions of aqueous ions with charged groups at mineral or bacterial surfaces and in solution, including complexation, sorption, surface-controlled precipitation, and redox reactions. These processes are studied in the environmental and biogeochemical context of metal and radionuclide transformations resulting from bacterial activity in the subsurface. I employ synchrotron x-ray spectroscopy to determine the speciation and molecular structure around the metals. I am also developing and applying synchrotron x-ray fluorescence and tomography imaging techniques at the micron and sub-micron scale.

## PROFESSIONAL ACTIVITIES

- Graduate research committee member and post-doc advisor of Drew Latta, University of Iowa/ANL
- Co-organizer of the "Spectroscopic Identification of Interfacial Chemical Species in Natural and Engineered Environments" session at ACS 2012 in Philadelphia, PA, August 19-23, 2012
- Co-organizer of the "Biogeochemical Processes in Radioactive Legacy Management" session at Goldschmidt 2011 in Prague, Czech republic, August 15-19, 2011
- Co-chair of the "Abiotic and Biotic Factors Affecting Contaminant Transformation at Iron Oxide Surfaces" session at the ACS Meeting in Chicago, March 25-29, 2007
- Journal article reviewer: Environmental Science and Technology (2x2008, 2009, 2x2010, 2x2011, 2012), Geochimica et Cosmochimica Acta (2008, 2009), Applied Geochemistry (2007), Chemical Geology (2006, 2011), Journal of Physical Chemistry (2x2008), American Mineralogist (2009, 2010), Biotechnology and bioengineering (2010), Science (2012)
- Grant proposal reviews: National Science Foundation (2008), ANL LDRD (2010), SLAC(2012)
- Review panels: UChicago Cancer Research Center, 2010, 2012 grant program
- Advanced Photon Source Upgrade (APS-U) committee member (2012)

## PEER REVIEWED PUBLICATIONS

1. "CuO and ZnO nanoparticles: phytotoxicity, metal speciation, and induction of oxidative stress in sand-grown wheat", C. Dimpka, J. McLean, D. Latta, E. Manangon, D. Britt, W. Johnson, **M. Boyanov**, A. Anderson, *Journal of Nanoparticle Research*, 14:1125-1139 (2012)
2. "Immobilization of U(VI) from oxic groundwater by Hanford 300 Area sediments and effects of Columbia River water", B. Ahmed, B. Cao, B. Mishra, **M. Boyanov**, K. Kemner, J. Fredrickson, H. Beyenal, *Water Research*, 46(13): 3989-3998 (2012)
3. "Redox Behavior of Uranium at the Nanoporous Aluminum Oxide-Water Interface: Implication for Uranium Remediation", H.-B. Jung, **M. Boyanov**, H. Konishi, B. Mishra, K. Kemner, E. Roden, H. Xu, *Environ. Sci. Technol* 46(13):7301-7309, (2012)
4. "Abiotic reduction of uranium by Fe(II) in soil", D. Latta, **M. Boyanov**, K. Kemner, E. O'Loughlin, M. Scherer, *Applied Geochemistry*, 27, 8, 1512-1524 (2012)
5. "Microbial Reductive Transformation of Phyllosilicate Fe(III) and U(VI) in Fluvial Subsurface Sediments", J.-H. Lee, J. Fredrickson, X. Lin, R. Kukkadapu, **M. Boyanov**, K. Kemner, D. Kennedy, B. Bjornstad, A. Konopka, D. Moore, C. Resch, J. Phillips. *Environ. Sci. Technol.*, 46, 3721–3730 (2012)
6. "Influence of Magnetite Stoichiometry on U<sup>VI</sup> Reduction", D. Latta, C. Gorsky, **M. Boyanov**, K. Kemner, E. O'Loughlin, M. Scherer. *Environ. Sci. Technol.*, 46, 778-786 (2012). (cited: 6)
7. "Microscale geochemical gradients in Hanford 300 Area sediment biofilms and influence of uranium", H. Nguyen, B. Cao, B. Mishra, **M. Boyanov**, K. Kemner, J. Fredrickson, H. Beyenal, *Water Research*, 46, 227-234 (2012) (cited: 4)
8. "Binding of Hg<sup>II</sup> to high affinity sites on bacteria inhibits reduction to Hg<sup>0</sup> by mixed Fe<sup>II/III</sup> phases", B. Mishra, E. O'Loughlin, **M. Boyanov**, K. M. Kemner. *Environ. Sci. Technol.* 45, 9597–9603 (2011). (cited: 0)
9. "Solution and Microbial Controls on the Formation of Reduced U(IV) Species", **M. Boyanov**, K. Fletcher, M.-J. Kwon, X. Rui, E. O'Loughlin, F. Löffler., K. Kemner. *Environ. Sci. Technol.* 45, 8336-8344 (2011) (cited: 7)
10. "Microbial reduction of chlorite and uranium followed by air oxidation", G. Zhang, W. Burgos, J. Senko, M. Bishop, H. Dong, **M. Boyanov**, K. Kemner. *Chemical Geology* 283, 242-250 (2011) (cited: 4)
11. "Multiple Mechanisms of Uranium Immobilization by Cellulomonas sp. Strain ES6", V. Sivaswamy, **M. Boyanov**, B. M. Payton, S. Viamajala, R. Gerlach, W. A. Apel, R. K. Sani, A. Dohnalkova, K. M. Kemner, T. Borch, *Biotechnology and Bioengineering*, 108, 264-276 (2011) (cited: 15)
12. "One-Pot Aqueous Synthesis of Fe and Ag Core/Shell Nanoparticles", K. Carroll, D. Hudgins, S. Spurgeon, K. Kemner, B. Mishra, **M. Boyanov**, L. Brown, III, M. Taheri, E. Carpenter, *Chemistry of Materials*, 22, 6291–6296 (2010) (cited: 7)
13. "U(VI) Reduction to Mononuclear U(IV) by *Desulfitobacterium* spp.", K. Fletcher, **M. Boyanov**, K. Kemner, S. Thomas, Q. Wu, F. Löffler. *Environ. Sci. Technol.* 44, 4705-4709 (2010).(cited: 31)
14. "Effects of Oxyanions, Natural Organic Matter, and Bacterial Cell Numbers on the Bioreduction of Lepidocrocite ( $\gamma$ -FeOOH) and the Formation of Secondary Mineralization Products", E. O'Loughlin, C. Gorski, M. Scherer, **M. Boyanov**, K. Kemner, *Environ. Sci. Technol.* 44, 4570–4576 (2010) (cited: 16)
15. "Equations of state and adsorption isotherms of low molecular non-ionic surfactants", I.Ivanov,K.Danov,D.Dimitrova,**M.Boyanov**,K.Ananthapadmanabhan,A.Lips, *Colloids.Surf.A* 354, 118-133 (2010) (cited: 2)
16. "Iron phase transformations resulting from the respiration of *Shewanella putrefaciens* on a mixed mineral phase", **M. Boyanov**, E. O'Loughlin, K. Kemner, *Journal of Physics: Conference Series* 190 (2009) 012193-012196 (cited: 1)
17. "High- and low-affinity binding sites for Cd on the bacterial cell walls of *Bacillus subtilis* and *Shewanella oneidensis*" B. Mishra, **M. Boyanov**, B. A. Bunker, S. D. Kelly, K. M. Kemner, J. B. Fein, *Geochimica et Cosmochimica Acta* 74 (2010) 4219–4233(cited: 11)
18. "An X-ray Absorption Spectroscopy Study of Cd Adsorption Onto Bacterial Consortia", B.Mishra, **M.Boyanov**, B.Bunker, S.Kelly, K.Kemner, R. Norenberg, B. Read-Daily, J.Fein, *Geochim. et Cosmochim. Acta* 73, 4311-4325 (2009) (cited: 10)

19. "Adsorption of iron(II) and uranium(VI) to carboxyl-functionalized microspheres: the influence of speciation on uranyl reduction studied by titration and XAFS", **M.Boyanov**, E.J.O'Loughlin, E.Roden, J.Fein, K.Kemner, *Geochim.Cosmochim.Acta* 1898-1912 (2007) (*cited: 40*)
20. "A pH-Dependent X-Ray Absorption Spectroscopy Study of U Adsorption to Bacterial Cell Walls", B. Ravel, S. Kelly, D.Gorman-Lewis,**M. Boyanov**, J.Fein, K. Kemner, *American Institute of Physics CP 882*, 202-204 (2007) (*cited: 1*)
21. "XAFS and X-Ray and Electron Microscopy Investigations of Radionuclide Transformations at the Mineral-Microbe Interface", K.Kemner,E.O'Loughlin,S.Kelly,B.Ravel,**M.Boyanov**,D.Sholto-Douglas,B.Lai,R.Cook,E.Carpenter,V.Harris,K.Nealson, *American Institute of Physics CP 882*, 250-252 (2007) (*cited: 1*)
22. "Comparison of Cd Binding Mechanisms by Gram-Positive, Gram-Negative and Consortia of Bacteria Using XAFS", B.Mishra,J.Fein,**M.Boyanov**,S.Kelly,K.Kemner,B.Bunker, *American Institute of Physics CP 882*, 343-345 (2007) (*cited: 2*)
23. "Mixed valence cytoplasmic iron granules are linked to anaerobic respiration," S. Glasauer, S. Langley, **M. Boyanov**, B. Lai, K. M. Kemner, T. J. Beveridge, *Appl. Environ. Microb.* 73(3), 993-996 (2007) (*cited: 16*)
24. "c-Type Cytochrome-Dependent Formation of U(IV) Nanoparticles by *Shewanella oneidensis*", M. Marshall, A.Beliaev, A.Dohnalkova, D.Kennedy, L. Shi, Z. Wang, **M.Boyanov**, B.Lai, K.Kemner, J.McLean, S.Reed, D.Culley, V.Bailey, C.Simonson, D.Saffarini, M.Romine, J.Zachara, J.Fredrickson, *PLoS Biology* 4(8), 1324-1333 (2006) (*cited: 124*)
25. "Synchrotron X-ray Investigations of Mineral–Microbe–Metal Interactions", K.Kemner, E.O'Loughlin, S.Kelly, **M.Boyanov**, *Elements* 1(4), 217-221 (2005) (*cited: 12*)
26. "Local structure around Cr<sup>3+</sup> ions in dilute acetate and perchlorate aqueous solutions", **M.I.Boyanov**, K.M.Kemner, T. Shibata, B.A.Bunker, *J. Phys. Chem. A* 108, 5131-5138 (2004) (*cited: 1*)
27. "Adsorption of cadmium to *B.subtilis* bacterial cell walls — a pH-dependent XAFS spectroscopy study", **M.I.Boyanov**, S.D.Kelly, K.M.Kemner, B.A.Bunker, J.B.Fein, D.A.Fowle. *Geochim. et Cosmochim. Acta* 67(18), 3299-3311 (2003) (*cited: 127*)
28. "Mechanism of aqueous Pb adsorption to fatty acid Langmuir monolayers studied by XAFS spectroscopy", **M.I.Boyanov**, J.Kmetko, T.Shibata, A.Datta, P.Dutta, B.A.Bunker. *J. Phys. Chem. B* 107, 9780-9788 (2003) (*cited: 20*)
29. "X-ray-absorption fine-structure determination of pH-dependent cell wall interactions", S.Kelly, K.Kemner, J.Fein, D.Fowle, **M.Boyanov**, B.Bunker, N.Yee. *Geochim. et Cosmochim. Acta*, 66(22), 3855-3871 (2002) (*cited: 133*)
30. "Non-metabolic reduction of Cr(VI) by bacterial surfaces under nutrient-absent conditions", J.Fein, K.Kemner, D.Fowle, J.Cahill, **M.Boyanov**, B.Bunker. *Geomicrobiology Journal* 19(3), 369-382 (2002) (*cited: 31*)
31. "XAFS determination of the bacterial cell wall functional groups responsible for complexation of Cd and U as a function of pH", S.D.Kelly, **M.I.Boyanov**, B.A.Bunker, J.B.Fein, D.A.Fowle, N.Yee, and K.M.Kemner. *J. Synchrot. Radiat.* 8, 946-948 (2001) (*cited: 41*)
32. "XAFS studies of gold and silver-gold nanoparticles in aqueous solutions", T. Shibata, H.Tostmann, B.Bunker, A.Henglein, D.Meisel, S.Cheong, and **M.Boyanov**. *J. Synchrot. Radiat.* 8, 545-547 (2001) (*cited: 17*)
33. "Analytical determination of the optical constants of a substrate in the presence of a covering layer by use of ellipsometric data", S.C.Russev, **M.I.Boyanov**, J.P.Drolet, R.M.Leblanc. *J. Opt. Soc. Am. A-Opt. Image Sci. Vis.* 16(6), 1496-1500 (1999) (*cited: 4*)
34. "Polynomial Inversion of the Single Transparent Layer Problem in Ellipsometry", J.P.Drolet, S.C.Russev, **M.I.Boyanov**, R.M.Leblanc. *J. Opt. Soc. Am. A-Opt. Image Sci. Vis.* 1112, 3284-3291 (1994) (*cited: 19*)

