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EDUCATION

California Institute of Technology, Pasadena, California

Doctor of Philosophy, Environmental Engineering Science, June 2001
Thesis: "Geochemistry of uranium at mineral surfaces: Rates of sorption-desorption and dissolutionprecipitation reactions"

Master of Science, Environmental Engineering Science, June 1998

Carnegie Mellon University, Pittsburgh, Pennsylvania

Bachelor of Science, Civil Engineering, with honors, May 1996

RESEARCH EXPERIENCE

Washington University, St. Louis, Missouri, 2002-present

Walter E. Browne Professor of Environmental Engineering, 2014-present
Associate Professor, 2008-2014
Assistant Professor, 2002-2008
Department of Energy, Environmental and Chemical Engineering (2006-present) Department of Civil Engineering (2002-2006)

Princeton University, Princeton, New Jersey, 2012-2013

William R. Kenan, Jr. Visiting Professor for Distinguished Teaching in the Department of Civil and Environmental Engineering and the Keller Center for Innovation and Engineering Education

University of Vienna, Vienna, Austria, November-December 2007

Guest Professor, Department of Earth Sciences, Geography, and Astronomy

Princeton University, Princeton, New Jersey, 2001-2002 **Research**

Associate, Geosciences

California Institute of Technology, Pasadena, California, 1996-2001 **Graduate**

Research Assistant, Environmental Engineering Science

Battelle Memorial Institute, Columbus, Ohio, Summers 1993-1996 **Research**

Intern, Environmental Restoration

Carnegie Mellon University, Pittsburgh, Pennsylvania, 1995-1996

Undergraduate Research Assistant, Civil and Environmental Engineering

PUBLICATIONS

Peer-Reviewed Archival Journal Publications

1. Bae, Yeunook, Jill D. Pasteris, and **Daniel E. Giammar**, The ability of phosphate to prevent lead release from pipe scale when switching from free chlorine to monochloramine, *Environmental Science & Technology*, 54(2): 879-888, 2020.
2. Li, Guiwei, Weiyi Pan, Lili Zhang, Ziqiao Wang, Baoyou Shi, and **Daniel E. Giammar**, Effect of Cu(II) on Mn(II) oxidation by free chlorine to form Mn oxides at drinking water conditions, *Environmental Science & Technology*, 54(3): 1963-1972, 2020.
3. Pan, Chao, Huan Liu, Jeffrey G. Catalano, Zimeng Wang, Ao Qian, and **Daniel E. Giammar**, Understanding the roles of dissolution and diffusion in $Cr(OH)_3$ oxidation by δ-MnO_2, *ACS Earth and Space Chemistry*, 3: 357-365, 2019.
4. Qian, Ao, Wen Zhang, Cheng Shi, Chao Pan, **Daniel E. Giamma**r, Songhu Yuan, Hongliang Zhang, and Zimeng Wang, Geochemical stability of dissolved Mn(III) in the presence of pyrophosphate as a model ligand: Complexation and disproportionation, *Environmental Science & Technology*, 53: 5768-5777, 2019.
5. Pan, Weiyi, Chao Pan, Yeunook Bae, and **Daniel E. Giammar**, The role of manganese in accelerating the oxidation of Pb(II) carbonate solids to Pb(IV) at drinking water conditions, *Environmental Science & Technology*, 53: 6699-6707, 2019.
6. Pan, Zezhen, Xiaoming Zhu, Anshuman Satpathy, Wenlu Li, John D. Fortner, and **Daniel E. Giammar**, Cr(VI) Adsorption on Engineered Iron Oxide Nanoparticles: Exploring Complexation Processes and Water Chemistry**,** *Environmental Science & Technology,* 53: 11913-11921, 2019.
7. Pan, Weiyi, Lia Schattner, Justin Guilak, and **Daniel E. Giammar**, Impact of Cu(II) and Zn(II) on the reductive dissolution of Pb(IV) oxide, *Environmental Science & Technology Letters,* 2019, 6: 745-751.
8. Kim, Changwoo, Seung Soo Lee, Brandon J. Lafferty, **Daniel E. Giammar**, and John D. Fortner, Engineered superparamagnetic nanomaterials for arsenic(V) and chromium(VI) sorption and separation: Quantifying the role of organic surface coatings, *Environmental Science: Nano,* 5: 556563, 2018.
9. Xiong, Wei, Rachel K. Wells, Jake A. Horner, Herbert T. Schaef, Philip A. Skemer, and **Daniel E. Giammar**, CO_2 Mineral Sequestration in Naturally Porous Basalt, *Environmental Science and Technology Letters*, 5: 142-147, 2018.
10. Wen, Hang, Zezhen Pan, **Daniel Giammar**, and Li Li, Enhanced uranium immobilization by phosphate amendment: Effect of geochemical and flow conditions, *Environmental Science and Technology*, 52(10): 5841-5850, 2018.
11. Dai, Chong, Juntao Zhao, **Daniel Giammar**, Jill Pasteris, Xiaobing Zuo, and Yandi Hu, Heterogeneous lead phosphate nucleation at organic-water interfaces: implications for lead immobilization, *ACS Earth and Space Chemistry*, 2(9) 869-877, 2018.
12. Menefee, Anne H., **Daniel E. Giammar**, and Brian R. Ellis, Permanent CO_2 trapping through localized and chemical gradient-driven basalt carbonation, *Environmental Science and Technology*, 52(15): 8954-8964, 2018.
13. Rivera-Nunez, Zorimar, Lora Ionatti, Zezhen Pan, and **Daniel Giammar**, Water metal contaminants in a potentially mineral deficient population of Haiti, *International Journal of Environmental Health Research*, 28(12): 1-9, 2018.

14. Zhao, Juntao, **Daniel E. Giammar**, Jill D. Pasteris, Chong Dai, and Yandi Hu, Formation and aggregation of lead phosphate nanoparticles: Implications for lead immobilization in water supply systems, *Environmental Science and Technology*, 52(21): 12612-12623, 2018.
15. Xiong, Wei, Rachel K. Wells, and **Daniel E. Giammar**, Carbon sequestration in olivine and basalt powder packed beds, *Environmental Science & Technology*, 51(4): 2105-2112, 2017
16. Wells, Rachel K., Wei Xiong, Erika Sesti, Jinlei Cui, **Daniel Giammar**, Philip Skemer, Sophia E. Hayes, and Mark S. Conradi, Spatially-variable carbonation reactions in polycrystalline olivine, *Geochimica et Cosmochimica Acta*, 204: 252-266, 2017.
17. Pan, Chao, Lyndsay D. Troyer, Peng Liao, Jeffrey G. Catalano, Wenlu Li, and **Daniel E. Giammar**, The effect of humic acid on the removal of chromium(VI) and the production of solids in iron electrocoagulation, *Environmental Science & Technology*, 51(11): 6308-6318, 2017.
18. Adeoye, Jubilee T., Anne H. Menefee, Wei Xiong, Rachel K. Wells, **Daniel E. Giammar**, Philip Skemer, and Brian R. Ellis, Effect of transport limitations and fluid properties on reaction products in fractures of unaltered and serpentinized basalt exposed to high P_{CO2} fluids, *International Journal of Greenhouse Gas Control*, 63: 310-320, 2017.
19. Menefee, Anne; Li, Peiyuan; **Giammar, Daniel**; Ellis, Brian, Roles of transport limitations and mineral heterogeneity in carbonation of fractured basalts, *Environmental Science & Technology*, 51: 9352-9362, 2017.
20. Pan, Zezhen, Wenlu Li, John D. Fortner and **Daniel E. Giammar**, Measurement and Surface Complexation Modeling of U(VI) Adsorption to Engineered Iron Oxide Nanoparticles, *Environmental Science & Technology*, 51: 9219-9226, 2017.
21. Wells, Rachel K., Wei Xiong, **Daniel E. Giammar**, and Philip Skemer, Dissolution and surface roughening of Columbia River flood basalt at geologic carbon sequestration conditions, *Chemical Geology*, 467: 100-109, 2017.
22. Pan, Chao, Huan Liu, Jeffrey G. Catalano, Ao Qian, Zimeng Wang, and **Daniel E. Giammar**, Rates of oxidation of Cr(III) in $Cr_xFe_{1-x}(OH)_3$ solids by manganese oxide: The influence of pH and iron content, *Environmental Science & Technology*, 51(21): 12416-12423, 2017.
23. Liao, Peng, Wenlu Li, Yi Jiang, Jiewei Wu, Songhu Yuan, John Fortner, and **Daniel Giammar**, Formation, aggregation, and deposition dynamics of NOM-iron colloids at anoxic-oxic interfaces, *Environmental Science & Technology* 51(21): 12235-12245, 2017.
24. Xiong, Wei, Rachel K. Wells, Anne H. Menefee, Philip Skemer, Brian R. Ellis, and **Daniel E. Giammar**, CO_2 mineral trapping in fractured basalt, *International Journal of Greenhouse Gas Control*, 66: 204-217, 2017.
25. Wang, L, Burns, S.R., **Giammar, D.E.**, and J.D. Fortner, Element mobilization from Bakken shales as a function of water chemistry, *Chemosphere*, 149: 286-293, 2016.
26. Troyer, L., Maillot, F., Wang, Z., Wang, Z., Mehta, V.S., **Giammar, D.E.**, and J.G. Catalano, Effect of phosphate on U(VI) sorption to montmorillonite: Ternary complexation and precipitation barriers, *Geochimica et Cosmochimica Acta*, 175: 86-99, 2016.
27. Mehta, V.S., Maillot, F., Wang, Z., Catalano, J.G. and **D.E. Giammar**, Effect of reaction pathway on the extent and mechanism of uranium(VI) immobilization with calcium and phosphate, *Environmental Science & Technology*, 50(6): 3128-3136, 2016.
28. Schenkeveld, Walter; Wang, Zimeng; **Giammar, Daniel**; Kraemer, Stephan, Synergistic effects between biogenic ligands and a reductant in Fe acquisition from calcareous soil, *Environmental Science & Technology*, 50: 6381-6388, 2016.
29. Cui, J., Sesti, E.L, Moore, J.K., **Giammar, D**., and S.E Hayes, Evidence from ^{29}Si solid-state NMR of dissolution reactions of forsterite, *Environmental Engineering Science*, 33(10): 799-805, 2016.

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33. Mehta, V.S., Maillot, F., Wang, Z., Catalano, J.G. and **D.E. Giammar**, Transport of U(VI) through sediments amended with phosphate to induce *in situ* uranium immobilization, *Water Research*, 69: 307-317, 2015.
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35. Wang, L. and **D.E. Giammar**, Effects of pH, dissolved oxygen, and aqueous ferrous iron on the adsorption of arsenic to lepidocrocite, *Journal of Colloid and Interface Science*, 448: 331-338, 2015.
36. Hinkle, M.A., Wang, Z., **Giammar, D.E.** and J.G. Catalano, Interaction of Fe(II) with phosphate and sulfate on iron oxide surfaces, *Geochimica et Cosmochimica Acta*, 158: 130-146, 2015.
37. Surface. J.A., Wang, F., Zhu, Y., Hayes, S.E., **Giammar, D.E.**, and M.S. Conradi, Determining pH at elevated pressure and temperature using *in situ* ^{13}C NMR, *Environmental Science & Technology*, 49: 1631-1638, 2015.
38. Wang, Z., Schenkeveld, W.D.C., Kraemer, S.M., and **D.E. Giammar**, Synergistic effect of reductive and ligand controlled dissolution of goethite, *Environmental Science & Technology*, 49(12): 72367244, 2015.
39. Lezama Pacheco, J., Cerrato, J., Veeramani, H., Alessi, D., Suvorova, E. ,Bernier-Latmani, R., **Giammar, D.**, Long, P., Williams, K. and J. Bargar, Long-term in-situ oxidation of biogenic uraninite in an alluvial aquifer: Impact of dissolved oxygen and calcium, *Environmental Science & Technology*, 49(12): 7340-7347, 2015.
40. Wang, Z, Ulrich, K.-U., Pan, C., and **D.E. Giammar**, Measurement and modeling of U(IV) adsorption to metal oxide minerals, *Environmental Science & Technology Letters*, 2: 227-232, 2015.
41. Xiong W. and **D.E. Giammar**, Forsterite carbonation in zones with transport limited by diffusion, *Environmental Science & Technology Letters*, 1: 333-338, 2014. dx.doi.org/10.1021/ez500182s |
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44. Wang, Z., Xiong, W., Tebo, B.M. and **D.E. Giammar**, Oxidative UO_2 dissolution induced by soluble Mn(III), *Environmental Science & Technology*, 48(1): 289-298, 2014. dx.doi.org/10.1021/es4037308
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58. Wang, Y., Wu, J. and **D.E. Giammar**, Kinetics of the reductive dissolution of lead(IV) oxide by iodide, *Environmental Science & Technology*, 46(11): 5859-5866, 2012. DOI: 10.1021/es2038905
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60. Singh, A., Catalano, J.G., Ulrich, K.-U. and **D.E. Giammar**, Molecular-scale structure of uranium(VI) immobilized with goethite and phosphate, *Environmental Science & Technology*, 46: 6604-6611, 2012. dx.doi.org/10.1021/es300501v

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Archival Journal Publications that are not Peer Reviewed

1. Wang, Zimeng and Daniel Giammar, Tackling deficiencies in the presentation and interpretation of adsorption results for new materials, *Environmental Science & Technology*, 53(10): 5543-5544, 2019.

