

# Maxim I. Boyanov

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<b>Address:</b>	Argonne National Laboratory 9700 S. Cass Ave #203, E-157 Argonne, IL 60439 U.S.A.	<b>Phone:</b>	1 (630) 252-8242
		<b>Fax:</b>	1 (630) 252-9793
		<b>Email:</b>	<a href="mailto:mboyanov@nd.edu">mboyanov@nd.edu</a>
		<b>WWW:</b>	<a href="http://www.nd.edu/~mboyanov/">http://www.nd.edu/~mboyanov/</a>

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## WORK EXPERIENCE

**Postdoctoral: X-ray Physical-Chemistry**, Environmental Research Division,  
Argonne National Laboratory, IL, U.S.A. 2003-2006

*Projects:* "Aqueous adsorption and reduction of U(VI) by Fe(II) at carboxyl surfaces", and "Elemental analysis of single bacterial cells."

*Supervisor:* Dr. Kenneth Kemner

## DEGREES

**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:* Dr. Stoyan Russev

*Graduated:* Magna Cum Laude

**High School:** National English Language School, Sofia, Bulgaria. 1986-1990

## RESEARCH INTERESTS

Synchrotron X-ray studies of aqueous ion speciation near charged interfaces and in solution, in relation to environmental mineral and bacterial systems

## RESEARCH EXPERIENCE

- Complete operation of a synchrotron beamline (MRCAT at the Advanced Photon Source)
- Combined acid-base titration, metal adsorption, and XAFS experiments
  - $H^+$ ,  $Fe^{2+}$ , and  $UO_2^{2+}$  sorption to colloidal systems: bacteria, minerals, latex spheres
  - Analysis using chemical equilibrium and electrostatic models
  - $UO_2^{2+}$  -  $Fe^{2+}$  redox processes
- Working with anoxic and radiological samples,  $Fe^{2+}(aq)$  and  $UO_2^{2+}(aq)$
- XAFS data analysis and software development
- Synchrotron X-ray Fluorescence (micro)analysis
  - Elemental content maps of single bacterial cells with 0.15 micron resolution
  - Elemental content of petrified wood
- 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 and new solutions to the ellipsometric equation
  - Protein adsorption at the air/water interface studied through the refractive index and thickness of the surface layer. Two analytical inversions of the non-linear minimization problem.

## 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

## SPECIAL TRAINING

**Research:** National School on Neutron and X-ray Scattering, Argonne National Laboratory, Aug 16-27, 1999

**Language:** English (fluent), Russian (fluent), Bulgarian (fluent), German (basic)

## PROGRAMMING, OPERATING SYSTEMS, AND SOFTWARE

**Programming:** FORTRAN, PASCAL, DELPHI (developed GUI analysis software for XAFS)

**OS:** Windows 2000, XP; UNIX; Linux; (administrator skills in all)

**Software:** MS Office, MS Visual Studio, Origin, EndNote, Labview, Gnuplot, VNC

XAFS software: winIDP, the UW suite (advanced skills in all).

Chemical equilibrium software: FITEQL, ECOSAT.

## PUBLICATIONS (Peer Reviewed Journals)

- "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, accepted at GCA (October, 2006)
- "c-Type Cytochrome-Dependent Formation of U(IV) Nanoparticles by *Shewanella oneidensis*", M. Marshall et al., PLoS Biology 4(8), 1324-1333 (2006)
- "Adsorption of Fe(II) to carboxyl lattices: electrostatic effects and surface polymerization", M.Boyanov, E.J.O'Loughlin, J.Fein, K.Kemner, in preparation (2006)
- "Mixed valence cytoplasmic iron granules linked to anaerobic respiration," S. Glasauer, S. Langley, M.Boyanov, B. Lai, K. M. Kemner, T. J. Beveridge, submitted to Applied and Environmental Microbiology (2006)
- "Synchrotron X-ray Investigations of Mineral-Microbe-Metal Interactions", K.Kemner, E.O'Loughlin, S.Kelly, M.Boyanov, Elements 1(4), 217-221 (2005)
- "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)
- "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)
- "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)
- "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)
- "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)
- "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)
- "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)