Three of the above publications (No. 8, No. 18, and No. 25) have been highlighted in *APS Science*, the annual report to the US Department of Energy highlighting science done at the Advanced Photon Source. Titles are "Local Structure Around Cr ions in Aqueous Acetate

Solutions” (p.97 of 2004 report), “Reducing Uranium Waste” (p.110 of 2007 report), and “How Subsurface Bacteria Breathe Affects Uranium Mobility and Dispersal” (p. 124 of 2012 report).

### PEER REVIEWED PUBLICATIONS (in review or in press)

35. “Micrometer-Scale Physical Structure and Microbial Composition of Soil Aggregates”, VL Bailey, LA McCue, SJ Fansler, **M.I. Boyanov**, F. De Carlo, K.M. Kemner, A.E. Konopka, *ISME Journal*, In revision (10/2012)

### BOOK CHAPTERS

1. “Redox processes affecting the speciation of technetium, uranium, neptunium, and plutonium”, E. O’Loughlin, **M. Boyanov**, D. Antonopoulos, K. Kemner, Chapter 22 In *Aquatic Redox Processes*; P.G. Tratnyek, T. J. Grundl, and S. Haderlein, Eds. American Chemical Society, Washington DC, pp. 477-517, DOI 10.1021/bk-2011-1071.ch022. (2011)
2. “Elemental Analysis and Fe K-edge XAFS of Petrified Wood”, **M. Boyanov**, R. Dayvault, K. Kemner; Work included in chapter 3 of “Petrified Wood: The World of Fossilized Wood, Cones, Ferns, and Cycads” by F.Daniels, B. Britt, and R. Dayvault, Western Colorado Publishing Company, Grand Junction, CO, (1998)

### CONTRIBUTED ABSTRACTS AND PAPERS

1. “Environmental Research at the Advanced Photon Source”, Kemner K. M., **Boyanov M. I.**, Eng P., Fenter P., Heald S., Lai B., Lee S. S., Scheckel K. G., Skanthakumar S., Soderholm L., Sutton S. R., and Wilson R. E., *Synchrotron Radiation News* 23(5), 20-27 (2010)
2. “Distinct uranium(IV) products result from uranyl reduction in different ferrous-ferric oxyhydroxide systems”, **Boyanov MI**, Latta DE, O’Loughlin EJ, Gorski CA, Scherer MM, Kemner KM, *Geochimica et Cosmochimica Acta* 73(13), A151 (2009)
3. “Effects of oxyanions, natural organic matter, and Fe(III) oxide mineralogy on the formation of Fe(II)-bearing secondary mineralization products resulting from the bioreduction of Fe(III) oxides”, O’Loughlin, E.J., Gorsky, C.A., Latta, D.E., **Boyanovi, M.I.**, Cook, R.E., Scherer, M.M., Kemner, K.M., *Geochimica et Cosmochimica Acta* 73(13), A959 (2009)
4. “Interactions of U(VI) with secondary mineralization products from the bioreduction of Fe(III) oxides”, O’Loughlin EJ, Kelly SD, **Boyanov MI**, Kemner KM, *Geochimica et Cosmochimica Acta* 72(12), A694 (2009)
5. “Fine-Scale Physical Structure and Microbial Composition of Soil Aggregates”, Bailey, V. L.; McCue, L.; **Boyanov, M. I.**; de Carlo, F.; Fierer, N.; Hamady, M. L.; Knight, R.; Konopka, A. E.; Lauber, C.; Smith, J. L.; Kemner, K. M., American Geophysical Union, Fall Meeting 2008, abstract #B52A-05, (12/2008)
6. “U(VI) reaction with green rusts: Influence of anions”, Clair MS, Smith SL, Harrison JO, O’Loughlin EJ, Kemner KM, **Boyanov MI**, Scherer MM. Abstracts of papers of the American Chemical Society, 231, 216-ENVR (2006)
7. “The Internalization of Iron and Manganese as Discrete Particles During the Bioreduction of Fe(III) and Mn(IV) by a Dissimilatory Metal-Reducing Bacterium”, Glasauer, S. M.; Langley, S.; Beveridge, T. J.; Fakra, S.; Tyliczszak, T.; Shuh, D.; Boyanov, M.; Kemner, K., American Geophysical Union, Fall Meeting 2006, abstract #B13B-1095 (12/2006)
8. “X-ray Microscopy Analysis of Bacterial Cells”, Kemner, K.; Kelly, S.; **Boyanov, M.**; Ravel, B.; O’Loughlin, E.; Lai, B.; Dohnalkova, Marshall, M.; Fredrickson, J.; Glasauer, S.; Beveridge, T.; Daly, M.; Nealson, K. , *Microscopy and Microanalysis*, vol. 12, issue S02, p. 1216, *Microscopy and Microanalysis 2006 in Chicago, Illinois, USA, July 30 – August 3* (2006)
9. “X-ray microprobe investigations of mineral-metal-microbe interfaces”, Kemner KM, Kelly SD, **Boyanov MI**, Lai B, Glasauer S, Langley S, Kulpa CF, Beveridge TJ, Nealson KH. *Geochimica et Cosmochimica Acta*, 69, A34 (2005)
10. “Reduction of U by adsorbed vs. surface-precipitated Fe(II) at model cell surfaces”, **Boyanov MI**, O’Loughlin EJ, Kelly SD, Roden EE, Fein JB, Kemner KM, *Geochimica et Cosmochimica Acta*, 69, A367 (2005)

11. "Cd adsorption onto *Bacillus subtilis* bacterial cell walls: Integrating isotherm and EXAFS studies", Mishra B, Kelly SD, Fein JB, **Boyanov M**, Kemner KM, Bunker BA, *Geochimica et Cosmochimica Acta* 69(10), A675 (2005)
12. "XAFS investigations of interactions of U(VI) with *Bacillus subtilis*, green rust, and bio-oxidizing *Dechlorosoma suillum*", S.D.Kelly, K.M.Kemner, E.J.O'Loughlin, J.B.Fein, D.A.Fowle, **M.I.Boyanov**, B.A.Bunker, N.Yee, J. D.Coates. *Preprints of Extended Abstracts*, American Chemical Society, Washington, D.C., 41(2):254-258 (2001).
13. "XAFS determination of U-bacterial cell wall interaction at low pH", S.D.Kelly, K.M.Kemner, J.B.Fein, D.A.Fowle, **M.I.Boyanov**, B.A.Bunker, N.Yee. Abstr. *Preprints of Extended Abstracts*, American Chemical Society, Washington, D.C., 41(1):541-546 (2001)
14. "Reduction of trace elements by mixed Fe(II)/Fe(III) hydroxide (green rust)", E.J.O'Loughlin, S.D.Kelly, K.M.Kemner, **M.I.Boyanov**. *Preprints of Extended Abstracts*, American Chemical Society, Washington, D.C., 41(1):573-577 (2001).
15. "XAFS Study of U Sorption to Bacterial Cell Wall," S.D.Kelly, K.M.Kemner, J.B.Fein, D.A.Fowle, **M.I.Boyanov**, B.A.Bunker, N.Yee. p. 19 in *Proceedings of the Sixth International Conference on Biogeochemistry of Trace Elements*; Guelph '01 (2001).
16. "Reduction of Cu(II) and U(VI) by Mixed Fe(II)/Fe(III) Hydroxide (Green Rust)," E. O'Loughlin, S.D.Kelly, K.M.Kemner, **M.I.Boyanov**. p. 49 in *Proceedings of the Sixth International Conference on Biogeochemistry of Trace Elements*; Guelph '01 (2001).
17. "Reflectivity and Reflection-mode XAFS study of III-V compound native oxide/GaAs Interface", B.A.Bunker, S.-K.Cheong, T.Shibata, **M.Boyanov**, D.Lahiri, D.C.Hall, G.L.Snider, P.J.Barrios. paper B6-04 in *11th International Conference on X-ray Absorption Fine Structure (XAFS XI)*. Aiko, Japan, July 27-31 (2000)
18. "Reflectivity and Reflection-mode XAFS study of the wet-thermal native oxide/GaAs interface," S-K.Cheong, T.Shibata, **M.Boyanov**, D.Lahiri, B.A.Bunker, D.C.Hall, G.L.Snider, P.J.Barrios, paper J11.010, in the *Bulletin of the American Physical Society*, vol. 46, no. 1 (2001).
19. "X-ray reflectivity and reflection-mode XAFS study of III-V compound native oxide/GaAs interfaces", S.-K.Cheong, T.Shibata, **M.Boyanov**, D.Lahiri, B.A. Bunker, D.C. Hall, G.L.Snider. paper I19.02, 2000 March Meeting of American Physical Society, Minneapolis, Minnesota, March 20-24, (2000)
20. "Reflection Mode XAFS studies of III-V compound native oxide/GaAs Interfaces," S.-K.Cheong, T.Shibata, **M.Boyanov**, D.Lahiri, B.A.Bunker, D.C.Hall, G.L.Snider, C.B. DeMelo. paper XC23.09, American Physical Society 1999 Centennial Meeting (Atlanta, Georgia, March 20-26, 1999).