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1. Bae, Yeunook and **Daniel Giammar**. 2019. Processes controlling the development of effective lead corrosion control with orthophosphate, Project No. 4686. Water Research Foundation, Denver, Colorado. ISBN 978-60573-449-1.
2. Wang, Z. and **D.E. Giammar**. 2015. Metal contaminant oxidation mediated by manganese redox cycling in subsurface environments, Chapter 2, pp. 29-50, in *Advances in the Environmental Biogeochemistry of Manganese Oxides*, Eds. Feng, X., Li, W., Zhu, M., and D.L. Sparks, American Chemical Society, Washington, DC
3. Welter, G., **Giammar, D.**, Wang, Y., and A. Cantor. 2013. *Galvanic corrosion following partial lead service line replacement.* Project 4349. Water Research Foundation, Denver, Colorado.
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Manuscripts in Review

1. Bae, Yeunook, Jill D. Pasteris, and Daniel E. Giammar, Impact of orthophosphate on lead release from pipe scale in high-pH, low-alkalinity water, submitted to *Water Research* in December 2019.
2. Liao Peng, Chao Pan, Wenyu Ding, Wenlu Li, Songhu Yuan, John Fortner and Daniel Giammar, Formation and transport of Cr(III)-NOM-Fe colloids upon reaction of Cr(VI) with NOM-Fe(II) colloids at anoxic-oxic interfaces, submitted to *Environmental Science & Technology* in December 2019.
3. Li, Guiwei, Yeunook Bae, Anushka Mishrra, Baoyou Shi, and Daniel E. Giammar, Effect of aluminum on lead release to drinking water from scales of corrosion products, submitted to *Environmental Science & Technology* in February 2020.
4. Bae, Yeunook, Jill D. Pasteris, and Daniel E. Giammar, Impact of iron-rich scale in service lines on lead release to water, submitted to *AWWA Water Science* in February 2020.

CONFERENCE PRESENTATIONS AND PROCEEDINGS

1. Nicole Blute, Jacqueline Rhoades, Daniel Giammar, and Anushka Mishrra, Water quality integration and blending strategies to prevent corrosion outcomes with potable reuse, International Potable Reuse Symposium, February 10-11, Atlanta, Georgia
2. Daniel Giammar, Yeunook Bae, Anushka Mishrra, Vicky Sidorkiewicz, and Jill Pasteris, Effects of orthophosphate and sodium silicate addition on controlling lead release, Water Quality Technology Conference, November 3-7, 2019, Dallas, Texas.
3. Yeunook Bae, Violla Liu, Guiwei Li, Anushka Mishrra, Jill Pasteris, and Daniel Giammar, The role of orthophosphate to limit lead release from pipe scales when switching disinfectant from free chlorine to monochloramine, Water Quality Technology Conference, November 3-7, 2019, Dallas, Texas.
4. Juntao Zhao, Daniel Giammar, Jill Pasteris, Chong Dai, Yeunook Bae, and Yandi Hu, Aggregation and deposition of lead phosphate particles in water supply systems, Water Quality Technology Conference, November 3-7, 2019, Dallas, Texas.
5. Anushka Mishrra, Daniel Giammar, Ziqi Wang, and Vicky Sidorkiewicz, Effect of sodium silicate addition on lead release from premise plumbing and lead service lines, Water Quality Technology Conference, November 3-7, 2019, Dallas, Texas.
6. Guiwei Li, Daniel Giammar, and Baoyou Shi, Catalytic effect of different Al(III) species residual on Mn(II) oxidation by chlorine in drinking water distribution, Water Quality Technology Conference, November 3-7, 2019, Dallas, Texas.
7. (invited) Daniel Giammar and Jeff Catalano, Geochemical controls of the bioavailability of metal nutrients in wetland soils, International Symposium on Environmental Geochemistry, August 7-10, 2019, Beijing, China.
8. Daniel Giammar, Yeunook Bae, Anushka Mishrra, and Jill Pasteris, Impact of changes in water chemistry on release of lead from lead service lines used for water supply, 2019 AEESP Education and Research Conference, May 14-16, 2019, Tempe, Arizona.
9. Anushka Mishrra and Daniel Giammar, Effects of sodium silicate corrosion inhibitors on lead release from pipe materials, *257th American Chemical Society National Meeting*, March 31 – April 4, 2019, Orlando, Florida.
10. Weiyi Pan and Daniel Giammar, Lead-catalyzed redox-driven recrystallization of lead oxide, *257th American Chemical Society National Meeting*, March 31 – April 4, 2019, Orlando, Florida.
11. Anshuman Satathy and Daniel Giammar, Trends of uranium(IV) adsorption onto clay minerals, *257th American Chemical Society National Meeting*, March 31 – April 4, 2019, Orlando, Florida.

12. Neha Sharma, John Fortner, and Daniel Giammar, U(VI) removal using rhamnolipid stabilized iron oxide nanoparticles, *257th American Chemical Society National Meeting,* March 31 – April 4, 2019, Orlando, Florida.
13. Yeunook Bae, Violla Liu, Jill Pasteris, and Daniel Giammar, Effectiveness of orthophosphate addition for controlling lead levels in water conveyed through lead service lines during a switch in disinfectant, *257th American Chemical Society National Meeting,* March 31 – April 4, 2019, Orlando, Florida.
14. Juntao Zhao, Daniel Giammar, Jill Pasteris, Chong Dai, Yeunook Bai, and Yandi Hu, Formation and aggregation of lead phosphate particles: Implications for lead immobilization in water supply systems, *257th American Chemical Society National Meeting,* March 31 – April 4, 2019, Orlando, Florida.
15. Daniel Giammar, Yeunook Bae, Weiyi Pan, Chao Pan, Anna Ivarson, and Jill Pasteris, Response of lead pipe scales to changes in water chemistry, *2018 Water Quality Technology Conference,* November 11-14, 2018, Toronto Ontario.
16. Yeunook Bae, Lia Schattner, Anna Ivarson, Anushka Mishra, Jill Pasteris, and Daniel Giammar, The ability of orthophosphate to limit lead release from pipe scales when switching from free chlorine to monochloramine, *2018 Water Quality Technology Conference,* November 11-14, 2018, Toronto Ontario.
17. Yandi Hu, Chong Dai, Juntao Zhao, Daniel Giammar, Jill Pasteris, and Xiaobing Zuo, Heterogeneous lead phosphate nucleation at organic-water interfaces: Implications for lead immobilization, *255th American Chemical Society National Meeting,* March 18-22, 2018, New Orleans, Louisiana.
18. Yeunook Bae, Lia Schattner, Anna Ivarson, Jill Pasteris, and Daniel E. Giammar, Rates and pathways of controlling lead concentrations in lead pipes by orthophosphate addition, *255th American Chemical Society National Meeting,* March 18-22, 2018, New Orleans, Louisiana.
19. Juntao Zhao, Chong Dai, Daniel E. Giammar, Jill D. Pasteris, and Yandi Hu, Aggregation of lead phosphate nanoparticles: Implication for lead immobilization in pipe systems, *255th American Chemical Society National Meeting*, March 18-22, 2018, New Orleans, Louisiana.
20. Chao Pan, Ao Qian, Jeffrey G. Catalano, and Daniel E. Giammar, Cr(VI) generation from Cr(III)containing iron oxides associated with manganese redox cycling, *255th American Chemical Society National Meeting,* March 18-22, 2018, New Orleans, Louisiana.
21. Anshuman Satpathy and Daniel E. Giammar, Intercomparison of surface complexation models for uranium(VI) adsorption to goethite: Sources of variation in model output and movement toward a more globally optimal model, *255th American Chemical Society National Meeting*, March 18-22, 2018, New Orleans, Louisiana.
22. Anne H. Menefee, Daniel Giammar, and Brian R. Ellis, Hyper-localized carbon mineralization in diffusion-limited basalt fractures, American Geophysical Union Fall Meeting, December 11-15, 2017, New Orleans, Louisiana.
23. Rachel K. Wells, Wei Xiong, Daniel Giammar, and Philip A. Skemer, Carbon storage potential of Columbia River flood basalt, American Geophysical Union Fall Meeting, December 11-15, 2017, New Orleans, Louisiana.
24. Daniel Giammar, Yeunook Bae, Chao Pan, Jill Pasteris, Yandi Hu, Juntao Zhao, and Chong Day, Processes influencing the effectiveness of orthophosphate for lead corrosion control, *2017 Water Quality Technology Conference,* November 12-16, 2017, Portland, Oregon.
25. (invited) Daniel E. Giammar, Zimeng Wang, Chao Pan, and Ao Qian, Oxidation of metals and metalloids by manganese oxides and soluble Mn(II), *2017 National Conference on Environmental Chemistry,* October 19-22, 2017, Hangzhou, China.
26. (invited) Daniel E. Giammar, Zimeng Wang, Zezhen Pan, and Anshuman Satpathy, Expanding the applications of surface complexation modeling for uranium adsorption to minerals and engineered sorbents, *2017 National Conference on Environmental Chemistry,* October 19-22, 2017, Hangzhou, China.