- "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.Lebanc. J. Opt. Soc. Am. A-Opt. Image Sci. Vis. 16(6), 1496-1500 (1999)
- "Polynomial Inversion of the Single Transparent Layer Problem in Ellipsometry", J.P.Drolet, S.C.Russev, M.I.Boyanov, R.M.Lebanc. J. Opt. Soc. Am. A-Opt. Image Sci. Vis. 1112, 3284-3291 (1994)

## CONTRIBUTED PAPERS

- "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).
- "Elemental Analysis and Fe K-edge XAFS of Petrified Wood", M. Boyanov, R. Dayvault, K. Kemner; Chapter to be included in a book on petrified wood by R. Dayvault.
- "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)
- "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).
- "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).
- "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).
- "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)*. Aka, Japan, July 27-31 (2000)
- "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).
- "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)
- "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).

## PRESENTATIONS

- (talk, M. Boyanov) "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.
- (poster) "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.
- (talk, B. Ravel), "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.
- (*talk*, D. W. Kennedy) "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.
- (*invited talk*, M. Boyanov) "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.
- (*talk*, M. J. Marshall) "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.
- (*poster*) Investigation of the Transformation of Uranium under Iron-Reducing Conditions: Reduction of UVI by Biogenic FeII/FeIII 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
- (*poster*) "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.
- (*talk*, M. Boyanov) "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.
- (*invited talk*, K. Kemner) "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.
- (*poster*) "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.
- (*poster*) "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.
- (*poster*) "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.
- (*invited talk*, K. Kemner) "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. Neilson; 15th Annual Goldschmidt Conference, Moscow, ID; May 20-25, 2005.
- (*poster*) "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.

- (poster) "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.
- (colloquium, S.Kelly) "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.
- (invited talk, K. Kemner) "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.; Nealon, K.; Glasauer, S.; Beveridge, T.; Lai, B.; Maser, J.; Cai, Z. DOE-NABIR PI Meeting; Warrenton, VA; Apr 18-20, 2005
- (poster) "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.
- (invited talk, S. Glasauer) "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
- (contributed talk, M. Boyanov) "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.
- (poster) "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.
- (invited talk, K. Kemner) K. M. Kemner, M. Boyanov "EMSI Collaborative Studies with the ER Division at ANL," EMSI Review, University of Notre Dame, Notre Dame, Indiana, September 24, 2003.
- (invited talk, K. Kemner) "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 2003
- (poster) "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
- (invited talk, M. Boyanov) "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
- (invited talk, J. Fein) "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
- (poster) "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
- (poster) "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
- (contributed talk, D. Lahiri) "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

- (*contributed talk*, A.Stuckey) "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
- (*contributed talk*, S.D.Kelly) "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
- (*contributed talk*, O'Loughlin) "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
- (*contributed talk*, S. D.Kelly) "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
- (*contributed talk*, S.-K.Cheong) "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
- (*contributed talk*, E.J. O'Loughlin) "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
- (*contributed talk*, S.D.Kelly) "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
- (*poster*) "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
- (*poster*) "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
- (*contributed talk*, D.Lahiri) "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
- (*invited talk*, S.Kelly) "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
- (*invited talk*, K.Kemner) "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., Nealson, 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.
- (*contributed talk*, S.Cheong) "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
- (*contributed talk*, M.Boyanov) "EXAFS of ZnSe<sub>x</sub>Te<sub>1-x</sub> 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
- (*contributed talk*, D.Fowle) "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.
- (*poster*) "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.mesq.anl.gov/kkemner.html>  
tel: 1 (630) 252-1163  
fax: 1 (630) 252-9793

### **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

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

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