## TECHNICAL REPORTS

1. "Effect of dimerization and ion specific effects on laurate salts surface activity", I. Ivanov, **M. Boyanov**, R. Stanchov, I. Stoychev. Research Progress Report submitted to Unilever's Global Research and Development Centre, Trumbull, CT, April 22, 2011
2. "XAFS Investigations of Hydrated Cr<sup>3+</sup> Ions and Their Complexation to Dissolved Acetate Groups", **M. Boyanov**, K. Kemner, T. Shibata, B. Bunker, Advanced Photon Source Activity Report 2003
3. "XAFS Study of Calcium Complexation to Uranyl Bicarbonate", S.D. Kelly, K.M. Kemner, **M. Boyanov**, E. O'Loughlin, S.C. Brooks, J.K. Fredrickson, APS Activity Report 2003
4. "Comparison of U Valence State Ratio Determined from U L3-Edge XANES to EXAFS Measurements", S.D. Kelly, K.M. Kemner, **M.I. Boyanov**, E.J. O'Loughlin, B.H. Jeon, M.O. Barnett, W.D. Burgos, B.A. Dempsey, E.E. Roden, APS Activity Report 2003
5. "U L3-Edge XANES Measurements of U(VI) Biologically Reduced by *Shewanella putrefaciens* with Soil Humic Acids", S.D. Kelly, K.M. Kemner, E.J. O'Loughlin, **M.I. Boyanov**, J. Stone, Z. Shi, R. Kirkham, R. Royer, B. Dempsey, E. Roden, B. Gu, W. Burgos, APS Activity Report 2003
6. "U L3-Edge EXAFS Measurements of Sediment Samples from Oak Ridge National Laboratory, Tennessee, U.S.A.", S.D. Kelly, K.M. Kemner, E.J. O'Loughlin, **M.I. Boyanov**, D.B. Watson, P.M. Jardine, D.H. Phillips, APS Activity Report 2003
7. Competitive Adsorption of Cd to Bacterial Cell Wall and Mineral Surfaces– XAFS study, B. Mishra, **M. Boyanov**, S.D Kelly, K.M Kemner, J.B Fein, B.A Bunker, APS Activity Report 2003

8. Reduction of Uranium(VI) to Uranium (IV) by Biogenic Mixed Fe(II)/Fe(III) Hydroxide (Green Rust), E.J. O'Loughlin, S.D. Kelly, K.M. Kemner, and **M.I. Boyanov**, APS Activity Report 2003
9. "XAFS Spectroscopy of the Trichromium Acetate Aqueous Complex", **M. Boyanov**, T. Shibata, K. Kemner, B. Bunker, APS Activity Report 2002
10. "EXAFS of Aqueous Pb Adsorbed underneath Fatty Acid Langmuir Monolayers" **M. Boyanov**, J. Kmetko, T. Shibata, A. Datta, B. Bunker, P. Dutta, APS Activity Report 2001
11. "Photo-induced Transformations at Semiconductor-Metal Interface: XAFS Investigation of UV-irradiated Au/TiO<sub>2</sub> Films", D. Dey, V. Subramanian, T. Shibata, **M. Boyanov**, P. Kamat, B. Bunker, APS Activity Report 2001
12. "XAFS of Ga<sub>1-x</sub>Mn<sub>x</sub>As Alloys", A. M. Stuckey, **M. Boyanov**, T. Shibata, T. Wojtowicz, APS Activity Report 2001
13. "EXAFS of Cadmium Acetate Aqueous Solutions", **M. I. Boyanov**, S. D. Kelly, B. A. Bunker, K. M. Kemner, J. B. Fein, APS Activity Report 2000
14. "EXAFS of Cadmium Phosphate Solutions", **M. I. Boyanov**, S. D. Kelly, B. A. Bunker, K. M. Kemner, J. B. Fein, APS Activity Report 2000
15. "XAFS Study of U-Bacterial Cell Wall Interaction", S. D. Kelly, K. M. Kemner, J. B. Fein, D. A. Fowle, **M. I. Boyanov**, B. A. Bunker, N. Yee, APS Activity Report 2000
16. "Reduction of Uranium(VI) by Mixed Fe(II)/Fe(III) Hydroxide (Green Rust)", E. J. O'Loughlin, S. D. Kelly, K. M. Kemner, **M.I. Boyanov**, APS Activity Report 2000
17. "Binding of Cd ions to the cell wall of B. Subtilis-- an EXAFS study", **M. Boyanov**, D. Fowle, K. Kemner, B. Bunker, J. Fein, APS Activity Report 1999
18. "Grazing Incidence XAFS of Lead Adsorbed Underneath Fatty Acid Langmuir Monolayers", **M. Boyanov**, A. Datta, T. Shibata, J. Kmetko, B. Bunker, P. Dutta, APS Activity Report 1999
19. "Ordering of Liquids Near Solid Interfaces", D. Lahiri, T. Shibata, S. Cheong, **M. Boyanov**, and B. A. Bunker, APS Activity Report 1999
20. "The Arsenic site in oxidized Al<sub>0.98</sub>Ga<sub>0.02</sub>As", S. Cheong, **M. Boyanov**, D. Lahiri, T. Shibata, B. A. Bunker, D. Hall, G. Snider, APS Activity Report 1999
21. "XAFS Study of Zn<sub>0.5</sub>Te<sub>1-x</sub> Sinusoidally-modulated Superlattices", **M. Boyanov**, B. Bunker, S. Lee, J. Furdyna, APS Activity Report 1999
22. "X-ray specular reflection study of oxidized 300 Å Al<sub>0.98</sub>Ga<sub>0.02</sub>As film on a GaAs substrate", S. Cheong, T. Shibata, **M. Boyanov**, D. Lahiri, B. A. Bunker, D. Hall, G. Snider, C. DeMello, APS Activity Report 1999

## INVITED CONFERENCE PRESENTATIONS

1. "Reactivity of U(VI) with pure, oxidized, and Ti-substituted magnetites", D. Latta, C. Pearce, C. Gorski, K. Rosso, E. O'Loughlin, K. Kemner, M. Scherer, **M. Boyanov**, Goldschmidt 2012, session 8f Inorganic redox processes at mineral surfaces and nanoparticles, Montreal, Canada, June 29, 2012
2. "Elucidating bacteria-mineral-contaminant interactions using electron and x-ray microspectroscopy approaches", **M. Boyanov**, D. Latta, B. Mishra, S. Langley, S. Glasauer, B. Lai, E. O'Loughlin, K. Kemner, Advanced Photon Source Users' Meeting, "Probing the Interface between Biological Systems and the Environment" workshop, Argonne, IL, May 8, 2012
3. "Bioreduction of U(VI) in the presence of phosphate", **M. Boyanov**, B. Mishra, D. Latta, X. Rui, M. J. Kwon, K. Fletcher, F. Loeffler, E. O'Loughlin, K. Kemner, EGU General Assembly 2012, "Nexus between microbes, metals and minerals in the environment" session, Vienna, Austria, April 24, 2012
4. "Reduction of U(VI)-phosphate Mineral by Metal Reducing Bacteria", M. J. Kwon, X. Rui, **M. Boyanov**, E. J. O'Loughlin, S. Dunham-Cheatham, J. Fein, B. Bunker, K. Kemner, 2012 Joint Conference of the Geological Science & Technology of Korea, 18-20 April 2012, Seolak Daemyeong Resort, Korea
5. "XRF imaging and XAFS analysis of uranium dynamics in biostimulated field-site sediments", E. J. O'Loughlin, **M. I. Boyanov**, K. Skinner, B. Mishra, S. D. Kelly, W.-M. Wu, C. Criddle, M. Mueller, T. Melhorn, D. Watson, S. Brooks, K. M. Kemner, 2012 Spring ACS Meeting, "Redox Transformations of Metals in Sediments at Molecular to Pore Scales" session, San Diego, March 25, 2012

6. "Mineral nucleation and redox transformations of U(VI) and Fe(II) species at a carboxyl surface", **M. Boyanov**, E. O'Loughlin, K. Kemner, 2011 International Workshop on Subsurface Biogeochemistry, KIST Gangneung Institute, South Korea, October 21, 2011
7. "An Introduction to Synchrotron Radiation and x-ray Fluorescence Micro(spectro)scopy to Investigate the Mineral-microbe Environment", **K. Kemner**, **M. Boyanov**, E. O'Loughlin, 2011 International Workshop on Subsurface Biogeochemistry, KIST Gangneung Institute, South Korea, October 21, 2011
8. "Biogeochemical Factors Controlling Green Rust Formation and Contaminant Reduction", **E. O'Loughlin**, **M. Boyanov**, K. Kemner, 2011 International Workshop on Subsurface Biogeochemistry, KIST Gangneung Institute, South Korea, October 21, 2011
9. "Immobilizing a legacy: bacterial reduction of hexavalent uranium", **F. Löffler**, **M. Boyanov**, K. Kemner, et al., Keynote presentation at the 8<sup>th</sup> International Symposium of Subsurface Microbiology, Garmisch-Partenkirchen, September 11, 2011
10. "Uranium dynamics in biostimulated field-site sediments: spatial distribution and formation of non-uraninite U(IV) phases", **Boyanov M**, O'Loughlin E, Skinner K, Mishra B, Kelly S, Wu W-M, Criddle C, Mueller M, Melhorn T, Watson D, Brooks S & Kemner K, Goldschmidt 2011, Prague, August 14-19, 2011
11. "Effects of Microbial Activity and Electron Shuttles on the Reduction of U(VI) Under Sulfidogenic Conditions", **O'Loughlin EJ**, **Boyanov MI**, Kwon MJ, Long P, Williams K & Kemner KM, Goldschmidt 2011, Prague, August 14-19, 2011
12. "Microbial Uranium Reduction and Monitoring Tools", R. Sanford, C. Lundstrom, T. Johnson, K. Kramer, **M. Boyanov**, K. Pennell, K. Ritalahti, **F. Loeffler**, Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 26-28, 2011
13. "Microbial and Geochemical Dynamics During Bioreduction Stimulated by Emulsified Vegetable Oil", **C. Schadt** et al., Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 26-28, 2011
14. "Fe(II)-Fe(III) Electron Transfer in Fe Oxides and Clays: Implications for Contaminant Transformations", **Scherer M**, Gorski C, Schaefer M, Latta D, O'Loughlin E, **Boyanov M** & Kemner K, International Goldschmidt meeting, Knoxville TN, June 18, 2010
15. "X-ray biogeochemistry: elucidating bacteria-mineral-contaminant interactions at the molecular scale", **M. Boyanov**, E. O'Loughlin, D. Sholto-Douglas, K. Skinner, M-J. Kwon, B. Mishra, K. Fletcher, **F. Loeffler**, M. Marshall, J. Fredrickson, T. Shibata, B. Lai, K. Kemner, APS Users' Meeting, Argonne, May 4, 2010
16. "Electron shuttle effects on microbial community development under iron- and sulfate-reducing conditions", **E. J. O'Loughlin**, D. A. Antonopoulos, B. S. Bates, **M. I. Boyanov**, J. M. Brulc, M. Egholm, A. Garoutte, T. Harkins, M. Kwon, P. Long, F. Meyer, J. Osterberger, B. B. Simen, K. A. Skinner, J. Wilkening, K. H. Williams, K. M. Kemner, Challenges in Environmental Molecular Microbiology, Argonne National Laboratory, April 26-27, 2010
17. "The utility of hard x-ray synchrotron radiation for environmental microbiology", **K. M. Kemner**, **M. Boyanov**, E. J. O'Loughlin, D. Sholto-Douglas, K. Skinner, B. Lai, R. E. Cook, E. Carpenter, V. G. Harris, S. D. Kelly, K. H. Nealson, Challenges in Environmental Molecular Microbiology, Argonne National Laboratory, April 26-27, 2010
18. "Microbial communities and ecosystem function: Challenges of making white boxes out of black boxes", **D. Antonopolus**, A. Ammar, B. S. Bates, **M. I. Boyanov**, M. H. Domanus, M. J. Kwon, P. Long, F. Meyer, E. O'Loughlin, D. Sholto Douglas, K. Skinner, K. H. Williams, K. M. Kemner, Challenges in Environmental Molecular Microbiology, Argonne National Laboratory, April 26-27, 2010
19. "The influence of ligands on the formation of non-uraninite U(IV) phases during biotic and abiotic U(VI) reduction", **M. Boyanov**, E. O'Loughlin, M-J. Kwon, K. Skinner, B. Mishra, C. Criddle, W-M. Wu, F. Yang, T. Marsh, K. Fletcher, **F. Loeffler**, K. Kemner, 2010 Subsurface Biogeoscience Research PI meeting, Washington D.C., March 30, 2010.
20. "Contaminant Interactions with Green Rusts: Abiotic and Biotic Pathways", **M. Scherer**, **M. Boyanov**, J. Coates, C. Gorski, K. Kemner, P. Larese-Casanova, D. Latta, E. O'Loughlin, S. Smith,