27. Benjamin Klayman and Daniel Giammar, Tools for study of lead release in water distribution systems, *AWWA Annual Conference and Exposition*, June 11-14, 2017, Philadelphia, Pennsylvania.
28. Anne H. Menefee, Daniel E. Giammar, Dustin Crandall, and Brian R. Ellis, Reaction fronts associated with mineral carbonation of fractured basalts, *2017 Association of Environmental Engineering and Science Professors Conference*, June 20-22, 2017, Ann Arbor, Michigan.
29. Zezhen Pan, Wenlu Li, John Fortner and Daniel Giammar, Measuring and modeling U(VI) adsorption to engineered iron oxide nanoparticles, *253rd American Chemical Society National Meeting*, April 26, 2017, San Francisco, California.
30. Yeunook Bae, Nyssa Crompton, Jeffrey Catalano, and Daniel Giammar, Iron electrocoagulation for removal of dissolved selenium: Impact of oxygen level and pH, *253rd American Chemical Society National Meeting*, April 2-6, 2017, San Francisco, California.
31. Xiongfei Xie, Daniel Giammar and Zimeng Wang, MINFIT: A spreadsheet-based tool for parameter estimation in an equilibrium speciation software program, *253rd American Chemical Society National Meeting*, April 2-6, 2017, San Francisco, California.
32. Chao Pan, Ao Qian, Huan Liu, Jeffrey Catalano and Daniel Giammar, Rates and products of MnO2 oxidation of Cr(III)-containing iron oxides, *253rd American Chemical Society National Meeting*, April 2-6, 2017, San Francisco, California.
33. Ao Qian, Songhu Yuan and Daniel Giammar, Production of OH from oxygenation of Fe2+ under near-neutral conditions, *253rd American Chemical Society National Meeting*, April 2-6, 2017, San Francisco, California.
34. Rachel K. Wells, Wei Xiong, Jubilee Adeoye, Anne Menefee, Brian Ellis, Philip Skemer and Daniel E. Giammar, Impact of dissolution and carbonate precipitation on carbon storage in basalt, American Geophysical Union Fall Meeting, December 12-16, 2016, San Francisco, California.
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36. Anne H. Menefee, Peiyuan Li, Daniel E. Giammar, and Brian R. Ellis, CO_2 storage in fractured basalt: Coupling experimental analyses with reactive transport modeling, *Goldschmidt Conference*, June 26 – July 1, 2016, Yokohama, Japan.
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47. Giammar, D., Xiong, W., Hayes, S., Skemer, P., Conradi, M., Ellis, B., Moore, J., and D. Crandall, Characterization of mineral trapping within fractured basalts, *14th Annual Carbon Capture Utilization and Storage Conference,* April 28 – May 1, 2015, Pittsburgh, Pennsylvania.
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49. Giammar, D., Pan, C., Wang, L., and J. Catalano, Contaminant removal from water through oxidation-reduction and adsorption on iron oxides generated during electrocoagulation, *249th ACS National Meeting*, March 22-26, 2015, Denver, Colorado. (invited)
50. Pan, Z., Giammar, D., Mehta, V., Troyer, L., Catalano, J., and Z. Wang, *In situ* immobilization of uranium in Hanford sediments with the amendment of phosphate, *249th ACS National Meeting,* March 22-26, 2015, Denver, Colorado.
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52. Mehta, V., Pan, Z., Maillot, F., Catalano, J. G., and D.E. Giammar, Column-scale evaluation of *in situ* uranium immobilization in sediments amended with phosphate, *248th ACS National Meeting,* August 10-14, 2014, San Francisco, California.
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54. Giammar, D., Wang, F., Hayes, S., Surface, J.A., Peters, C., Moore, J., Guo, B., and W. Xiong, Control of mineral carbonation of forsterite by diffusive transport processes, 13th Annual Carbon Capture, Utilization and Storage Conference, April 28 – May 1, 2014, Pittsburgh, Pennsylvania.
55. Wang, Z., Schenkeveld, W.D.C., Catalano, J.G., Kraemer, S.M. and D.E. Giammar, Synergistic effects of reduction and ligand controlled dissolution on iron bioavailability to plants, *247th ACS National Meeting*, March 16-20, 2014, Dallas, Texas.
56. Wang, L., Giammar, D.E. and J.D. Fortner, Trace element mobilization from shales as a function of fluid properties, *247th ACS National Meeting*, March 16-20, 2014, Dallas, Texas.
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60. Wang, L., Karakocak, B., Giammar, D., and J. Fortner, Impact of water chemistry on trace element mobilization during shale-fluid contact, *246th ACS National Meeting*, September 8-12, 2013, Indianapolis, Indiana.
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62. Giammar, D. and Z. Wang, Addressing challenges in environmental engineering laboratory teaching by examining the perspectives of students and teaching assistants, Association of Environmental Engineering and Science Professors Biannual Conference, July 14-16, 2013, Golden, Colorado.
63. Giammar, D.E, Wang, L., Fortner, J.D., Karakocak, B. and O. Yenigun, Influence of water chemistry on trace element mobilization from fractured shales, Association of Environmental Engineering and Science Professors Biannual Conference, July 14-16, 2013, Golden, Colorado.
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65. Wang, F., Mehra, A. and D.E. Giammar, Effects of diffusive transport on mineral-water-CO2 reactions: Rates, locations, and extents of forsterite dissolution and magnesite precipitation, 11th Annual Conference on Carbon Capture, Utilization, and Sequestration, May 13-16, 2013, Pittsburgh, Pennsylvania.
66. Wang, Y. and D.E. Giammar, Mechanisms of PbO_2 Reductive Dissolution: A Surface Complexation Modeling Approach, *245th ACS National Meeting*, April 7-11, 2013, New Orleans, Louisiana.
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70. Cerrato, J.M., Ashner, M.N., Alessi, D.S., Lezama-Pacheco, J.S., Bernier-Latmani, R., Bargar, J.R., and D.E. Giammar,, Reactivity of U(IV) species under different chemical conditions, *245th ACS National Meeting*, April 7-11, 2013, New Orleans, Louisiana.
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72. Wang, Y., Giammar, D.E., Welter, G.J, and A. Cantor, Experimental investigation of lead release following simulated partial lead service line replacement, 2012 Water Quality Technology Conference, November 4-8, 2012, Toronto, Canada.

73. Wang, L., Giammar D., Maillot, F., and J. Catalano, Interfacial chemistry of arsenic and lepidocrocite in water treatment systems, *244th ACS National Meeting*, ENVR-138, August 19-23, 2012, Philadelphia, Pennsylvania.
74. Bargar, J.R., Lezama-Pacheco, J.S., Janot, N., Stubbs, J.E., Williams, K.H., Long, P.E., Suvorova, E.I., Stylo, M.A., Alessi, D.S., Bernier-Latmani, R., Campbell, K.M., Davis, J.A., Fox, P.M., Cerrato, J.M., and D.E. Giammar, Uranium(VI) reduction products in the Old Rifle, CO alluvial aquifer: Insights from X-ray absorption spectroscopy, *244th ACS National Meeting*, ENVR-184, August 1923, 2012, Philadelphia, Pennsylvania.
75. Giammar, D.E., Wang, L., and J. Fortner, Impacts of the chemistry of fracturing fluids on the mobilization of trace elements in shales, *244th ACS National Meeting*, GEOC-28, August 19-23, 2012, Philadelphia, Pennsylvania.
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81. Wang, Y., Wu, J., and **D.E. Giammar**, Effects of oxidants and reductants on the dissolution rate of the lead corrosion product PbO_2, *2011 WQTC Conference*, November 13-17, 2011, Phoenix, Arizona. 66. **D. Giammar**, Wang, Y., Jing, H., Cantor, A. and G.Welter, Experimental investigation of lead release during connection of lead and copper pipes, *2011 WQTC Conference*, November 13-17, 2011, Phoenix, Arizona.

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69. *Wang Y., Wu, J., and **D.E. Giammar**, Effect of water chemistry on the dissolution of the corrosion product lead(IV) oxide, 242nd American Chemical Society National Meeting, ENVR484, August 28 – September 1, 2011, Denver, Colorado.
70. *Wang, F. and **D.E. Giammar**, Reaction of forsterite in saline water at elevated temperature and high carbon dioxide pressure, 242nd American Chemical Society National Meeting, GEOC67, August 28 – September 1, 2011, Denver, Colorado.
71. *Luo, Y.. **Giammar**, **D.E.**, and J.G. Catalano, Speciation of selenium, arsenic, and zinc in Class C fly ash, 242nd American Chemical Society National Meeting, ENVR8, August 28 – September 1, 2011, Denver, Colorado.

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149. *Xie, L. and **D.E. Giammar,** Dissolution rate of the lead phosphate mineral pyromorphite. *2005 Goldschmidt Conference*, May 20-25, 2005, Moscow, Idaho, *Geochimica et Cosmochimica Acta*, A608.

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154. Xie, L., Farnsworth, C.E., and **D.E. Giammar,** Dissolution and precipitation rates of the lead phosphate mineral pyromorphite. *Gordon Research Conference, Environmental Science: Water*, June 26-July 1, 2004, Plymouth, New Hampshire.

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158. Bruant Jr., R.G., **Giammar, D.E.**, and C.A. Peters, Effects of pressure and solution composition on mineral weathering rates as applied to geologic storage of carbon dioxide. Abstract submitted to *American Geophysical Union Annual Meeting*, December 2003.

159. Hering, J.G. and **D.E. Giammar,** Mineral Transformations During Dissolution: Influence of Aqueous Species on the Formation of U(VI) Solid Phases. Telluride Workshop: Chemical Reactivity of Aqueous Species at Mineral Surfaces, Telluride, CO, 24-27 June 2003

160. **Giammar, D.E.**, Bruant Jr., R.G., and C.A. Peters, Silicate weathering at pressure, temperature, and aqueous carbon dioxide conditions relevant to geologic carbon sequestration, *Abstracts of the Geological Society of America Annual Meeting*, Vol. 34, No. 6, 135-6, October 27-30, 2002, Denver, Colorado.

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164. ***Giammar, D.E.** and J.G. Hering, Rates of uranium(VI) sorption and surface-precipitation on mineral surfaces, *221st American Chemical Society National Meeting*, 2001.

165. ***Giammar, D.E.** and J. Hering, Dissolution and transformation rates of uranyl mineral phases, *220th American Chemical Society National Meeting*, 2000.

166. **Giammar, D.E.** and J.G. Hering, Kinetics of uranium sorption on goethite and dissolution of uranium containing minerals, *Geological Society of America Annual Meeting*, 1999.

167. ***Giammar, D.E.** and J.G. Hering, Kinetics of uranium sorption on goethite, *217th American Chemical Society National Meeting*, 1999.

168. Gavaskar, A.R., B.M. Sass, E. Drescher, L. Cumming, **D. Giammar**, and N. Gupta, Enhancing the reactivity of permeable barrier media, *First International Conference on Remediation of Chlorinated and Recalcitrant Compounds*, 1998.

169. Sass, B.M., **D. Giammar**, and J. Means, Investigation of cadmium in hydrated tricalcium silicate. *Third International Symposium on Stabilization/Solidification of Hazardous, Radioactive, and Mixed Wastes*, 1993.

INVITED PRESENTATIONS

1. Lead in drinking water: The role of water chemistry and reactions at the pipe scale-water interface, November 12, 2019, Ecological and Environmental Engineering, Purdue University.
2. Lead in drinking water: The role of water chemistry and reactions at the pipe scale-water interface, March 14, 2019, Department of Civil and Environmental Engineering, Cornell University.
3. Impacts of water chemistry on lead corrosion control, March 4, 2019, 2019 St. Louis Environmental and Water Resources Institute Spring Seminar.
4. Lead in drinking water: The role of water chemistry and reactions at the pipe scale-water interface, January 31, 2019, Department of Civil and Environmental Engineering, University of Texas - Austin.
5. Measuring and modeling uranium adsorption at solid-water interfaces, December 14, 2018, Department of Civil and Environmental Engineering, Hong Kong University of Science and Technology.
6. Understanding the impact of changes in water chemistry on concentrations of lead in drinking water, December 13, 2018, Environmental Division of the Hong Kong Insitute of Engineers.
7. Lead in drinking water: The role of water chemistry and reactions at the pipe scale-water interface, December 12, 2018, Department of Civil and Environmental Engineering, Hong Kong Polytechnic University.
8. Measuring and modeling uranium adsorption at solid-water interfaces, October 10, 2018, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing, China.
9. Measuring and modeling uranium adsorption at solid-water interfaces, October 11, 2018, Peking University, Beijing, China.
10. Geochemical reactions and transport processes involved in geologic carbon sequestration, September 21, 2018, Department of Earth and Ocean Sciences and Department of Civil and Environmental Engineering, Duke University.
11. Lead in drinking water: The role of water chemistry and reactions at the pipe scale-water interface, February 9, 2018, Department of Civil, Structural and Environmental Engineering, University at Buffalo.
12. Lead in drinking water: The role of water chemistry and reactions at the pipe scale-water interface, November 10, 2017, Department of Civil and Environmental Engineering, University of Houston.
13. Causes and Control of Lead Release from Lead Service Lines used for Drinking Water Supply, February 13, 2017, St. Louis Chapter of the National Association of Corrosion Engineers
14. Geochemical processes involved in geologic carbon sequestration, September 1, 2016, Department of Earth and Planetary Sciences, Washington University in St. Louis

15. Appreciating metal speciation diversity, June 29, 2016, Gordon Research Conference on Environmental Sciences: Water, Plymouth, New Hampshire
16. Geochemical reaction and transport processes involved in geologic carbon sequestration, April 29, 2016, Department of Civil and Environmental Engineering and the Graduate Program of Hydrologic Sciences, University of Nevada, Reno
17. From plant to tap: Optimizing your distribution system, March 29, 2016, Black and Veatch Insight H_2O^{TM} series
18. Causes and control of lead release from water pipes, December 10, 2015, Hong Kong Institution of Engineers
19. Contaminant removal from water through oxidation-reduction and adsorption on iron oxides, December 11, 2015, Department of Civil and Environmental Engineering, Hong Kong University of Science and Technology.
20. Biogeochemical processes affecting uranium transport in the subsurface, December 14, 2015, Department of Municipal Engineering, Tongji University
21. Oxidation-reduction reactions of metals and metalloids at mineral-water interfaces, December 14, 2015, Department of Environmental Science and Engineering, Fudan University.
22. Biogeochemical processes affecting uranium transport in the subsurface, December 15, 2015, Department of Chemistry and Materials Science, University of Science and Technology of China.
23. Geochemical processes involved in geologic carbon sequestration: The importance of chemical reactions and transport processes for sequestration in fractured basalts, September 25, 2015, Department of Geology and Environmental Earth Science, Miami University.
24. Coupling of geochemical reactions and transport processes during geologic carbon sequestration, September 15, 2015, Department of Geography and Environmental Engineering, Johns Hopkins University.
25. Influence of geochemical reactions and transport processes on carbonate mineral formation during geologic carbon sequestration in fractured basalts, July 10, 2015, Pacific Northwest National Laboratory.
26. Writing papers for peer-reviewed journals: Insights into the process and examples from research on metal adsorption to iron and manganese oxides, June 16, 2015, Peking University.
27. The importance of speciation to the behavior of heavy metals at mineral-water interfaces, June 13, 2015, Research Center for Eco-Environmental Sciences, Chinese Academy of Science, Beijing.
28. Contaminant removal from water through oxidation-reduction and adsorption on iron oxides, June 10, 2015, Huazhong University of Science and Technology
29. Redox reactions on iron oxide surfaces for removal of arsenic and chromium(VI) from drinking water, June 10, 2015, Huazhong Agricultural University.
30. The role of solid-water interfaces in controlling the mobility of heavy metals and metalloids in natural and engineered aquatic systems, June 8 and 15, 2015, China University of Geosciences (Wuhan and Beijing)
31. Publishing research in peer-reviewed journals: A workshop on writing papers and the peer-review process, June 9 and 15, China University of Geosciences (Wuhan and Beijing)
32. Influence of interfacial processes on the fate and transport of uranium in the environment, February 26, 2015, Environmental Engineering and Earth Science Program, Notre Dame University.
33. Giammar, D.E., Wang, Z., Tebo, B.M., and J.G. Catalano, Influence of water chemistry on metal sorption to manganese oxides, *247th ACS National Meeting*, March 16-20, 2014, Dallas, Texas.

34. Chemical reaction and transport controls on of carbonate mineral formation in geologic carbon sequestration, January 10, 2014, Department of Chemical and Environmental Engineering, University of California Riverside.
35. Impact of galvanic corrosion on lead release following partial lead service line replacement, August 8, 2013, Water Research Foundation Webcast (www.waterrf.org).
36. Biogeochemical processes influence the mobility of uranium in the environment, May 22, 2013, Department of Environmental Sciences, Rutgers University.
37. Biogeochemical processes controlling the mobility of uranium in contaminated subsurface environments, March 28, 2013, Department of Civil and Environmental Engineering, Princeton University.
38. Water quality implications of hydraulic fracturing for shale gas production, March 15, 2013, Princeton Environmental Institute Energy Group Seminar, Princeton University.
39. Rates and products of mineral-water-CO_2 reactions that can affect the performance of geologic carbon sequestration strategies, January 30, 2013, Lamont-Doherty Earth Observatory of Columbia University.
40. Coupling of redox cycles of uranium and manganese in subsurface environments, October 4, 2012, Environmental Geology and Geochemistry Seminar Series, Department of Geosciences, Princeton University.
41. Lead in drinking water: The impact of oxidation-reduction reactions, September 14, 2012, Department of Civil and Environmental Engineering, Villanova University.
42. Lead(IV) oxide formation and stability: Rates and mechanisms of processes at the solid-water interface, August 14, 2012, Water Research Foundation Webcast (www.waterrf.org).
43. Impact of galvanic corrosion on lead release from aged lead service lines, Polytechnique de Montreal, June 18, 2012, Montreal, Canada.
44. Influence of aqueous geochemistry on the oxidative dissolution of uraninite. Monte Verita Workshop on Uranium Biogeochemistry, March 11-16, 2012, Ascona, Switzerland.
45. Formation and stability of solid phase lead corrosion products. *2009 American Water Works Association Annual Conference and Exposition*, June 17, San Diego, California.
46. Adsorption of toxic metals and metalloids to nanostructured metal oxides, Indian Institute of Technology Bombay, Centre for Environmental Science and Engineering, December 17, 2008.
47. Interfacial chemical processes affecting the environmental fate and transport of uranium, Indian Institute of Technology Bombay, Department of Chemical Engineering, December 12, 2008.
48. Environmental geochemistry of uranium: Importance of reactions at the solid-water interface, Saint Louis University, Department of Chemistry, September 26, 2008.
49. Interfacial reactions controlling the mobility of lead in natural and engineered aquatic systems, University of Delaware, Department of Civil and Environmental Engineering, May 9, 2008.
50. Biogeochemical processes affecting the environmental fate and transport of uranium, University of Iowa, Department of Civil and Environmental Engineering, February 8, 2008.
51. Adsorption of metals and metalloids to nanostructured metal oxides, University of Vienna, Center for Earth Sciences, December 4, 2007.
52. Interfacial reactions affecting contaminant fate and transport: Reactions of uranium at the solid-water interface, Washington University, Department of Energy, Environmental, and Chemical Engineering, September 22, 2007.
53. Adsorption of toxic metals and metalloids to nanostructured metal oxides, The Swiss Federal Institute of Aquatic Science and Technology (Eawag), August 14, 2007.

54. Processes controlling the long-term stability of uranium in contaminated environments: the role reactions at the solid-water interface, California Institute of Technology, Environmental Science and Engineering, May 16, 2007.
55. Adsorption of toxic metals and metalloids to nanostructured metal oxides, Northwestern University, Department of Civil and Environmental Engineering, November 10, 2006.
56. Influence of phosphate on the mobility of lead in the environment, University of Illinois, Department of Civil and Environmental Engineering, October 5, 2006.
57. Nanostructured materials in environmental systems: Effects of particle size on reactions at the solidwater interface, Carnegie Mellon University, Department of Civil and Environmental Engineering, April 14, 2006.
58. Reactions at the nanoparticle-water interface: Applications in environmental science and engineering, Rice University, Department of Civil and Environmental Engineering, February 24, 2006.
59. Processes at the Solid-Water Interface that Affect Metal Mobility in the Environment, Battelle, Department of Environmental Restoration, January 6, 2006.
60. Environmental Fate and Transport of Lead: Effects of Phosphate on Adsorption and Dissolution-Precipitation Reactions, Department of Civil Engineering, Auburn University, October 19, 2005.
61. Reactions at the Mineral-Water Interface Affecting Heavy Metal Transport, Department of Geography and Environmental Engineering, Johns Hopkins University, September 13, 2005.
62. Mercury Fate and Transport in Aquatic Environments, St. Louis Earth Day Activities at Washington University, April 22, 2005.
63. Reactions at the Solid-Water Interface Affecting the Fate and Transport of Lead in Contaminated Soils and Groundwater, Department of Civil Engineering, University of Minnesota, October 1, 2004.
64. Applications of Science and Technology in Addressing Complex Environmental Problems of the Past, Present, and Future, Peter Canisius Distinguished Speaker Lecture, Canisius College, Buffalo, New York, October 9, 2003.
65. Geochemical Aspects of Carbon Storage and Sequestration in Deep Aquifers, Department of Chemistry, Canisius College, Buffalo, New York, October 10, 2003.
66. Uranium Mobility in the Environment: reactions occuring at the mineral-water interface. Environmental Engineering, University of Missouri at Rolla, March 7, 2003.
67. Carbon storage and sequestration in deep saline aquifers: rates and products of relevant geochemical reactions. Earth and Planetary Sciences, Washington University, January 15, 2003.
68. Carbon storage and sequestration in deep saline aquifers: rates and products of relevant geochemical reactions. Environmental Engineering and Water Resources, University of Missouri at Columbia, November 21, 2002.
69. Uranium mobility in the environment: the importance of reactions occurring at the mineral-water interface. Department of Civil and Environmental Engineering and Geodetic Science, Ohio State University, Columbus, OH, May 31, 2001.
70. Uranium mobility in the environment: the importance of reactions occurring at the mineral-water interface**.** Environmental Engineering Science Program, Washington University, St. Louis, MO, May 21, 2001.
71. Surface geochemical processes affecting uranium mobility in the environment. School of Earth and Atmospheric Sciences, Georgia Tech, Atlanta, GA, April 17, 2001.
72. Surface geochemical processes affecting uranium mobility in the environment. Department of Geosciences, Princeton University, Princeton, NJ, February 8, 2001.

RESEARCH GRANTS AND CONTRACTS

Current Research Grants

1. Impact of redox-driven recrystallization on the stability and reactivity of UO_2 and PbO_2, National Science Foundation, $400,000, August 1, 2017 – July 31, 2020, PI is Giammar; Co-PI is Catalano.
2. Collaborative Research: Rates and mechanisms of lead phosphate formation, aggregation, and deposition for more efficient corrosion control, National Science Foundation, July 1, 2016 – June 30, 2019, $154,111, PI is Giammar; Co-PI is Pasteris.
3. Processes Controlling the Time for Orthophosphate to Achieve Effective Corrosion Control, Water Research Foundation, July 1, 2016 – June 30, 2019, $75,000, PI is Giammar.
4. Corrosion Control with Sodium Silicates, PQ Corporation, January 1, 2018 – December 31, 2019, $188,537, PI is Giammar.
5. Generation, speciation, and reactivity of radical oxidants under simulated downhole conditions in hydraulic fracturing operations, International Center for Energy and Environmental Sustainability, June 1, 2018 – May 31, 2019, $40,000, PI is Parker, Co-PI's are Catalano and Giammar.
6. Trace Metal Dynamics and Limitations on Biogeochemical Cycling in Wetland Soils and Hyporheic Zones, Department of Energy Subsurface Biogeochemical Research Program, $600,000 (234,421 to Giammar), August 1, 2018 – July 31, 2021, PI is Catalano, Co-PIs are Giammar, Kemner, and Brooks.

Completed Research Grants

1. Impact of microstructure on the containment and migration of CO_2 in fractured basalts, Department of Energy Office of Fossil Energy, October 1, 2014 – March 31, 2018, $1,284,701, PI is Giammar, CoPI's are Sophia Hayes, Phil Skemer and Mark Conradi at WUStL and Brian Ellis at the University of Michigan.
2. New Tools for Probing the Impacts of Metal Dynamics on Biogeochemical Cycling in Wetland Soils, International Center for Energy Environment and Sustainability, $40,000, May 1, 2017 – April 30, 2018, PI is Catalano, Co-PIs are Giammar and Wang.
3. Assessment of Trace Metal Abundance and Speciation in Tyson Soils and Sediments to Support Future Biogeochemical Field Research, Tyson Faculty Seed Grant Program, January 1 – December 31, 2017, $20,000, PI's are Catalano and Giammar.
4. Development and Demonstration of Superparamagnetic Nanomaterials for Novel Flow-Through Separation and Recovery Processes for Metal/Metalloid Pollutants and Rare Earth Elements, International Center for Advanced Renewable Energy and Sustainability at Washington University, May 1, 2016 – August 31, 2017, $35,000, PI is Fortner, Co-PI's are Giammar, Sadtler, and Lo (HKUST).
5. Evaluating trace metal limitations on methane fluxes in terrestrial ecosystems, Department of Energy, September 1, 2015 – August 31, 2017, $100,000, PI is Catalano; Co-PI's are Giammar, Bradley, Hasenmueller (SLU), and Chambers (UCF).
6. Platform Nanoscale Sorbents for Advanced Separation and Recovery of Metals and Metalloids in Water, National Science Foundation, September 1, 2014 – August 31, 2017, PI is John Fortner and Giammar is Co-PI, $329,835.
7. Iron Electrocoagulation for Efficient Removal of Selenium from Flue Gas Desulfurization Wastewaters, Consortium for Clean Coal Utilization, June 1, 2015 – December 31, 2016, $63,703, PI is Giammar; Co-PI is Catalano.
8. Coupled geochemical and transport processes in geologic carbon sequestration: Evolution of geochemical gradients and flow properties in diffusion-limited zones, Consortium for Clean Coal

Utilization, $241,995, PI is Giammar (Co-PI's are Hayes (WUStL), Mehra (IITB), and Peters (Princeton)), July 1, 2012 – December 31, 2015.