- M. St. Clair, K. Weber, 233rd American Chemical Society (ACS) Meeting, Chicago, March 25-29, 2007
21. "Geomicrobiology investigations using x-ray and electron microprobes", K.Kemner, **M.Boyanov**, et al., Workshop on Biological Applications of X-Ray Microprobes, Northwestern Hospital, Chicago, Illinois, November 15 and 16, 2007.
  22. "Formation of Minerals Inside and Near Single Bacterial Cells: Elemental Content and Valence State at the Sub-Micron Scale", M. Boyanov, B. Lai, S. Glasauer, M. Marshall, S. Langley, A. Dohnalkova, J. Fredrickson, T. Beveridge, K. Kemner; X-ray Spectromicroscopy: a Tool for Environmental Science Workshop, 2006 Users Meeting, Argonne National Laboratory, Argonne, IL; May 1-5, 2006.
  23. "The use of synchrotron-based techniques for biogeoscience research," K. M. Kemner, **M. Boyanov**, E. J. O'Loughlin, S. D. Kelly, B. Ravel; Synchrotron Environmental Science-III Conference, Brookhaven National Laboratory, Upton, NY, September 19-21, 2005.
  24. "X-ray microprobe investigations of mineral-metal-microbe interfaces", K.M. Kemner, S.K. Kelly, **M.I. Boyanov**, B.Lai, S. Glasauer, S. Langley, C. Kulpa, T. Beveridge, K. Neelson; 15th Annual Goldschmidt Conference, Moscow, ID; May 20-25, 2005.
  25. "Effect of microbial exopolymers on the spatial distributions and transformations of Cr and U at the bacteria-geosurface interface", Kemner, K.; Kelly, S.; O'Loughlin, E.; **Boyanov, M.**; Neelson, K.; Glasauer, S.; Beveridge, T.; Lai, B.; Maser, J.; Cai, Z. DOE-NABIR PI Meeting; Warrenton, VA; Apr 18-20, 2005
  26. "Metal sorption and the bacterial membrane : implications for biomineralization and fossilization", S. M. Glasauer, C. Cousins; S. Langley, T. Beveridge, **M. Boyanov**, B. Lai, K. Kemner, European Geoscience Union General Assembly 2005; Vienna, Austria; Apr 24-29, 2005
  27. "Mechanism of lead adsorption to fatty acid Langmuir monolayers by XAFS spectroscopy ", M.Boyanov, T.Shibata, J.Kmetko, A.Datta, P.Dutta, B.Bunker. APS Users' Meeting, Argonne, March 2003
  28. "Metal Adsorption onto Bacterial Surfaces:The Use of X-ray Absorption Fine Structure Measurements to Determine Metal Binding Mechanisms ", J.Fein, P.Wightman, D.Fowle, N.Yee, K.Kemner, S.Kelly, **M.Boyanov**, B.Bunker. SES-II Conference, Argonne, May 2002
  29. "XAFS investigations of interactions of U(VI) with minerals and microbes", S.Kelly, K. Kemner, E.O'loughlin, R.Cook, R.Csencsits, J.Fein, D.Fowle, **M.Boyanov**, B.Bunker, N.Yee, J.Coates, J.Lack, S.Chaudhuri, S.O'Connor. 11th Users Meeting for the APS, Argonne, IL, October 2001
  30. "X-ray Investigations of Microbe-Mineral-Contaminant Interactions," Kemner, K.M., Lai, B., Maser, J., Pratt, S.T., Cai, Z., Legnini, D., Ilinski, P., Rodrigues, W., Germino, K., Kelly, S., Belz, A., Neelson, K., Schneegurt, M., Kulpa, C., Mundo, M., Fowle, D., **Boyanov, M.**, Bunker, B., Fein, J., Tischler, M., Fredrickson, J., Gorby, Y., Smith, S., and Zachara, J., Natural and Accelerated Bioremediation Meeting, DOE Office of Biological and Environmental Research, Washington, D.C., January 31-February 2, 2000.

## INVITED SEMINAR PRESENTATIONS

1. "Tracking the transformations of contaminants and Fe phases using synchrotron x-ray absorption spectroscopy", M. Boyanov, E. O'Loughlin, K. Kemner, Seminar at the KIST Seoul Institute, Korea, October 18, 2011.
2. "Uranium Transformations by Coupled Microbial and Geochemical Processes: Rust-Breathing Bacteria and Our Cold War Legacy", E.O'Loughlin, **M.Boyanov**, K.Kemner, et al., Seminar at the McCormick School of Engineering of Northwestern University, September 30, 2011.
3. "Differences in the electron transfer mechanisms of gram-negative vs. gram-positive bacteria suggested by the products of uranyl reduction", M.Boyanov, K.Fletcher, E.O'Loughlin, M.Kwon, B.Mishra, K.Skinner, D. Sholto-Douglas, F. Loeffler, K.Kemner. Biosciences Division seminar, Argonne National Laboratory, December 3, 2009.
4. "Investigating mineral-metal-microbe interactions with hard x-ray radiation", K.Kemner, E. O'Loughlin, **M.Boyanov**, S.Kelly, D.Sholto-Douglas, K.Skinner, B.Lai, Y.Londer, M.Schiffer, R.Cook,

M.Marshall, J.Fredrickson, P.Jardine, D.Watson, J.Banfield, Y. Suzuki, Seminar at the University of Illinois, Urbana-Champaign, September 11, 2009.

5. "Effect of electron shuttles on Fe reduction", E.O'Loughlin, **M.Boyanov**, S.Kelly, K.Kemner, et al., Seminar at the University of Iowa, Dept of Civil and Environmental Engineering, January 21, 2009.
6. "Investigation of mineral-metal-microbe interactions with hard x-rays", K.Kemner, **M.Boyanov**, et al., Pennsylvania State University Environmental Engineering Department Colloquium, State College, Pennsylvania, November 2, 2007.
7. "Biogeochemical processes affecting uranium in calcium carbonate systems – Atomic-scale interactions related to macroscopic properties" S.D. Kelly, K.K. Kemner, S.C. Brooks, J. Fredrickson, T.Rasbury, C. Spotl, N.Sturchio, P. Fenter, S. Chattopadhyay, **M. Boyanov**, E. O'Loughlin, J. Kropf, Geological Sciences Colloquium, Indiana University, Bloomington, IN, April 25, 2005.
8. "EMSI Collaborative Studies with the ER Division at ANL," K. M. Kemner, **M. Boyanov**, EMSI Review, University of Notre Dame, Notre Dame, Indiana, September 24, 2003.
9. "X-ray and electron micro(spectro)scopy investigations of internal biomineralization products produced by dissimilatory metal reducing bacteria (DMRB)", **M.Boyanov**, S.Glasauer, B.Lai, K.Kemner, T.Beveridge. EMSI Review Meeting, University of Notre Dame, Sept 24, 2003

## CONTRIBUTED TALKS AND POSTERS

1. "Abiotic redox transformations of Hg(II)", B. Mishra, E.O'Loughlin, **M. Boyanov**, K. Kemner, ACS Meeting in Philadelphia, PA, session "Spectroscopic Identification of Interfacial Chemical Species in Natural and Engineered Environments" August 22, 2012
2. "Using EXAFS to detect redox transformations of U(VI) and Fe(II) at a carboxyl", **M. Boyanov**, E.O'Loughlin, D. Latta, B. Mishra, K. Kemner, , ACS Meeting in Philadelphia, PA, session "Spectroscopic Identification of Interfacial Chemical Species in Natural and Engineered Environments" August 22, 2012
3. "XAFS investigations of uranium(VI) interactions with iron(II)-bearing minerals" , E.O'Loughlin, **M. Boyanov**, M-J. Kwon, S. Kelly, C. Gorski, D. Latta, M. Scherer, K. Kemner , ACS Meeting in Philadelphia, PA, session "Spectroscopic Identification of Interfacial Chemical Species in Natural and Engineered Environments" August 22, 2012
4. "Mechanistic study of carbon-supported Pd/Re catalysts for perchlorate reduction: Spectroscopic characterization of Re speciation", J-K. Choe, **M. Boyanov**, K. Kemner, C. Werth, T. Strathmann, ACS Meeting in Philadelphia, PA, session "Spectroscopic Identification of Interfacial Chemical Species in Natural and Engineered Environments" August 22, 2012
5. "Dissimilatory iron reduction and the redox cycling of green rust", E.O'Loughlin, **M. Boyanov**, C. Gorski, M. McCormick, M. Scherer, K. Kemner ACS Meeting in Philadelphia, PA, session "Environmental Chemistry of Fe-Oxides and Fe-Hydroxides" August 21, 2012
6. "Transformations of aqueous U(VI) during the redox cycling of Fe phases", **M. Boyanov**, D. Latta, M. Scherer, E.O'Loughlin, K. Kemner, Goldschmidt 2012, session 8c. Structural incorporation of heavy metals/radionuclides into mineral phases in aqueous environment, Montreal, Canada, June 29, 2012
7. "Dissimilatory iron reduction and the redox cycling of green rust", E.O'Loughlin, **M. Boyanov**, C. Gorski, M. McCormick, M. Scherer, K. Kemner, Goldschmidt 2012, session 16d. Biogeochemistry under redox-dynamic conditions: Processes, speciation and fluxes, Montreal, Canada, June 29, 2012
8. "Ligand effects on Hg(II) reduction by magnetite", B. Mishra, T.Pasakarnis, **M. Boyanov**, E.O'Loughlin, M. Scherer, K. Kemner, Goldschmidt 2012, session 14d. Geochemical influences on Hg bioavailability and biogeochemical transformations, Montreal, Canada, June 27, 2012
9. "Dissolution of uranyl precipitates in contaminated vadose zone sediments", A. Singh, J. Zachara, J. McKinley, C. Liu, **M. Boyanov**, K. Kemner, D. Moore, Goldschmidt 2012, session 8k: Trace element interactions with soils and sediments: implications for transport, Montreal, Canada, June 26, 2012