9. Evaluation of Environmental Contaminants Affecting Water Quality in Haiti, International Center for Advanced Renewable Energy and Sustainability, May 1, 2014 – April 30, 2015, $31,700, PI is Rivera-Nunez (Giammar is a Co-PI – other Co-PI is Iannotti).
10. Iron production, urbanism, and environmental sustainability along the Medieval Silk Road: ecological niche construction and ancient industrial development at the highland smelting center Tashbulak, Uzbekistan, International Center for Advanced Renewable Energy and Sustainability, May 1, 2014 – April 30, 2015, $35,000, PI is Frachetti (Giammar is a Co-PI – other Co-PI's are Maksudov, Kidder, Spengler, and Panyushkina).
11. Dominant mechanisms of uranium-phosphate reactions in subsurface sediments, submitted to the Department of Energy Subsurface Biogeochemical Research Program, $624,385 (WUStL amount), PI is Catalano (Co-PIs are Giammar and Wang (PNNL)), September 1, 2011 – August 31, 2015.
12. Performance and Mechanisms of Iron Electrocoagulation for Removal of Chromium(VI) from Drinking Water, National Science Foundation, September 1, 2013 – August 31, 2016, $330,000, PI is Giammar (Co-PI is Catalano)
13. Mechanisms and Kinetics of Multiphase Fluid-Formation Mineral Reactions in Carbon Dioxide Geologic Sequestration, Consortium for Clean Coal Utilization, $520,000 ($202,319 for Giammar), May 1, 2009 – May31, 2013, PI is Jun (Co-PI is Giammar; International Partners are Mehra and Shimada)
14. Synergistic Effects of Iron Reduction and Ligand Controlled Dissolution on Iron Uptake by Plants, submitted to the International Center for Renewable Energy and Sustainability in March 2013, May 1, 2013 – April 30, 2014, $42,753, PI is Giammar (Co-PI and collaborators are Catalano, Baxter and Danforth Plant Sciences Center, and Kraemer at University of Vienna).
15. The energy-water nexus of emerging technologies for energy resource extraction: Impacts of shale hydraulic fracturing and geothermal energy production on the mobilization of trace elements, McDonnell Academy Global Energy and Environment Partnership, $70,000, PI is Fortner (Co-PI's are Giammar, Lipeles, Mehra (IITB), Yenigun (Bogazici)), December 1, 2011 – November 30, 2013.
16. Impact of Galvanic Corrosion on Lead Release Following Partial Lead Service Line Replacement, Water Research Foundation, lead PI is Greg Welter (O'Brien and Gere) and Co-PI's are Giammar and Abigail Cantor (Process Research Solutions), $87,560 (Washington University amount), March 1, 2011 – February 28, 2013.
17. Lead and Copper Rule revision data gaps: Evaluation of coupling method and orthophosphate addition on lead release following partial lead service line replacement, $32,001 (WUStL amount), October 1, 2011 – September 30, 2013, PI is Welter of O'Brien and Gere Engineers, Giammar is a Co-PI. Funded as an extension of project "Impact of galvanic corrosion on lead release following partial lead service line replacement."
18. Rates and mechanisms of processes influencing lead(IV) oxide formation and stability in drinking water distribution systems, American Water Works Association Research Foundation, $149,847, April 1, 2009 – October 1, 2012.
19. SLAC Science Focus Area for Environmental Remediation Science Program, sub-contract from Stanford Linear Accelerator Center (PI is John Bargar), DOE Environmental Remediation Science Program, March 1, 2009 – December 31, 2012, $307,941 (Washington University Amount).
20. Manganese Redox Mediation of UO_2 Stability and Uranium Fate in the Subsurface: Molecular and Meter Scale Dynamics, submitted to the DOE Environmental Remediation Science Program in April 2009, ($249,000 to WUStL), three year duration, PI is Tebo - OHSU (Co-PI's are Giammar – WUStL and Bernier-Latmani – EPFL), notified of award January 2010.
21. CAREER: Interfacial Reactions Affecting Heavy Metal Fate and Transport: An Integrated Research and Education Plan, National Science Foundation, $400,000, April 1, 2006 – March 31, 2012.

22. Life cycles of metals in coal combustion: metal release and capture, speciation in fly ash, and transformations during ash reuse and storage, Consortium for Clean Coal Utilization, $320,000 ($154,976 for Giammar), May 1, 2009 – April 30, 2012, PI is Giammar (Co-PI's are Biswas and Catalano; International Partners are Hao and Dikshit)
23. Interfacial chemistry of arsenic in groundwater and water treatment systems, International Center for Advanced Renewable Energy and Sustainability, $35,000, May 1, 2011 – April 30, 2012, PI is Giammar (Co-PI is Catalano).
24. Sustainable technology for removal of arsenic from drinking water: Principles and performance of electrocoagulation, McDonnell Academy Global Energy and Environment Partnership, $30,000, June 1, 2009 – September 30, 2010, PI is Giammar (Co-PI's are Catalano and Chaudhari).
25. Influence of Water Chemistry on the Dissolution and Transformation Rates of Lead Corrosion Products, American Water Works Association Research Foundation, $234,771, September 1, 2006 – March 1, 2010.
26. Sustainable aquatic ecosystems and emerging disease: How do contaminants affect the ability of ecosystems to buffer disease?, submitted to the International Center for Advanced Renewable Energy and Sustainability, $28,000, April 1, 2009 – March 31, 2010, PI is Smith (Co-PI's are Chase and Giammar).
27. Synthesis and transformation of iron(III) oxide nanoparticles: Influence of iron(II) reactions at the solid-water interface, Subthrust of Nanosynthesis Thrust Area Proposal, Washington University Center for Materials Innovation, September 1, 2008 – August 31, 2009, $25,000, PI is Giammar (CoPI's are Biswas, Catalano, Jun, and Pasteris).
28. Interfacial Processes Controlling Lead Mobility in Environmental Systems, McDonnell Academy Global Energy and Environmental Partnership, $29,500, November 1, 2007 – December 31, 2008, PI is Giammar (Co-PI's are Pasteris - WUStL and A.K. Suresh – Indian Institute of Technology Bombay).
29. Coupled Biogeochemical Processes Governing the Stability of Bacteriogenic Uraninite and Release of U(VI) in Heterogeneous Media: Molecular to Meter Scales, DOE Environmental Management Science Program (EMSP): Transport of Contaminants in Subsurface Environments at DOE Sites, $304,181 (WUStL amount), April 1, 2006 – May 31, 2009. (Lead PI is John Bargar (Stanford Synchrotron Radiation Lab): Other Co-PI's Rizlan Bencheikh-Latmani (Ecole Polytechnique Federale Lausanne) and Brad Tebo (Oregon Health Sciences University)).
30. Symposium Highlighting Recent Advances in Fundamental Research of Biogeochemical Processes in Subsurface Environments, American Chemical Society Petroleum Research Fund, June 1, 2008 – August 31, 2008, $2,400, PI is Giammar.
31. NER: Nanoscale Size Effects on the Biogoechemical Reactivity of Iron Oxides in Active Environmental Nanosystems, National Science Foundation Active Nanostructures and Nanosystem (ANN) Program, July 15, 2006 – November 30, 2007, $114,998, PI is Giammar (Co-PI's are Biswas and Wrenn).
32. Ameren and Powerspan Low Sulfur Coal Emissions Reduction Project, funded by the U.S. EPA through the Missouri Department of Natural Resources, $151,110, January 1, 2006 – December 31, 2007. PI is Biswas (Co-PI is Giammar).
33. Environmental Applications of Nanostructured Materials Subthrust of Nanosynthesis Thrust Area Proposal, Washington University Center for Materials Innovation, September 1, 2007 – August 31, 2008, $35,000, PI is Giammar (Co-PI's are Biswas, Hayes, Pasteris, and Walker).
34. Environmental Applications of Nanostructured Materials Subthrust of Nanosynthesis Thrust Area Proposal, Washington University Center for Materials Innovation, September 1, 2006 – August 31, 2007, $53,200, PI is Biswas (Co-PI's are Giammar, Hayes, and Pasteris).

35. Environmental Nanoparticle Technology Subthrust of Nanosynthesis Thrust Area Proposal, Allocated $20,500 for project from August 1, 2005 – July 31, 2006. (Co-PI's are Biswas, Giammar, Hayes, and Pasteris).
36. Integrated System for Elemental Analysis of Aerosols and Aqueous Solutions, submitted to Air Force Office of Scientific Research through the Defense University Research Instrumentation Program, submitted August 2004, $233,400, 12 months, PI is Pratim Biswas (Co-PI's are Buhro, Chen, Giammar, and Wrenn), Funds received June 2005. April 2005-April 2006.
37. Environmental Impacts Subthrust of Nanosynthesis Thrust Proposal, submitted to the Washington University Center for Materials Innovation, submitted April 2004, $25,000, 12 months, Co-PI's with Pratim Biswas and Sophia Hayes. August 1, 2004 – July 31, 2005.
38. Evaluation of Chemical and Biological Tracers for Phosphorus Source Apportionment in Table Rock Lake, on the Missouri-Arkansas Border, submitted to the National Decentralized Water Resources Capacity Development Project, submitted September 2003, $263,382, 1.5 years, Co-PI with Lars Angenent. Approved on October 27, 2003 for Project Period of November 1, 2003 through April 30, 2005.
39. Phase III Continuation of Mercury Capture Studies Using Inorganic Sorbents, submitted to Ameren UE in June 2004, $90,000, 12 months, Co-PI with Biswas. Approved October 2004 for project period January-December 2005.
40. Phase II (1) Testing of Novel Sorbents for Mercury Capture and Design of Sorbent Injectors for Pilot Scale Testing; (2) Viability of Enriched Oxygen Coal Combustion, submitted to Ameren UE, an industrial partner of the Washington University Environmental Engineering Program, submitted July 2003, $99,315, 15 months. Co-PI with Pratim Biswas. Approved November 2003.

Successful Applications for National User Facilities

1. XAFS investigation of mechanisms of arsenic removal from drinking water by iron-based electrocoagulation , Advanced Photon Source at Argonne National Laboratory, Beamline 20-BM, February 2010, PI is Giammar (Co-PI's are Luo and Catalano).
2. An XAFS study of the effect of phosphate on uranium immobilization mechanisms in uranium(VI)phosphate-iron(III) oxide systems, Advanced Photon Source at Argonne National Laboratory, Beamline 20-BM, June 2009, PI is Singh; Co-PI's are Giammar, Ulrich and Catalano.
3. XAFS investigation of nanoscale size effects on uranium(VI) adsorption and surface-mediated reduction on iron(III) oxide surfaces, Advanced Photon Source at Argonne National Laboratory, Beamline 12-BM, February 2008, PI is Giammar (Co-PI's are Ulrich and Catalano).

Completed Research Contracts

1. Evaluation of sorbent materials for arsenic removal from drinking water. Enviroscrub Technologies Corporation. Phase I, $35,000 received October 2004.
2. Investigation of Causes of High Plant Effluent Total Suspended Solids. American Bottoms Regional Wastewater Treatment Facility. $5250. March-June, 2004.

TEACHING EXPERIENCE

New courses developed:

- The Energy Water Nexus (Fall 2012 while on sabbatical at Princeton University – together with Eric Larson and Sankaran Sundaresan)

- Environmental Implications of Energy Technologies (Spring 2013 while on sabbatical at Princeton University)
- Aquatic Chemistry (Fall 2004)
- Sustainable Water Resources Engineering (Fall 2003) **Substantial revisions of existing courses:**

- Introduction to Environmental Engineering (Spring 2003)
- Physical and Chemical Methods for Water Treatment (Spring 2004)
- Environmental Chemistry (Fall 2005)
- Environmental Engineering Laboratory (Spring 2011) **Courses Taught**

(Semester taught, students in course, and overall course satisfaction evaluation score; beginning in 2017 using rating for teaching quality)

Introduction to Energy, Environmental, and Chemical Engineering (EECE101/ChE146A), Fall 2019, 28 students, 5.96/7.00 for course content and 6.29/7.00 for teaching quality; co-taught with Trent Silbaugh, Fall 2018, 21 students, 6.24/7.00 for course content and 6.71/7.00 for teaching quality; co-taught with Jay Turner, Fall 2017, 26 students, 6.29/7.00 for course content and 6.31/7.00 for teaching quality; Fall 2016, 35 students, 6.25/7.00 for course content and 6.61/7.00 for teaching quality; Fall 2015, 24 students, 6.14/7.00; Fall 2014, 40 students, 6.05/7.00; Fall 2013, 36 students, 5.53/7.00; Fall 2011, 53 students, 5.84/7.00; Fall 2010, 45 students, 6.35/7.00; Fall 2009, 47 students, 5.67/7.00; Fall 2008, 52 students, 5.31/7.00

Environmental Engineering Laboratory (EECE425/ChE408A), Fall 2018, 13 students, 5.60/7.00 for course content and 6.30/7.00 for teaching quality; Fall 2017, 4 students, no scores because did not meet threshold of responses; Fall 2016, 12 students, 5.22/7.00 for course content and 5.91/7.00 for teaching quality' Fall 2015, 24 students, 6.29/7.00; Fall 2014, 11 students, 5.57/7.00; Fall 2013, 8 students, 6.00/7.00; Spring 2012, 5 students, 6.00/7.00; Spring 2011, 16 students, 5.00/7.00

Environmental Implications of Energy Technologies (CEE 304), Spring 2013, 79 students, 4.50/5.00.

Physical and Chemical Processes for Water Treatment (EECE533), Spring 2019, 23 students, 6.78/7.00; Spring 2018, 21 students, 6.90/7.00; Spring 2017, 12 students, 6.75/7.00; Spring 2016, 16 students, 5.80/7.00, Spring 2015, 25 students, 6.38/7.00; Spring 2014, 10 students, 6.63/7.00; Fall 2011, 13 students, 6.63/7.00; Spring 2004, 2 students, 8.00/9.00

Environmental Chemistry (EECE443), Fall 2010, 38 students, 6.76/7.00; Fall 2009, 26 students, 5.94/7.00; Fall 2008, 39 students, 5.90/7.00; Fall 2007, 21 students, 8.54/9.00; Fall 2005, 18 students, 7.24/9.00.

Aquatic Chemistry (EECE 543), Fall 2004, 14 students; Fall 2006, 4 students.

Introduction to Environmental Engineering (EECE262), Spring 2010, 22 students, 6.60/7.00; Spring 2009, 23 students, 6.07/7.00; Spring 2008, 22 students, 6.94/7.00; Spring 2007, 48 students, 7.69/9.00; Spring 2006, 56 students, 6.48/9.00; Spring 2005, 51 students, 7.06/9.00; Spring 2004, 50 students; Spring 2003, 35 students

Sustainable Water Resources Engineering (Env/CE531), Fall 2003, 7 students, 8.29/9.00.

Guest Lecturer

- Earth's Future: Causes and Consequences of Global Climate Change (Spring 2015, Fall 2016, Fall 2017)
- Environmental Mineralogy
- Environmental Chemistry

- Environmental Geochemistry
- Energy for the 21st Century (while on sabbatical at Princeton University)

Previous Teaching Experience

Princeton University, Princeton, New Jersey, 2001-2002

Post-doctoral Teaching Fellow, Council on Science and Technology
Played major role in instructing "Fundamentals of Environmental Studies: Population, Land Use, Water, and Energy," an introductory course in the Princeton Environmental Studies program.

California Institute of Technology, Pasadena, California, 1998-2001

The Chemistry of Natural Waters, Water Chemistry Laboratory, Chemical Reaction Engineering for Water Quality Control, Global Biogeochemical Cycles, and The Terrestrial Surface System.

STUDENTS AND POST-DOCTORAL ASSOCIATES ADVISED

Doctoral Students

Graduated

Yeunook Bae, Ph.D. July 2019, "Lead release from corrosion scales on lead service lines: Impact of phosphate and scale composition."

Chao Pan, Ph.D. November 2017, "Coupling of oxidation-reduction reactions of chromium, iron and manganese: Implications for the fate and mobility of chromium in aquatic environments."

Zezhen Pan, Ph.D. August 2017, "Sorption of metals onto natural sediments and engineered iron oxide nanoparticles."

Wei Xiong, Ph.D. May 2017, "The effect of diffusive transport on mineral carbonation in geological carbon sequestration."

Lin Wang, Ph.D. May 2015, "Interfacial chemistry of trace elements at mineral surfaces in engineered water systems,"

Vrajesh Mehta, Ph.D. August 2014, "Dominant mechanisms of uranium(VI)-phosphate interactions in subsurface environments: An *in situ* remediation perspective."

Zimeng Wang, Ph.D. December 2013, "Coupling of the biogeochemical cycles of uranium and manganese: Implications for the fate and transport of uranium in subsurface environments."

Fei Wang, Ph.D. August 2013, "Silicate mineral dissolution and associated carbonate precipitation at conditions relevant to geologic carbon sequestration."

Yin Wang, Ph.D. December 2012, "Redox reactions influencing lead concentrations in drinking water: Formation and dissolution of lead(IV) oxide and impact of galvanic corrosion."

Yanjiao Xie, Ph.D. July 2010, "Dissolution, formation, and transformation of the lead corrosion product PbO_2: Rates and mechanisms of reactions that control lead release in drinking water distribution systems," Current position: Abhas Singh, Ph.D. June 2010, "Geochemical factors affecting uranium fate and transport in soil and groundwater in the presence of phosphate." Hui Zeng, Ph.D. December 2008, "Reactions of inorganic contaminants at the surfaces of nanostructured iron oxides."

Liyun Xie, Ph.D. May 2007, "Reactions at the mineral-water interface affecting lead mobility in soil and sediments."

Current

Yao Ma, Ph.D. expected May 2023, Dissolution of U(IV) oxide solids

Anushka Mishrra, Ph.D. expected May 2021, Control of lead concentrations in service lines and premise plumbing

Weiyi Pan, Ph.D. expected May 2021, Redox reactions on surfaces of lead(IV) oxides

Anshuman Satpathy, Ph.D expected May 2020, Metal adsorption to mineral surfaces

Neha Sharma, Ph.D. expected May 2021, Trace metal limitations on biogeochemical processes in wetland sediments

Visitors

Kyle Chardi, 2019-2020, Ph.D. student at University of Vienna
Guiwei Li, 2019-2020, Ph.D. student at University of the Chinese Academy of Sciences
Peng Liao, 2014-2015, Ph.D. student at China University of Geoscience
Ao Qian, 2016-2017, Ph.D. student at China University of Geoscience

Masters Students

Current

Ziqi Wang, M.S. expected May 2020, Uptake of silica by lead pipe scales

Graduated

James Noel, M.S. May 2006, "The determination of mercury binding mechanisms in coal combustion byproducts through a sequential extraction process," current position: doctoral student in Environmental Engineering at Washington University.

Katherine Nelson-Nguyen, M.S. January 2009, Dissolution rates of lead phosphate solids in drinking water distribution systems.

Wei Wan, M.S. May 2010, Electrocoagulation for removal of arsenic from drinking water.

Post-doctoral Research Associates

Rachel Wells	Geologic carbon sequestration (co-advised with P. Skemer)	2015-

Previous

Jose Manuel Cerrato	Stability of biogenic uranium(IV)	2010-2013
Lisa Blue	Stability of biogenic uranium(IV)	2009-2010
Yun Luo	Speciation of metals in coal fly ash	2009-2011
Dr. Kai-Uwe Ulrich	Coupled uranium-manganese biogeochemical cycles	2006-2009
Yin Wang	Uranium remediation	2012-2013
Zimeng Wang	Iron biogeochemistry	2013-2014
Dr. Zhiwen Yuan	Chemical indicators for pollutant source apportionment.	2004-2005
Dr. Beizhan Yan	Microbially-mediated reduction of iron oxide nanoparticles	2006-2007

Undergraduates:	**Year**	**Subject**	**Program***
Maiko Arashiro	2006	Arsenic treatment	REU (Pomona College)
Matt Ashner	2011	Uranium bioremediation	ChE UG Research (WUStL)
Charlie Barrows	2009-11	Uranium bioremediation	Chemistry UG Research (WUStL)
Alexis Boleda	2010	Carbon sequestration	ChE UG Research (WUStL)
Scott Burns	2014	Metals from shales	ChE UG Research (WUStL)
David Case	2008-10	Carbon sequestration	Chemistry UG Research (WUStL)
Chi Chun Chan	2018	Lead water chemistry	International Intern (HKUST)

Samuel Crawford	2006	Mercury and iron oxides	REU (WUStL)
Vince DeCapio	2003	Lead adsorption	REU (West Virginia) Scott Dixon
	2006-7	Uranium bioremediation	SSM UG Research
Claire Dreesen	2004	Pollutant source apportionment	REU (Rice University)
Claire Farnsworth	2003-5	Lead adsorption	REU (WUStL) and CivE UG Research
Brian Fisher	2005	Arsenic treatment	REU (Clarkson)
Andrew Frangos	2009	Metals in fly ash	ChE UG Research (WUStL)
Stephanie Giles	2006	Lead soil remediation	REU (Beloit)
Angelica Gonzalez	2003	Goethite coated sand	REU (Univ. Texas El Paso)
Kelley Greenman	2008-9	Carbon sequestration	EnSt Senior Thesis
Lauren Heeg	2014	Chromium in drinking water	ChE UG Research (WUStL)
Tom Hutchison	2010	Metals in fly ash	ChE UG Research (WUStL)
Anna Ivarson	2015-	Metals in Soils and Lead	ChE UG Research (WUStL)
Pratyul Kapoor	2011	Uranium-manganese cycles	International Intern (IIT-GN)
Hannah Koenig	2016	Lead Corrosion Control	ChE Summer Research (WUStL)
Kerry Kreitman	2008	Uranium bioremediation	CivE UG Research (WUStL)
Edgar Leslie	2007	Uranium bioremediation	CivE UG Research (WUStL)
Erica Levine	2011	Carbon sequestration	REU (WUstL)
Violla Liu	2018-19	Lead in drinking water	ChE UG Research (WUStL)
Yuk Ki Lo	2019	Lead in Drinking Water	MAGEEP (HKUST)
Manvitha Marni	2014-6	Iron oxide dissolution	ChE UG Research (WUStL)
Carolyn Maus	2005-7	Adsorption to nanoparticles	REU (WUStL) and ChE UG Research
Jessica Mohatt	2004-7	Arsenic treatment	REU (WUStL) and ChE UG Research
Carolyn Moore	2002-3	Lead in contaminated soils	ChE Intern
Jake Muilenberg	2019	Metals in wetlands	ChE UG Research (WUStL)
Tyler Nading	2008-9	Lead in drinking water	CivE UG Research (WUStL)
Daniel Pagan	2004	Contaminant transport	REU (WUStL)
T.J. Pepping	2009-11	Arsenic electrocoagulation	ChE UG Research (WUStL)
Lia Schattner	2017-	Lead in drinking water	ChE UG Research (WUStL)
Matt Sculnick	2006-7	Uranium bioremediation	CivE UG Research (WUStL)
Lindsay Soh	2005	Surface-mediated reduction	REU (Berkeley)
Eloise Thompson	2020	Lead in drinking water	EnvE UG Research (WUStL)
Jacky Tse	2017	Metals in soils	MAGEEP (HKUST)
Xiaoming Zhu	2016	Nanoparticle Sorbents	MAGEEP (HKUST)
Xiaochen Zuo	2012	Arsenic treatment	ChE UG Research (WUStL)

REU – Research Experiences for Undergraduates program

High School Students	**Year**	**Subject**	**Program**
Olivia Crowell	2019	Lead in drinking water	St. Louis STARS
Justin Guilak	2018	Lead in drinking water	St. Louis STARS
Leanne Dang	2017	Lead in drinking water	St. Louis STARS
Wenyu Ding	2015	Chromium transport	Follow-up from summer program
Justin Guilak	2018	Lead in drinking water	St. Louis STARS
Sarah Huynh	2009	Lead in drinking water	St. Louis STARS
Nevin Peeples	2008	Lead in drinking water	St. Louis STARS