10. "Mechanistic Study of Carbon-Supported Pd/Re Catalysts for Perchlorate Reduction: Spectroscopic Characterization of Re Speciation", J.-K. Choe, K.Kemner, **M.Boyanov**, C.Werth, T. Strathmann, Gordon Research Conference, Environmental Sciences: Water, Holderness, NH , June 24-29, 2012
11. "Understanding Uranium Transformations in Reduced Sediments: An Integrated Bottom-Up and Top-Down X-Ray Spectroscopy Approach" , **M. Boyanov**, E.O'Loughlin, D.Latta, B.Mishra, K.Skinner, M.Scherer, W.-M.Wu, C.Criddle, F.Yang, T.Marsh, R.Sanford, F.Löffler, M. Mueller, T.Mehlhorn, K.Lowe, D.Watson, S.Brooks, K.Kemner,Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 30- May 2, 2012
12. "The Argonne Subsurface Biogeochemical Research Program Scientific Focus Area" K.Kemner , E.O'Loughlin, M.**Boyanov**, D.Antonopoulos, D.Latta, T.Flynn, S.Brooks, E.Carpenter, C.Criddle, J.Fredrickson, F.Löffler, T.Marsh, M.McCormick, B.Mishra, R.Sanford, C.Segre, M.Scherer, W.Wu, J.Zachara, C.Giometti, Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 30- May 2, 2012
13. "Ligand and Surface Effects on the Reduction of HgII by FeII" B.Mishra, T.Pasakarnis, **M.Boyanov**, E.O'Loughlin, M.Scherer, K.Kemner,Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 30- May 2, 2012
14. "Effects of FeIII Oxide Mineralogy and Electron Donor on the Biogeochemical Dynamics of Fe, S, and C under Sulfate- and Iron-Reducing Conditions", E.O'Loughlin, M.J.Kwon, D.Antonopoulos, **M.Boyanov**, J.Brulc, T.Flynn, E.Johnston, K.Skinner, P.Long, K.Williams, M.McCormick, K.Kemner,Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 30- May 2, 2012
15. "Relating Differences in Mineral Reaction Rates to Microenvironment Creation and Heterogeneous Pore-Scale Phase Distribution at the Hanford Site", K.Rosso, A.Felmy, C.Pearce, J.Liu, O.Qafoku, S.Heald, D.Latta, **M.Boyanov**, K.Kemner, E.Arenholz, E.Buck, L.Shi, J.McKinley, D.Moore, T.Resch, T.Shaef, M.Bowden, Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 30- May 2, 2012
16. "Temporal Monitoring of Microbial Community Dynamics Under Iron- and Sulfate-Reducing Conditions via "Now-Generation" DNA Sequencing-Enabled Molecular Environmental Microbiology" , D.Antonopoulos, **M.Boyanov**, J.Brulc, E.Johnston, M.J.Kwon, P.Long, T.Marsh, M.McCormick, F.Meyer, K.Skinner, K.Williams, D.Sholto-Douglas, E.O'Loughlin, K.Kemner, Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 30- May 2, 2012
17. "Multiscale Investigations on the Rates and Mechanisms of Targeted Immobilization and Natural Attenuation of Radionuclides and Co-Contaminants in the Subsurface", S.Brooks, D.Watson— ORNL, G.Baker, **M.Boyanov**, C.Brandt, C.Criddle, B.Gu, S.Hubbard, K.Kemner, J.Kostka, J.Parker, C.Schadt, Wei-Min Wu, T.Zimmerman, F.Zhang, J.Zhou, Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 30- May 2, 2012
18. "Electron Transfer and Atom Exchange between Aqueous Fe(II) and Structural Fe(III) in Clays: Role in U and Hg(II) Transformations", A. Neumann, M.M. Scherer, M. Barger, C. Johnson, B. Beard, L. Wu, K.M. Rosso, V. Alexandrov, K. Kemner, M. **Boyanov**, E. O'Loughlin, Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 30- May 2, 2012
19. "Monitoring Microbial Uranium Reduction at the Oxic-Anoxic Interface", R.Sanford, A.Basu, C. Lundstrom, T. Johnson, J. Merryfield, G. Walshe, K. Kemner, M. **Boyanov**, K. Pennell, F. Löffler, Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 30- May 2, 2012
20. "Microscale Metabolic, Redox and Abiotic Reactions in Hanford 300 Area Subsurface Sediments", H.Beyenal, J.Fredrickson, J.McLean, P.Majors, K.Kemner, B.Mishra, **M.Boyanov**, M.Marshall, L.Shi, D.Kennedy, R.Brown, Y.Xion, M.Romine, M.Lipton, N.Isern, Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 30- May 2, 2012
21. "Effects of electron shuttles on the reduction of U(VI) under Fe(III)- and sulfate-reducing conditions", EJ O'Loughlin, **MI Boyanov**, M-J Kwon, PE Long, KH Williams, KM Kemner, 2012 Spring ACS Meeting, "Redox Processes of Bioactive Molecules in Aquatic Environments" session, San Diego, March 28, 2012
22. "Ferrous iron minerals in soil reduce uranium(VI), DE Latta, **MI Boyanov**, EJ O'Loughlin, KM Kemner, MM Scherer, 2012 Spring ACS Meeting, "Sorption and Transformation of Contaminants in Natural Soil Environment" session, San Diego, March 25, 2012

23. "Bioreduction of U(VI): factors controlling the speciation of U(IV)", **M. Boyanov**, K. Fletcher, E. O'Loughlin, M.-J. Kwon, F. Löffler, K. Kemner, "Uranium biogeochemistry: transformations and applications" workshop, Ascona, Switzerland, March 12, 2012
24. "Reduction of U(VI) by Fe(II)-containing phases", E. O'Loughlin, **M. Boyanov**, D. Latta, C. Gorski, M. Scherer, K. Kemner, "Uranium biogeochemistry: transformations and applications" workshop, Ascona, Switzerland, March 12, 2012
25. "Characterization of U(VI) reduction in contaminated sediments with slow-degrading electron donor source", W.-M. Wu, D. B. Watson, G.-X. Zhang, T. Mehlhorn, K. Lowe, J. Earles, J. Phillips, S. D. Kelly, **M. Boyanov**, K. M. Kemner, C. Schadt, C. S. Criddle, P. M. Jardine, S. C. Brooks. 2011 American Geophysical Union meeting, San Francisco, December 6, 2011.
26. "Injection of Emulsified Vegetable Oil for Long-Term Bioreduction of Uranium", S. C. Brooks, D. B. Watson, C. Schadt, P. M. Jardine, T. M. Gihring, G.-X. Zhang, T. Mehlhorn, K. Lowe, J. Phillips, J. Earles, W.-M. Wu, C. S. Criddle, , K. M. Kemner, **M. Boyanov**. 2011 American Geophysical Union meeting, San Francisco, December 6, 2011.
27. "Reductive and non-reductive U(VI) sequestration in non-uraninite and non-uranyl phases", **M. Boyanov**, E. O'Loughlin, B. Mishra, X. Rui, K. Kemner, American Chemical Society National Meeting, Denver, Aug. 28 – Sept. 1, 2011
28. "Binding of Hg(II) to high affinity sites on bacteria inhibits reduction to Hg(0) by mixed Fe(II/III) phases", Mishra, B., E.J. O'Loughlin, **M.I. Boyanov**, and K. Kemner. 242nd American Chemical Society National Meeting, Denver, CO., Aug. 28 – Sept. 1, 2011
29. "Reduction of HgII by Non-Stoichiometric Magnetite", T. Pasakarnis, M. Scherer, G. Parkin, **M. Boyanov**, K. Kemner, B. Mishra, Ed O'Loughlin, American Chemical Society National Meeting, Denver, Aug. 28 – Sept. 1, 2011
30. "Reduction of Biogenic Uranyl Phosphate Nanoparticles by Three Metal-Reducing Bacteria", Rui X, **Boyanov M**, Kwon MJ, O'Loughlin E, Dunham-Cheatham S, Fein J, Bunker B & Kemner K, Goldschmidt 2011, Prague, August 14-19, 2011
31. "Roles of Sulfate and FeIII Reduction on Microbial Community Development", Kwon MJ, **Boyanov MI**, Antonopoulos D, Brulc J, Kemner K & O'Loughlin EJ, Goldschmidt 2011, Prague, August 14-19, 2011
32. "Uranium Valence Cycling with Iron-Rich Phyllosilicates", Burgos W, Luan F, **Boyanov M**, Kemner K & Dong H, Goldschmidt 2011, Prague, August 14-19, 2011
33. "Binding of Hg(II) to high affinity sites on bacteria inhibits reduction to Hg(0) by mixed Fe(II/III) phases", Mishra, B., E.J. O'Loughlin, **M.I. Boyanov**, and K. Kemner. 10th International Conference on Mercury as a Global Pollutant, Halifax, Canada., July 24-29, 2011
34. "U(IV) Products Suggest Distinct U(VI) Bioreduction Mechanisms in *Desulfitobacterium*, *Anaeromyxobacter*, and *Shewanella*", **M. Boyanov**, K. Fletcher, M. Kwon, X. Rui, E. O'loughlin, F. Loeffler, K. Kemner; ; Americal Society for Microbiology general meeting, New Orleans, May 21-24, 2011
35. "Reduction of phosphate doped iron oxides by *Shewanella putrefaciens* CN3", E. O'loughlin, C. Gorski, K. Kemner, **M. Boyanov**, R. Cook, M. Scherer; Americal Society for Microbiology general meeting, New Orleans, May 21-24, 2011
36. "U(VI) Reduction In Contaminated Sediments With Oleate, Emulsified Vegetable Oil And Ethanol As Electron Donor", W-M. Wu, D. Watson, G. Zhang, T. Gihring, C. Schadt, T. Mehlhorn, F. Zhang, S. Kelly, **M. Boyanov**, K. Kemner, J. Van nostrand, P. Zhang, J. Zhou, W. Overholt, S. Green, J. Kostka, C. Criddle, P. Jardine, S. Brooks; Americal Society for Microbiology general meeting, New Orleans, May 21-24, 2011
37. "Bioreduction of nanoparticulate uranyl phosphate", X. Rui, **M. Boyanov**, M. J. Kwon, E. J. O'Loughlin, S. Dunham-Cheatham, J. Fein, B. A. Bunker, K. Kemner, APS Users meeting, Argonne, IL, May 3, 2011
38. "Reduction of U(VI) and Hg(II) by Magnetite", T. Pasakarnis, D. Latta, M. Scherer, **M. Boyanov**, K. Kemner, E. O'Loughlin, B. Mishra. Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 26-28, 2011