Nevel Vaidyan	2014	Metals in urban gardens	St. Louis STARS

HONORS AND AWARDS RECEIVED BY STUDENTS

- Yeunook Bae, Ph.D. student, Best Student Paper Award at 2019 Water Quality Technology Conference.
- Anushka Mishrra, Ph.D. Student, 2019 Mid-American Environmental Engineering Conference Best Presentation Award
- Violla Liu, B.S. Chemical Engineering, American Chemical Society Environmental Chemistry Division Undergraduate Award, 2019
- Yeunook Bae, Ph.D. Student, 2018 Mid-American Environmental Engineering Conference Best Presentation Award
- Justin Guilak, High School Student, 2018 Award for Excellence in Research for St. Louis STARS
- Yeunook Bae, Ph.D. Student, 2018 Graduate Student Paper Award from the American Chemical Society Division of Environmental Chemistry
- Chao Pan, Ph.D. Student, 2018 Graduate Student Award in Environmental Chemistry from the American Chemical Society Division of Environmental Chemistry
- Yeunook Bae, Ph.D. Student, 2016 Mid-American Environmental Engineering Conference Best Presentation Award
- Leah Gable, Ph.D. student on collaborative project, 2015 Outstanding Poster Award of the Institute for Public Health 8th Annual Conference
- Chao Pan, Ph.D. Student, 2015 Department of Energy, Environmental and Chemical Engineering Graduate Student Teaching Award
- Nevel Vaidyan, High School Student, 2014 LMI Aerospace STARS Excellence in Research Award
- Vrajesh Mehta, Ph.D. student, Student Paper Competition Award Winner for the Ninth International Conference on Remediation of Chlorinated and Recalcitrant Compounds for "Column-scale evaluation of *in situ* uranium immobilization in sediments amended with phosphate."
- Zimeng Wang, Ph.D. student, 2013 Chinese Scholar Council Award for Outstanding SelfFinanced Students Abroad.
- Zimeng Wang, Ph.D. student, 2013 Graduate Student Award in Environmental Chemistry from the American Chemical Society Division of Environmental Chemistry
- Matthew Ashner, B.S. Chemical Engineering, American Chemical Society Environmental Chemistry Division Undergraduate Award, 2012
- Vrajesh Mehta, Ph.D. student, Student Travel Award for Department of Energy Subsurface Biogeochemical Research Program PI's Meeting, April 2012
- Yin Wang, Ph.D. student, Best Student Paper Award at 2011 Water Quality Technology Conference.
- Fei Wang, Ph.D. student, Student Travel Award for American Chemical Society National Meeting for Outstanding Presentation on Carbon Sequestration, September 2011.
- Zimeng Wang, Ph.D. student, Student Travel Award for Department of Energy Subsurface Biogeochemical Research Program PI's Meeting, April 2011
- Charles Barrows, B.S. Chemistry, 2011 Arthur Wahl Award for Undergraduate Achievement in Chemistry, Washington University Department of Chemistry
- Yanjiao Xie, Ph.D. Student, 2010 Department of Energy, Environmental and Chemical Engineering Graduate Student Research Award
- Zimeng Wang, Ph.D. Student, 2010 Department of Energy, Environmental and Chemical Engineering Graduate Student Teaching Award

- David Case, B.S. Chemistry, 2010 Sam Weissman Award for Undergraduate Achievement in Chemistry, Washington University Department of Chemistry
- David Case, B.S. Chemistry, 2010 National Science Foundation Graduate Research Fellowship
- Yanjiao Xie, Ph.D. student, 2010 Graduate Student Award of the American Chemical Society Division of Environmental Chemistry
- Abhas Singh, Ph.D. student, Student Travel Award for Department of Energy Environmental Remediation Science Program PI's Meeting, April 2009
- Kelley Greenman, Undergraduate, 2009 Outstanding Overall Achievement in Environmental Studies
- Nevin Peeples, High School Student, 2008 LMI/D 3 Technologies Award for Excellence in Research

PROFESSIONAL SERVICE, DEVELOPMENT, AND ASSOCIATIONS

Licensed Professional Engineer in the State of Missouri, 2011-present (Number PE-2011015742)
Editorial Positions and Reviewing Service

- **Associate Editor,** *Environmental Science & Technology,* 2014-present
- **Associate Editor,** *Geochimica et Cosmochimica Acta,* 2012-2013
- **Member of Peer Review Editorial Board (2013-2014), Member of Journal Editorial Board (2014-2017),** *Journal – American Water Works Association*
- **Guest Editor**, together with Young-Shin Jun and Charlie Werth, of a special issue of *Environmental Science & Technology* (Issue 1 of Volume 47) on geological carbon sequestration, 2011-2013.
- **Peer Reviewer for Scientific Literature:** *ACS Earth and Space Chemistry (2 in 2019), Adsorption of Metals by Geomedia II (book), American Mineralogist, Applied Geochemistry, Aquatic Geochemistry, AWWA Water Science (1 in 2019)Central European Journal of Chemistry, Chemical Engineering Journal (1 in 2010), Chemical Geology (4 in 2013), Chemosphere (1 in 2010), Colloids and Surfaces A: Physicochemical and Engineering Aspects, Corrosion (1 in 2011), Critical Reviews in Environmental Science and Technology, Energy and Fuels (1 in 2011), Environmental Engineering Science (3 in 2015), Environmental Pollution, Environmental Science and Technology (1 in 2016), Geochimica et Cosmochimica Acta (1 in 2014), Geochemical Transactions, Geomicrobiology Journal (2 in 2011), Geology (1 in 2010), Industrial and Engineering Chemistry Research, International Journal of Environment and Waste Management (1 in 2011), International Journal of Greenhouse Gas Control (1 in 2013), Journal American Water Works Association (4 in 2018), Journal of Colloid and Interface Science, Journal of Contaminant Hydrology (1 in 2014), Journal of Environmental Engineering (1 in 2012), Journal of Environmental Engineering and Science, Journal of Environmental Management, Journal of Environmental Quality, Journal of Hazardous Materials (1 in 2015), Journal of Hydrology, Journal of Industrial Microbiology and Biotechnology (1 in 2010), Journal of Materials Research, Journal of Nanoparticle Research (1 in 2010), Mine Water and the Environment, Soil Science Society of America, Science (1 in 2013), Waste Management, Water Research (1 in 2017), Water Resources Research (2 in 2012)*

National Review Panels National Science Foundation,

- IGERT Program, Panel Reviewer, June 2009
- Sustainability Research Networks, Panel Reviewer, September 2014

- Environmental Engineering Program, Panel Reviewer for Proposals submitted to the Unsolicited Program, May 2003, June 2008, and May 2012. External reviewer July 2003, June 2004, December 2005
- External reviewer for Marine Geology and Geophysics, October 2006; Geobiology and Low Temperature Geochemistry, October 2008, April 2009, April 2011, September 2014, March 2017; Environmental Chemical Sciences, February 2018.
- Ad hoc reviewer for Engineering Research Center proposals in August 2016.

Department of Energy

- Subsurface Biogeochemical Research, External Reviewer (Mail-In), 2019
- Office of Basic Energy Sciences, Geosciences Program (Mail-In), 2019
- Office of Basic Energy Sciences EPSCOR/National Laboratory Partnerships, 2018
- Small Business Innovative Research (SBIR) Program, 2014, 2015, 2018, 2020
- Innovative Field-Scale Remediation and Long-Term Stewardship Research and Novel Measurement and Measuring Concepts, Member of National Review Panel, July-August 2006.
- Transuranic Actinide Science Focus Area, Member of National Review Panel, April 2009.
- Argonne Subsurface Biogeochemical Research Program SFA Reverse Site Visit, Member of Review Panel, April 2012.

Strategic Environmental Research and Development Program (SERDP), Development of Remedial Technologies for Remediating Groundwater Contaminated with Heavy Metals, Member of National Review Panel, April-May 2003.

External reviewer for ACS Petroleum Research Fund, 2015.

External reviewer for the Energy Biosciences Institute, 2010.

External reviewer for Qatar National Research Fund National Priorities Research Program, 2007.

Reviewer of proposals for the Stanford Synchrotron Radiation Lightsource (2 in 2010).

Service on National Scientific Committees

- Panel Co-Lead for Department of Energy Basic Research Needs Workshop on the Energy-Water Nexus, Washington, DC January 4-6, 2017 (Susan Hubbard, Matthew Tirrell, and David Sholl chairs).
- Invited Participant in President's Council of Advisors on Science and Technology workshop on "Science and Technology to Ensure the Safety of the Nation's Drinking Water", Washington, DC, May 18, 2016
- Panelist in "Subsurface Complex System Science Relevant to Contaminant Fate and Transport," a workshop sponsored by the U.S. Department of Energy Office of Biological and Environmental Research, Gaithersburg, Maryland, August 3-5, 2009
- WATERS Network and Collaborative Large-Scale Engineering Analysis Network for Environmental Research (CLEANER) Program of Waters Network, o Member of the Education Committee, 2005-2007 (Elizabeth Eschenbach and James Johnson, co-chairs).
    - o Invited participant in NSF/EPA Workshop on WATERS Network, April 29-May 1, 2008.
- Center for Sustainable Engineering (NSF-sponsored center), invited participant in advisory workshop, January 9-10, 2008.
- Participant in "Frontiers in Environmental Engineering Education" workshop at Arizona State University sponsored by the National Science Foundation, January 8-10, 2007.

- Participant in Solid State Chemistry Workshop at Northwestern University sponsored by the National Science Foundation, invited to provide information on environmental impacts of nanoscale science and solid state chemistry, May 18-20, 2006.

Symposium Organizing for National Conferences

Chemistry of Drinking Water Distribution Systems and Infrastructure, 2018 American Chemical Society Spring National Meeting in New Orleans, March 18-22, co-organized with Yandi Hu and Haizhou Liu.

New Challenges on Metals and Metalloids: Chemistry, Treatment, and the Impacts on Water Quality, 2016 American Chemical Society Spring National Meeting in San Diego, March 13-17, coorganized with Haizhou Liu.

Geochemical Impacts of Human Activities Theme, 2011 Goldschmidt Conference in Prague, August 2011, theme co-coordinator with Steve Banwart.

Environmental and Geochemical Aspects of Carbon Sequestration, 2010 American Chemical Society Spring National Meeting in San Francisco, March 21-25, co-organized with Young-Shin Jun and Charles Werth.

Molecular-scale Chemical and Biogeochemical Processes Affecting the Mobility of Metal and Radionuclide Contaminants in the Subsurface, 2008 Goldschmidt Conference in Vancouver, July 13-18, 2008, co-organized with John Bargar, Rizlan Bernier-Latmani, and Brad Tebo

Reactions at Mineral-Water Interfaces – The Role of Solute Adsorption on Contaminant CoAdsorption, Mineral Dissolution and Colloid Behavior, 2006 Geological Society of America Annual Meeting in Philadelphia, October 22-25, 2006, co-organized with John Lenhart

Biotic and Abiotic Factors Affecting Contaminant Transformation at Iron Oxide Surfaces. 2007 American Chemical Society Spring National Meeting in Chicago, March 25-29, co-organized with Mike McCormick and Ed O'Loughlin

Service to Professional Organizations

- Member of Project Advisory Committee for Water Research Foundation project Non-Intrusive Methodology for Assessing Lead and Copper Corrosion (Jonathan Cuppett, Project Manager), 2010 – 2013.
- Member of Project Advisory Committee for Water Research Foundation project Metals Accumulation and Release with the Distribution System: Evaluation of Mechanisms and Mitigation (Jian Zhang, Project Manager), 2012 – 2015.
- Conference Chair for 21st Annual Mid-America Environmental Engineering Conference, Washington University, St. Louis, Missouri, October 7, 2017.
- Conference Chair for 18th Annual Mid-America Environmental Engineering Conference, Washington University, St. Louis, Missouri, September 21, 2013.
- Conference Chair for 14th Annual Mid-America Environmental Engineering Conference, Washington University, St. Louis, Missouri, October 24, 2009.
- Organizer of Association of Environmental Engineering and Science Professors' workshop *Navigating the Academic Job Search*, University of Iowa, Iowa city, Iowa, July 26, 2009.
- Panelist on National Science Foundation CAREER Workshop, Golden, Colorado, July 14, 2014.
- Panelist on National Science Foundation CAREER Workshop, Virginia Tech, Blacksburg, Virginia, July 29, 2007.
- Member of the Student Services Committee of the Association of Environmental Engineering and Science Professors, 2005-2012

- Missouri Water Environment Association, Scholarship Judge, 2003

Professional Development

Summer STEM Faculty Institute on Teaching, Washington University Teaching Center, June 17-19, 2014.

Center for Integrative Research on Cognition, Learning, and Education (CIRCLE), Faculty Fellow, 2016-2017, to promote active learning in STEM courses.

Engineering in Transition, Workshop for the Center for Sustainable Engineering, Carnegie Mellon University, July 17-19, 2006.

Association of Environmental Engineering and Science Professors workshop "Successful Academic Careers: Mentoring, Funding, Winning CAREER Awards," Clarkson University, July 24, 2005.

ITeach Innovations in Teaching symposium, Washington University, January 12-13, 2006.

ITeach Innovations in Teaching symposium, Washington University, January 14-16, 2004.

Professor 101: Entering the Professoriate, Princeton University, May 6-28, 2002.

Professional Association Memberships

American Academy of Environmental Engineers, American Chemical Society, American Society of Civil Engineers, American Water Works Association, Association of Environmental Engineering and Science Professors, The Geochemical Society, Water Environment Foundation

Tau Beta Pi Engineering Honor Society, Chi Epsilon Civil Engineering Honor Society, Phi Kappa Phi

Selected Consulting Experience

Consulting expert to the City of Chicago regarding lead corrosion control, 2016-present.