39. "Effects of Incorporated P on the Bioreduction of Fe(III) Oxides", E. O'Loughlin, **M. Boyanov**, C. Gorski, M. McCormick, M. Scherer, K. Kemner. Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 26-28, 2011
40. "Role of Sorbents in Abiotic Redox Transformations of Hg(II)", B. Mishra, E.J. O'Loughlin, T. Pasakarnis, **M.I. Boyanov**, M.M. Scherer, K.M. Kemner. Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 26-28, 2011
41. "Non-Uraninite U(IV) Phases in Biostimulated Sediments from the Oak Ridge IFRC", **M.I. Boyanov**, E.J. O'Loughlin, K. Skinner-Nemec, S.D. Kelly, W.-M. Wu, C. Criddle, F. Yang, T. Marsh, M. Mueller, T. Melhorn, K. Lowe, D. Watson, S. Brooks, K. Kemner. Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 26-28, 2011
42. "Microbial Community Development under Sulfate- and Iron-Reducing Conditions Based on Electron Donor and Electron Shuttle Amendment", D. Antonopoulos, **M. Boyanov**, J. Brulc, E. Johnston, M.J. Kwon, P. Long, T. Marsh, M. McCormick, F. Meyer, R. Sanford, K. Skinner, K. Williams, D. Sholto-Douglas, E. O'Loughlin, K. Kemner, Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 26-28, 2011
43. "Biological Reduction of Uranium in the Contaminated Subsurface by Slow-Release Electron Donor", W. Wu (PI), C.S. Criddle, D. Watson, S. Brooks, C. Schadt, T. Gihring, G. Zhang, T. Melhorn, K. Lowe, J. Phillips, C. Brandt, P. Jardine, K. Kemner, **M. Boyanov**, J. Kostka, Q. Overholt, S.J. Green, P. Zhang, J. Von Nostrand, J. Zhou. Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 26-28, 2011
44. "ORNL IFRC: Multiscale Investigations on the Rates and Mechanisms of Targeted Immobilization and Natural Attenuation of Radionuclides and Co-Contaminants in the Subsurface", S.C. Brooks, D.B. Watson, G.S. Baker, **M. Boyanov**, C.C. Brandt, C.S. Criddle, B. Gu, S.S. Hubbard, K. Kemner, J.E. Kostka, J.C. Parker, G. Tang, W.-M. Wu, T. Zimmerman, F. Zhang, J. Zhou, Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 26-28, 2011
45. "Anaerobic Biogeochemical Processes in Hanford 300 Area IFRC Subsurface Sediments", J. Fredrickson, J.-H. Lee, X. Lin, R. Kukkadapu, A. Plymale, D. Kennedy, A. Konopka, B. Bjornstad, D. Moore, T. Resch, J. Phillips, J. McKinley, J. Zachara, **M. Boyanov**, S. Held, K. Kemner. Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 26-28, 2011
46. "The Role of Nanopores on U(VI) Sorption and Redox Behavior in Contaminated Subsurface Sediments", H. Xu, E.E. Roden, K.M. Kemner, H.-B. Jung, Y. Sun, J. Konishi, B. Mishra, **M. Boyanov**. Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 26-28, 2011
47. "Reactivity of Iron-bearing Phyllosilicates with Uranium and Chromium through Redox Transition Zones", B. Burgos, H. Dong, **M. Boyanov**, K. Kemner. Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 26-28, 2011
48. "Microscale Metabolic, Redox, and Abiotic Reactions in Hanford 300 Area Subsurface Sediments", H. Beyenal, J. Fredrickson, J.S. McLean, B. Cao, P.D. Majors, K.M. Kemner, B. Mishra, **M.I. Boyanov**, M.J. Marshall, L. Shi, D.W. Kennedy, R. Brown, Y. Xiong, M.F. Romine, M.S. Lipton, N.G. Isern, Subsurface Biogeochemistry Research PI meeting, Washington D.C., April 26-28, 2011
49. "Effects of Electron Donor and Sulfate on Iron Reduction and Microbial Community Structure", M.-J. Kwon, D. Antonopoulos, **M. Boyanov**, J. Brulc, K. Kemner, E. O'Loughlin, Korean Society of Soil and Groundwater Environment meeting, Korea, April 14-15, 2011
50. "Uranium Biogeochemistry – Novel Insights from a Microbe's Perspective", Sanford R, Fletcher K, Thomas S, Kemner K, **Boyanov M**, Ritalahti K & Loeffler F, International Goldschmidt meeting, Knoxville TN, June 17, 2010
51. "Redox Transformations of Uranium Near the Mineral-Microbe Interface", Kemner K, **Boyanov M**, O'Loughlin E, Sholto-Douglas D, Skinner K, Lai B, Kelly S, Cook R, Carpenter E & Nealson K, International Goldschmidt meeting, Knoxville TN, June 15, 2010
52. "Molecular Scale Transformations of Hg(II) during Coupled Biotic and Abiotic Processes", Mishra B, **Boyanov M**, O'Loughlin E & Kemner K, International Goldschmidt meeting, Knoxville TN, June 15, 2010

53. "Mineral Nucleation and Redox Transformations of U(VI) and Fe(II) Species at a Carboxyl Surface:", **Boyanov M**, O'Loughlin E, Kwon M-J, Mishra B, Rui X, Shibata T & Kemner K, International Goldschmidt meeting, Knoxville TN, June 17, 2010
54. "In situ Biostimulation of U(VI) Reduction and Immobilization Using Emulsified Vegetable Oil", Wu W, Watson D, Mehlhorn T, Earles J, **Boyanov M**, Gihring T, Schadt C, Lowe K, Phillips J, Kemner K, Spalding B, Criddle C, Jardine P & Brooks S, International Goldschmidt meeting, Knoxville TN, June 15, 2010
55. "Effects of Structural Phosphate on the Microbial Reduction of Iron Oxide and Secondary Mineralization Product Formation and Reactivity", O'Loughlin E, **Boyanov M**, Cook R, Gorski C, Mishra B, Scherer M & Kemner K, International Goldschmidt meeting, Knoxville TN, June 18, 2010
56. "Effects of Fe Mineralogy, Phosphate, and Electron Shuttles on the Bioreduction of Fe(III) Oxides and Fe(II)-bearing Secondary Mineral Formation.", E. O'Loughlin, C. Gorski, M. Scherer, D. Latta, **M. Boyanov**, R. Cook, K. Kemner, ASM Meeting, San Diego, CA, May 24, 2010
57. "Biogeochemical Response to Injection of Emulsified Edible Oil in the Uranium(VI) Contaminated Subsurface at the US DOE IFRC Site, Oak Ridge, TN.", W. Wu, D. Watson, T. Mehlhorn, K. Lowe, J. Phillips, J. Earles, G. Zhang, T. Gihring, **M. Boyanov**, J. D. Van Nostrand, W. A. Overholt, S. J. Green, K. Kemner, C. Schadt, J. E. Kostka, J. Zhou, C. S. Criddle, P. Jardine, S. Brooks, ASM Meeting, San Diego, CA, May 24, 2010
58. "The Evolution of Microbial Communities Within Iron-rich Mineral Suspensions Inoculated with Sediments from an UMTRA Site", D. A. Antonopoulos, B. S. Bates, **M. I. Boyanov**, J. M. Brulc, M. Egholm, A. Garoutte, T. Harkins, M. Kwon, P. Long, F. Meyer, E. J. O'Loughlin, J. Osterberger, B. B. Simen, K. A. Skinner, J. Wilkening, K. H. Williams, K. M. Kemner, ASM Meeting, San Diego, CA, May 24, 2010
59. "Design and Application of Microbial-Uranium-Reduction Monitoring Tools", R. Sanford, C. Lundstrom, T. Johnson, K. Kemner, **M. Boyanov**, K. Pennell, K. Ritalahti, F. Loeffler, Subsurface Biogeoscience Research PI meeting, Washington D.C. , March 30, 2010.
60. "The Role of Nanopores on U(VI) Sorption and Redox Behavior in U(VI)-Contaminated Subsurface Sediments", H. Xu , E.E. Roden, K.M. Kemner, H.-B. Jung, Y. Sun, H. Konishi, B. Mishra, **M. Boyanov**, Subsurface Biogeoscience Research PI meeting, Washington D.C. , March 30, 2010.
61. "Multiscale Investigations on the Rates and Mechanisms of Targeted Immobilization and Natural Attenuation of Radionuclides and Co-Contaminants in the Subsurface", S.C. Brooks, D. Watson, G. Baker, **M. Boyanov**, C.C. Brandt, C.S. Criddle, B. Gu, K. Horita, S.S. Hubbard, LBNL; K. Kemner, J.E. Kostka, J. Luo, A.V. Palumbo, J. Parker, C.W. Schadt, B. Spalding, W.-M Wu, F. Zhang, J. Zhou, Subsurface Biogeoscience Research PI meeting, Washington D.C. , March 30, 2010.
62. "In Situ Biostimulation of Uranium Reduction and Immobilization Using Emulsified Vegetable Oil as Electron Donor at the Oak Ridge IFRC Site", W. Wu, D. Watson, T. Melhorn, J. Earles, **M. Boyanov**, T.M. Gihring, G. Ahang, C. Schadt, K. Lowe, J. Phillips, K. Kemner, B. Spalding, Yux. Wu, S.S. Hubbard, G. Baker, C.S. Criddle, P. Jardine, S. Brooks, Subsurface Biogeoscience Research PI meeting, Washington D.C. , March 30, 2010.
63. "Microbial Community and Biogeochemical Dynamics under Sulfate- and Iron-Reducing Conditions", M.J. Kwon, D. Antonopoulos, D. Bartels, B.S. Bates, **M. Boyanov**, J. Brulc, M. Egholm, A. Garoutte, C. Giometti, T. Harkins, P. Long, T. Marsh, M. McCormick, F. Meyer, J. Osterberger, R. Sanford, K. Skinner, J. Wilkening, K.H. Williams, K. Kemner, E. O'Loughlin, Subsurface Biogeoscience Research PI meeting, Washington D.C. , March 30, 2010.
64. "Uranium (VI) Interactions with Iron(II)-Bearing Minerals", E. O'Loughlin, **M. Boyanov**, M.J. Kwon, S. Kelly, C. Gorski, D. Latta, M. Scherer, K. Kemner, Subsurface Biogeoscience Research PI meeting, Washington D.C. , March 30, 2010.
65. "Abiotic Reduction of Uranium by Fe(II) in Soil", D.E. Latta, E. O'Loughlin, K.M Kemner, **M.I. Boyanov**, M.M. Scherer, Subsurface Biogeoscience Research PI meeting, Washington D.C. , March 30, 2010
66. "Reduction of uranium(VI) by iron(II) species and minerals: Reactivity and uranium(IV) products", **M. Boyanov**, D. Latta, E. O'Loughlin, C. Gorski, M. Scherer, K. Kemner, 2010 ACS Meeting, San Francisco, CA, March 25, 2010.

67. "Electron donor effects on the biological reduction of iron oxides under sulfate-rich conditions", M-J Kwon, D Antonopoulos, **M Boyanov**, J Brulc, P Long, B Mishra, K Skinner, K Williams, K Kemner, E O'Loughlin, 2010 ACS Meeting, San Francisco, CA, March 25, 2010.
68. "Effects of phosphate doping on the bioreduction of iron oxide ", E O'Loughlin, C Gorski, K Kemner, **M Boyanov**, R Cook, M Scherer, 2010 ACS Meeting, San Francisco, CA, March 25, 2010.
69. "Coupled biotic-abiotic redox transformations of uranium near the mineral-microbe interface", K Kemner, **M Boyanov**, Ed O'Loughlin, D Sholto-Douglas, K Nemeč, B Lai, R Cook, E Carpenter, V Harris, S Kelly, K Neelson, 2010 ACS Meeting, San Francisco, CA, March 25, 2010.
70. "Combined x-ray, chemical, and biological characterization of biostimulated and sulfate-amended sediments from the Oak Ridge Field Research Center", **M. Boyanov**, E. O'Loughlin, K. Skinner, M.-J. Kwon, S. Kelly, F. Yang, T. Marsh, W.-M. Wu, C. Criddle, K. Kemner, 2009 American Geophysical Union meeting, San Francisco, December 16, 2009.
71. "The New MRCAT (Sector 10) Bending Magnet Beamline at the Advanced Photon Source," A. J. Kropf, J. Katsoudas, S. Chattopadhyay, T. Shibata, E. Lang, V. Zyryanov, B. Ravel, K. McIvor, K. M. Kemner, **M. I. Boyanov**, K. G. Scheckel, S. R. Bare, J. Terry, S. D. Kelly, B. A. Bunker, and C. U. Segre, Tenth International Conference on Synchrotron Radiation Instrumentation, Melbourne, Australia, September 2009.
72. "Using U L<sub>III</sub>-edge microXANES investigations of contaminant transformations near bacterial surfaces", Kemner, K. M., E. J. O'Loughlin, **M. Boyanov**, D. Sholto-Douglas, K. Skinner-Nemeč, B. Lai, R. E. Cook, E. Carpenter, V. G. Harris, and K. H. Neelson, The 14<sup>th</sup> International Conference on X-ray Absorption Fine Structure in Camerino, Italy, July 26-31, 2009.
73. "Using XAFS to track iron phase transformations during bacterial respiration", M. Boyanov, E. O'Loughlin, K. Kemner, The 14<sup>th</sup> International Conference on X-ray Absorption Fine Structure in Camerino, Italy, July 26-31, 2009.
74. "Distinct uranium(IV) products result from uranyl reduction in different ferrous-ferric oxyhydroxide systems", M. Boyanov, D. Latta, E. O'Loughlin, C. Gorski, M. Scherer, K. Kemner, Goldschmidt Meeting in Davos, Switzerland, June 22, 2009.
75. "Effects of oxyanions, natural organic matter, and Fe(III) oxide mineralogy on the formation of Fe(II)-bearing secondary mineralization products resulting from the bioreduction of Fe(III) oxides", E. O'Loughlin, C. Gorski, D. Latta, **M. Boyanov**, R. Cook, M. Scherer, K. Kemner, Goldschmidt Meeting in Davos, Switzerland, June 23, 2009.
76. "Uranium reduction is a common trait of *Desulfitobacterium* Spp.", K. Fletcher, S. Thomas, Q. Wu, M. Beazley, K. Kemner, **M. Boyanov**, F. Löffler, ASM Meeting in Philadelphia, PA, May 18, 2009.
77. "Microbial community analyses of iron-rich mineral suspensions inoculated with sediments from a uranium mill tailings site", D. Antonopoulos, A. Ammar, B. Bates, **M. Boyanov**, M. Domanus, M.-J. Kwon, P. Long, F. Meyer, E. O'Loughlin, D. Sholto-Douglas, K. Skinner-Nemeč, K. Williams, K. Kemner, ASM Meeting in Philadelphia, PA, May 18, 2009.
78. "Reduction of uranium(VI) in sediments with slow release organic electron donors", W.-M. Wu, G. Zhang, **M. Boyanov**, S. Kelly, F. Zhang, T. Mehlhorn, K. Lowe, S. Green, K. Kemner, S. Brooks, J. Kostka, C. S. Criddle, C. Schadt, D. Watson, P. Jardine, ASM Meeting in Philadelphia, PA, May 18, 2009.
79. "Effect of carbonate ligands on the speciation and reduction of U(VI) by Fe(II) at a carboxyl surface", M. Boyanov, E. O'Loughlin, K. Kemner, ACS Meeting in Salt Lake City, March 24, 2009.
80. "Magnetite versus green rust: Effects of phosphate on the formation of Fe(II)-bearing secondary mineralization products resulting from the bioreduction of Fe(III) oxides", E. O'Loughlin, C. Gorski, K. Kemner, **M. Boyanov**, R. Cook, D. Latta, M. Scherer, ACS Meeting in Salt Lake City, March 24, 2009.
81. "Reduction of U(VI) by soil containing natural green rust", D. Latta, E. O'Loughlin, K. Kemner, **M. Boyanov**, M. Scherer, ACS Meeting in Salt Lake City, March 24, 2009.
82. "X-ray micro(spectro)scopy investigations of transformations at the mineral-metal-microbe interface", K. M. Kemner, T. J. Beveridge, **M. I. Boyanov**, R. E. Cook, A. Dohnalkova, J. K. Fredrickson, S. Glasauer, S. D. Kelly, B. Lai, M. J. Marshall, E. J. O'Loughlin, B. D. Ravel, D. Sholto-Douglas, ACS Meeting in Chicago, March 25-29, 2007

83. "Mechanisms of U(VI) uptake and reduction by carbonate, sulphate, and chloride green rusts studied by XAFS", **M.Boyanov**, E. O'Loughlin, S. Smith, S. Kelly, D. Latta, B. Ravel, M. St. Clair, M. Scherer, K. Kemner, ACS Meeting in Chicago, March 25-29, 2007
84. "Transformation of uranium by biogenic Fe(II) phases resulting from the bio-reduction of Fe(III) oxides by *Shewanella putrefaciens* CN32". E. J. O'Loughlin, S. D. Kelly, **M. I. Boyanov**, M. M. Scherer, K. M. Kemner, ACS Meeting in Chicago, March 25-29, 2007
85. "XAFS of U(VI)-Fe(II) sorption to carboxyl surfaces as a model for redox interactions at the cell wall", **M.Boyanov**, E. O'Loughlin, E. Roden, S. Kelly, B. Ravel, J. Fein, K. Kemner, ACS Meeting in Chicago, March 25-29, 2007.
86. "X-ray microscopy of uranium precipitates near single bacterial cells", **M.I. Boyanov**, B. Lai, M.J. Marshall, A.C. Dohnalkova, J.K. Fredrickson, K.M. Kemner; Actinide XAS 2006 Conference, Karlsruhe, Germany; September 18-20, 2006.
87. "The effect of Fe(II)-Fe(II) coordination on the reduction of U(VI) at a carboxyl surface determined by titration and XAFS", **M.I. Boyanov**, E.J. O'Loughlin, E.E. Roden, J.B. Fein, K.M. Kemner; Actinide XAS 2006 Conference, Karlsruhe, Germany; September 18-20, 2006.
88. "A pH-dependent X-ray Absorption Spectroscopy study of U adsorption to bacterial cell walls", B. Ravel, S. D. Kelly, D. Gorman-Lewis, **M. I. Boyanov**, J. B. Fein and K. M. Kemner; 13th International XAFS Conference, Stanford University, Palo Alto, CA, July 9-14, 2006.
89. "The Role of *Shewanella oneidensis* MR-1 Outer Membrane c-Type Cytochromes in Extracellular U(IV)O<sub>2</sub> Nanoparticle Formation," D. W. Kennedy, M. J. Marshall, A. S. Beliaev, A. C. Dohnalkova, L. Shi, Z. Wang, **M. I. Boyanov**, B. Lai, K. M. Kemner, J. S. McLean, S. B. Reed, V. L. Bailey, D. A. Saffarini, M. F. Romine, J. M. Zachara, and J. K. Fredrickson; American Society of Microbiology Meeting, May 21-25, 2006, Orlando.
90. "Biomolecular Mechanisms of U(IV)O<sub>2</sub> and Tc(IV)O<sub>2</sub> Nanoparticle Formation by *Shewanella oneidensis* MR-1," M. J. Marshall, A. S. Beliaev, D. W. Kennedy, A. E. Plymale, A. C. Dohnalkova, L. Shi, Z. Wang, **M. I. Boyanov**, B. Lai, K. M. Kemner, J. S. McLean, S. B. Reed, D. E. Culley, B. L. Bailey, C. J. Simonson, D. A. Saffarini, M. F. Romine, Y. A. Gorby, J. M. Zachara, and J. K. Fredrickson; Environmental Remediation Science Program PI Meeting, Arlie, VA, April 3-5, 2006.
91. "Investigation of the Transformation of Uranium under Iron-Reducing Conditions: Reduction of U(VI) by Biogenic Fe(II)/Fe(III) Hydroxide (Green Rust), E. O'Loughlin, K. Kemner, S. Kelly, **M. Boyanov**, B. Ravel, R. Cook; ERSP PI Meeting, Warrenton, VA, April 3-5, 2006
92. "U(VI) reaction with green rusts: Influence of anions" St. Clair, M., S. L. Smith, J. O. Harrison, E. J. O'Loughlin, K. M. Kemner, **M. I. Boyanov**, M. M. Scherer; 231st American Chemical Society National Meeting, Atlanta, GA, March 26-30, 2006.
93. "Reduction of U(VI) by Fe(II) at a model cell surface: reactive species, products, and insight obtained by EXAFS", **M.I. Boyanov**, E.J. O'Loughlin, S.K. Kelly, J.B. Fein, E.E. Roden, K.M. Kemner; Synchrotron Environmental Science III, Brookhaven National Laboratory, Upton, NY; September 19-21, 2005.
94. "Investigation of the transformations of Uranium under Fe reducing conditions: Reduction of U(VI) by biogenic Fe(II) in Green Rust", E.J. O'Loughlin, M. Scherer, K.M. Kemner, J. Harrison, **M.I. Boyanov**, S.K. Kelly; NABIR PI Meeting, Warrenton, VA; April 18-20, 2005.
95. "Using XAFS to study U(VI) reduction by Fe(II) at a model bacterial surface", **M.I. Boyanov**, E.J. O'Loughlin, S.K. Kelly, J.B. Fein, E.E. Roden, K.M. Kemner; Workshop on In-Situ Characterization of Surface and Interface Structures and Processes, Argonne, IL; September 8-9, 2005.
96. "Characterization of the c-type Cytochromes and the Type II Secretion System of *Shewanella oneidensis* MR-1 in Radionuclide Reduction and Localization", M.J. Marshall, D.W. Kennedy, A.C. Dohnalkova, A.E. Plymale, D.A. Saffarini, **M.I. Boyanov**, K.M. Kemner, B. Lai, S.B. Reed, D.E. Culley, M.F. Romine, A.S. Beliaev, J.M. Zachara, J.K. Fredrickson; The Joint International Symposia for Subsurface Microbiology (ISSM 2005) and Environmental Biogeochemistry (ISEB XVII), Jackson Hole, Wyoming - August 14-19, 2005.
97. "Reduction of U(VI) by adsorbed vs. surface-precipitated Fe(II) at model cell surfaces", **M.I. Boyanov**, E.J. O'Loughlin, S.K. Kelly, J.B. Fein, E.E. Roden, K.M. Kemner; 15th Annual Goldschmidt Conference, Moscow, ID; May 20-25, 2005.



98. "Cd adsorption onto *Bacillus subtilis* bacterial cell walls: integrating isotherm and EXAFS studies", Mishra, B.; Kelly, S. D.; Fein, J. B.; **Boyanov, M.**; Kemner, K. M.; Bunker, B. A. 15th Annual Goldschmidt Conference, Moscow, ID; May 20-25, 2005.
99. "The Role of *Shewanella oneidensis* MR-1 c-type Cytochromes and Type II Secretion System in Uranium Reduction and Localization of UO<sub>2</sub> Nanoparticles", J.K.Fredrickson, J.M. Zachara, A.S. Beliaev, M.J.Marshall, D.W. Kennedy, A. Dohnalkova, **M.I. Boyanov**, K. Kemner, B. Lai, S.B. Reed, M.F. Romine, D.A. Saffarini, Annual NABIR PI meeting, Warrenton, VA; April 18-20, 2005.
100. "XAFS of Cd and U sorption to bacterial surfaces—bridging between macroscopic measurements and molecular binding mechanism", **M.Boyanov**, S.Kelly, K. Kemner, B.Bunker, J.Fein, D.Fowle, N.Yee; Third International Conference on Interfaces Against Pollution, Aachen, Germany, May 24-27, 2005.
101. "Contaminant metal (Cd and Pb) speciation in the presence of biological and mineral surfaces", B.Mishra, **M.Boyanov**, S.Kelly, K.Kemner, P. Maurice, J.Fein, B.Bunker. APS Users Meeting, May 3, 2004.
102. "Spectral features in the XAFS of aqueous metal-acetate complexes", **M.Boyanov**, T.Shibata, S.Kelly, K.Kemner, B.Bunker. XAFS XII conference in Malmo, Sweden, June 2003
103. "XAFS of Aqueous Pb Adsorbed Underneath Fatty Acid Langmuir Monolayers", **M.Boyanov**, J.Kmetko, T.Shibata, A.Datta, B.Bunker, P.Dutta. X-02 Conference, Rome, Italy, June 2002
104. "Adsorption of Cadmium to *B. subtilis* Bacterial Cell Walls — a pH-Dependent XAFS Spectroscopy Study", **M.Boyanov**, S.Kelly, K.Kemner, B.Bunker, J.Fein, D.Fowle. X-02 Conference, Rome, June 2002
105. "Oxidation state and coordination of gold deposited on titania nanoparticles", D.Lahiri, V.Subramanian, T.Shibata, **M.Boyanov**, A.Stuckey, B.Mishra, P.Kamat, B.Bunker. APS March Meeting, Indianapolis, 2002
106. "XAFS of Ga(1-x)Mn(x)As alloys", A.Stuckey, **M.Boyanov**, T.Shibata, T.Wojtowicz, Y.Sasaki, X.Liu, J.Furdyna, B.Bunker. APS March Meeting, Indianapolis, 2002
107. "XAFS Study of U Sorption to Bacterial Cell Wall," S.D.Kelly, K.M.Kemner, J.Fein, D.Fowle, **M.Boyanov**, B.Bunker, N.Yee, Sixth International Conference on the Biogeochemistry of Trace Elements, Guelph, Ontario, August 2001
108. "Reduction of Cu(II) and U(VI) by mixed Fe(II)/Fe(III) hydroxide (Green rust)," O'Loughlin, E.J., S.D. Kelly, **M. Boyanov**, and K.M. Kemner. 6th International Conference on the Biogeochemistry of Trace Elements, Guelph, Ontario, August 2001
109. "XAFS investigations of interactions of U(VI) with *Bacillus subtilis*, green rust, and bio-oxidizing *Dechlorosoma suillum*", S.D.Kelly, K.M.Kemner, E.J.O'Loughlin, J.B.Fein, D.A.Fowle, **M.I.Boyanov**, B. A. Bunker, N. Yee, J. D. Coates. 222nd ACS National Meeting, Chicago, August 2001
110. "Reflectivity and Reflection-mode XAFS study of the wet-thermal native oxide/GaAs Interface", S.-K.Cheong, T.Shibata, **M.Boyanov**, D.Lahiri, B.Bunker, D.Hall, G.Snider, P.Barrios. APS March Meeting, Seattle, 2001
111. "Reduction of trace elements by mixed Fe(II)/Fe(III) hydroxide (green rust)", E.J.O'Loughlin, S.D.Kelly, K.M.Kemner, **M.Boyanov**. 221st ACS National Meeting, San Diego, April 2001
112. "XAFS determination of U-bacterial cell wall interaction at low pH", S.D.Kelly, K.M.Kemner, J.B.Fein, D.A.Fowle, **M.I.Boyanov**, B.A.Bunker, N.Yee. 221st ACS National Meeting, San Diego, April 2001
113. "EXAFS of Aqueous Cadmium Complexes: the Role of Hydrogen and Multiple Scattering Paths", **M.Boyanov**, S.Kelly, B.Bunker, K.Kemner, T.Shibata, S.-K.Cheong, D.Lahiri, J.Fein. The 11th Annual APS Users' Meeting, Argonne, IL, October 2001
114. "Cadmium Adsorption to the Cell Wall of *B.subtilis*—an EXAFS Study", **M.Boyanov**, S.Kelly, K.Kemner, B.Bunker, J.Fein, D.Fowle. Annual NSLS Users' Meeting, Upton, NY, May 2001
115. "XAFS Studies of Clustering and Ordering in Liquid Dilute Alloys," D.Lahiri, T.Shibata, S.-K. Cheong, **M.Boyanov**, B.A.Bunker, American Physical Society Meeting, March 2001
116. "X-ray reflectivity and reflection-mode XAFS study of III-V compound native oxide/GaAs interfaces," S.-K.Cheong, T.Shibata, **M.Boyanov**, D.Lahiri, B.A.Bunker, D.C.Hall, G.L.Snider.

paper I19.02 in 2000 March Meeting of American Physical Society, Minneapolis, Minnesota, March 20-24 2000

117. "EXAFS of  $\text{ZnSe}_x\text{Te}_{1-x}$  Superlattices and CdSe Quantum Dots", **M.Boyanov**, S.Cheong, D.Lahiri, T.Shibata, B.Bunker, S.Lee, J.Furdyna. Centennial APS March Meeting, Atlanta, GA, 1999
118. "Copper Biomineralization: Towards Quantifying the Effects of Bacteria on Precipitation," D.A.Fowle, J.B.Fein, K.M.Kemner, B.A.Bunker, S.D.Kelly, **M.I.Boyanov**, Goldschmidt Conference of the Geochemical Society, Cambridge, Massachusetts, August 23-27, 1999.
119. "EXAFS of II-VI Superlattice Interfaces and Buried Quantum Dots", **M.Boyanov**, S.Cheong, D.Lahiri, T.Shibata, B. Bunker. 10<sup>th</sup> EXAFS Conference, Chicago, Aug 1998

## REFERENCES

### **Prof. Bruce Bunker**

Department of Physics  
University of Notre Dame  
Notre Dame, IN 46556  
email: [bunker.1@nd.edu](mailto:bunker.1@nd.edu)  
www: <http://www.nd.edu/~bunker/>  
tel: 1 (574) 631-7219  
fax: 1 (574) 631-5952

### **Dr. Kenneth Kemner**

Biological Sciences Division  
Argonne National Laboratory  
Argonne, IL 60439  
email: [kemner@anl.gov](mailto:kemner@anl.gov)  
www: <http://www.mesg.anl.gov/kkemner1.html>  
tel: 1 (630) 252-1163  
fax: 1 (630) 252-9793

### **Dr. Edward O'Loughlin**

Biological Sciences Division  
Argonne National Laboratory  
Argonne, IL 60439  
email: [oloughlin@anl.gov](mailto:oloughlin@anl.gov)  
www: [http://www.mesg.anl.gov/Ed\\_web\\_files/oloughlinVITA.htm](http://www.mesg.anl.gov/Ed_web_files/oloughlinVITA.htm)  
tel: 1 (630) 252-9902  
fax: 1 (630) 252-9793

### **Prof. Frank Löffler**

Governors Chair Professor  
Microbiology, U of Tennessee  
706 Science and Engineering Building  
1414 Circle Drive  
Knoxville, TN 37996-2000  
email: [frank.loeffler@utk.edu](mailto:frank.loeffler@utk.edu)  
www: NA.  
tel: 1 (865) 974-4004  
fax: 1 (865)974-2669

### **Prof. Jeremy Fein**

Department of Civil Engineering &  
Geological Sciences  
University of Notre Dame  
Notre Dame, IN 46556  
email: [fein.1@nd.edu](mailto:fein.1@nd.edu)  
www: <http://www.nd.edu/~cegeos/people/faculty/fein.htm>  
tel: 1 (574) 631-6101  
fax: 1 (574) 631-9236

### **Prof. Michelle M. Scherer**

4126 Seamans Center for the  
Engineering Arts and Sciences  
University of Iowa  
Iowa City, IA 52242-1527  
email: [michelle-scherer@uiowa.edu](mailto:michelle-scherer@uiowa.edu)  
www: <http://www.cee.engineering.uiowa.edu/scherer/>  
tel: 1 (319) 335-5654  
fax: 1 (319) 335-5660

### **Prof. Eric E. Roden**

Department of  
Geology and Geophysics  
University of Wisconsin-Madison  
Madison, WI 53706  
email: [eroden@geology.wisc.edu](mailto:eroden@geology.wisc.edu)  
www: <http://www.geology.wisc.edu/~eroden/>  
tel: 1 (608) 890-0724  
fax: 1 (608) 262-0693

### **Prof. William Burgos**

Professor of Environmental Engineering  
and Professor in Charge of Graduate Programs  
Department of Civil & Environmental Engineering  
Pennsylvania State University  
Office: 212 Sackett Building  
University Park, PA 16802 USA  
email: [wdb3@psu.edu](mailto:wdb3@psu.edu)  
www:<http://www.engr.psu.edu/ce/enve/burgos/new/>  
tel: 1 (814) 863-0578  
fax: 1 (814) 863-7304

(last updated Sept 15, 2012)