Consultant to NRDC providing scientific and technical assistance regarding *Concerned Pastors for Social Action v. Khouri,* No. 16-cv-10277, 2016-present.

Consultant to NRDC providing scientific and technical assistance regarding potential litigation related to the City of Newark's and the State of New Jersey's violations of the Safe Drinking Water Act, 2018-present.

Consultant to Black & Veatch regarding the Water Quality Corrosion Study for the Medford Water Commission, 2017-present.

Consultant to Black & Veatch regarding the Vista Ridge Integration Program for the San Antonio Water System, 2016-present.

Member of Expert Panel on abatement of lead corrosivity convened by the Providence Water Supply Board, July 2012 – present.

Consultant to Corona Environmental Consulting for review of report prepared by the Philadelphia Water Department titled "Data Analysis to Evaluate the Efficacy of the Philadelphia Water Department's Optimized Corrosion Control Treatment for Lead", 2017-2018.

Member of Technical Advisory Committee of Distribution System Water Quality Project, Portland Water Bureau, 2014-2017.

Member of Technical Advisory Team on Water Research Foundation Project 4449: Sources, Fate and Treatment of Hexavalent Chromium (PI is Phil Brandhuber, HDR), 2012-2015.

UNIVERSITY SERVICE

Energy, Environmental, and Chemical Engineering Department

Graduate Program Coordinator, 2006-2009

Member of Undergraduate Studies Committee, 2019-

Chair of committee on awards and nominations, 2017-

Chair of task force to develop an environmental engineering major, 2018

Chair of faculty search committee in environmental engineering, 2017-2018

Chair of faculty search committee, 2015-2016

Chair of faculty search committee in metabolic engineering, 2011-2012

Coordinator of the Environmental Engineering Science Minor, 2010-

Chair of faculty search committee in environmental engineering, 2008-2010.

Member of faculty search committee in environmental engineering, 2006-2007 (Pratim Biswas and Jay Turner, co-chairs)

Member of search committee for Director of Tyson Research Center, 2013-2014 (Barbara Schaal and Holden Thorp, co-chairs)

Member of faculty search committee in Biology, 2010-2011 (Jon Chase and Tuan-hua Ho, co-chairs)

Member of faculty search committee in Earth and Planetary Science, 2006-2007 (Jan Amend, chair)

Member of faculty search committee in Chemistry, 2007-2008 (William Buhro, chair)

Faculty Advisor to Environmental Engineering Student Association and chapter of Water Environment Foundation

Environmental Engineering Science Program

Graduate Admissions and Recruitment Coordinator, 2002-2006.

Member of faculty search committee in Chemical Engineering, 2006 (Bamin Khomami, chair)

Civil Engineering Department

Undergraduate Curriculum Committee, 2003 – 2006 (Srinivasan Sridharan, chair)

Center for Materials Innovation

Coordinator of bimonthly Researcher Forums, 2005-2006

School of Engineering and Applied Science

Member of Decanal Review Committee, 2019

Member of Tenure and Promotion Committee, 2016-

Liaison to the Faculty of Arts and Sciences, 2016-

Mentor of students in workshop on submitting NSF Graduate Research Fellowship applications, 2016

Member of Search Committee for the Dean of the School of Engineering and Applied Science, 2014-2015 (Mahendra Gupta, chair)

Member of Faculty and Staff Campaign Committee, 2013-2018

Liaison to the Graduate School of Arts and Sciences, 2011-2012,

Speaker of the Faculty Assembly, 2009-2010

Member of Advisory Committee on the Appointment of the Dean of Engineering, 2009-2010 (Joe Ackerman and Shelly Sakiyama-Elbert, co-chairs)

Member of Strategic Advisory Committee to the Institute of Material Science and Engineering, 2016 (Bill Buhro, chair)

Judge for Neureuther Book Collection Contest, 2012 (Washington University Libraries)

Environmental Coordinator for National Science Foundation GK12 Program, LEAP: Learning through Engineering and Applied Science Partnerships (Kevin Truman, director)

Member of Committee on Training of Women in STEM Fields, 2010-2012 (Barbara Baumgartner and Bill Buhro, co-chairs)

Member of Education Sub-group of Environmental Education and Research Working Group, 2005-2006 (Jan Amend, chair)

Member of Geospatial Information System Advisory Committee, 2006-2012 (T.R. Kidder, chair)

Member of Committee on Environmental Quality, 2005-2008 (Tom Simmons, chair)

Member of Cox Distinguished Lecture Committee, 2006-2012(Jon Turner, chair)

Presentations to Prospective Students and University Supporters Engineering Theme Day for Admissions Office – July 24, 2007.

Engineering Scholarship Student Recruiting – Undergraduates and Research, March 30, 2007.

Eliot Society Seminar Series – The Environment and Public Health, October 24, 2006.

St. Louis Earth Day Activities at Washington University - Mercury Fate and Transport in Aquatic Environments, April 22, 2005.

McDonnell International Scholars Academy

McDonnell Academy Ambassador to the Hong Kong University of Science and Technology, 2015-

Coordinator of a workshop on environmental nanotechnology at the Seventh International Symposium, Beijing, October 11-14, 2018.

Coordinator of Water Quality and Water Resources session at the Second International Symposium on Energy and Environment, Hong Kong, December 8-10, 2008.

Co-coordinator of Water Resources and Aquatic Processes Group, International Symposium on Energy and Environment, May 4-7, 2007.

Doctoral Thesis Committees

Department of Energy, Environmental and Chemical Engineering (students other than own)

	Advisor	Proposal	Final
Ahmed Abokifa	Pratim Biswas	NA	May 2018
Soubir Basak	Pratim Biswas	April 2007	August 2008
Zhuo Cheng	Cynthia Lo	March 2012	August 2014
Peter Colletti	John Fortner	November 2013	NA
Xueyang Feng	Yinjie Tang	August 2010	January 2012
Jeff Fornero	Lars Angenent	October 2008	August 2009
Shaohua Hu	Pratim Biswas		January 2007
Yandi Hu	Young-Shin Jun		May 2013
Haesung Jung	Young-Shin Jun	November 2014	November 2017
Changwoo Kim	John Fortner	November 2015	2018
Doyoon Kim	Young-Shin Jun	December 2014	2018
Qingyun Li	Young-Shin Jun	November 2013	August 2016
Wenlu Li	John Fortner	September 2012	August 2015
Yujia Min	Young-Shin Jun	February 2014	August 2017
Chelsea Neil	Young-Shin Jun	November 2012	May 2015
Jessica Ray	Young-Shin Jun	October 2012	July 2015
Shruthi Santhanam	Nathan Ravi	November 2015	December 2017
Achariya Suriyawong	Pratim Biswas	October 2005	August 2008

Katelyn Swindle	Nathan Ravi	January 2008	August 2008
Elijah Thimsen	Pratim Biswas	October 22, 2007	May 2009
Jiewei Wu	John Fortner	November 2012	January 2016
Yi Yang	Young-Shin Jun		June 2013
Qingqing Zeng	John Fortner	November 2017	TBD
Ke Zhang	Kim Parker	November 2019	TBD
Lijie Zhang	Young-Shin Jun	November 2014	March 2018

Other Departments at Washington University

	Advisor	Department	Final
Kathryn Becker	Jeff Catalano	Earth and Planetary Science	NA
Dawn Cardace	Julie Morris	Earth and Planetary Science	November 2006
Chia-Hsin Chen	Sophia Hayes	Chemistry	March 2019
Jinlei Cui	Sophia Hayes	Chemistry	TBD
Selby Cull	Ray Arvidson	Earth and Planetary Science	November 2010
Angang Dong	William Buhro	Chemistry	October 2007
Elaine Flynn	Jeff Catalano	Earth and Planetary Science	April 2018
Andrew Frierdich	Jeff Catalano	Earth and Planetary Science	2011
Johanna Kieniewicz	Jen Smith	Earth and Planetary Science	May 2007
Elizabeth Hasenmueller	Bob Criss	Earth and Planetary Science	December 2011
Margaret Anne Hinkle	Jeff Catalano	Earth and Planetary Science	November 2014
Nancy Hsia-Akerman	Jan Amend	Earth and Planetary Science	November 2009
Brian Hynek	Roger Phillips	Earth and Planetary Science	April 2003
Zhen Li	Jill Pasteris	Earth and Planetary Science	December 2013
Yi-Hsin Liu	William Buhro	Chemistry	August 2010
Peng Lu	Amy Walker	Chemistry	October 2009
Jeremy Moore	Sophia Hayes	Chemistry	May 2015
Stacy Mui	Sophia Hayes	Chemistry	September 2008
Kenya Powell	Karen Wooley	Chemistry	September 2006
Vernal Richards	William Buhro	Chemistry	July 2010
Karyn Rogers	Jan Amend	Earth and Planetary Science	August 2006
Stephen Seddio	Randy Korotev	Earth and Planetary Science	November 2013
J. Andrew Surface	Sophia Hayes	Chemistry	July 2013
Matthew Van Duzor	Richard Mabbs	Chemistry	May 2011
Mehul Vesvikar	Muthana Al-Dahhan	Chemical Engineering	May 2006
Fudong Wang	William Buhro	Chemistry	April 2007
Sandra Wiseman	Ray Arvidson	Earth and Planetary Science	July 2009
Tingying Xu	Jeff Catalano	Earth and Planetary Science	April 2018
Jinshu Yan	Jeff Catalano	Earth and Planetary Science	
Chuanzhen Zhou	Amy Walker	Chemistry	February 2009

Master Thesis Committees

Department of Energy, Environmental and Chemical Engineering

	Advisor	Final
Rebecca Barefoot	Brian Wrenn	January 2006
Samuel Fisher	Brian Wrenn	February 2006
Rhoda Hall	Brian Wrenn	April 2007
Catherine Reid	Jay Turner	August 2005
Marina Smallwood	Pratim Biswas	January 2005

California Institute of Technology

Environmental Quality Laboratory, Discussion Series Coordinator, 1997-2001

Advisory Committee on Performing and Creative Arts, 1998-2001

Committee on Institute Programs, 1998-2001

COMMUNITY OUTREACH

Water Quality Activities for St. Louis Students

Laboratory tours and discussion with Lego League Students for the Hydrodynamic Challenge, September 2017 (groups from Clayton, Parkway, and Rockwood School Districts).

Field sampling and analysis of water quality in Forest Park for 40 students from the summer EcoAcademy of the Gifted Resource Council, June 2005 and 2011.

Classroom activities on carbon sequestration, water quality, water and wastewater treatment, environmental impacts of consumer products, and life cycle assessment for students in the Gifted Resource Council's Eco-Academy, June 2004, 2005, 2006, 2007, 2008, 2009, 2011, and 2014 2016, 2018, 2019.

Hands-on experiments on water quality and water treatment for more than 50 students attending the Gifted Resource Council 25th Anniversary Open House, October 5, 2008.

Hands-on activities in drinking water treatment for 20 middle school students participating in "Moving and Shaking: An Introduction to Engineering," a St. Louis Area Gifted Resource Council Learning Lab; October 23, 2003; November 6, 2004; November 12, 2005; October 14, 2006; October 13, 2007; February 7, 2009; October 31, 2009.

Classroom demonstration and activities on carbon dioxide and climate change for 15 middle school students in the Washington University Campus Y Youth University Program, July 23, 2008.

Laboratory activities on environmental engineering for a small group of students from Lydia's House, a shelter for women and children who have been victims of domestic abuse.

Water Quality Assistance for City of St. Louis, 2004-2006

Analyze monthly samples collected by City personnel in Forest Park waterways. Stakeholder in the Forest Park Water Quality Plan.

Science Advisory Board of the St. Louis Confluence Riverkeeper, Member, 2010-2012

HONORS

PE of the Year in Education for 2019-2020, St. Louis Chapter of the Missouri Society of Professional Engineers

Top Reviewer Award for *AWWA Water Science,* 2019

Honorary Professor in the School of Water Resources and the Environment, China University of Geosciences, 2015.

Chemical Geology Most Cited Article 2005 to 2010 for "Forsterite dissolution and magnesite precipitation at conditions relevant for deep saline aquifer storage and sequestration of carbon dioxide", awarded in 2011

Emerson Excellence in Teaching Award, 2010

Journal of Environmental Engineering, 2009 Excellence in Review

Department of Energy, Environmental and Chemical Engineering Teaching Award, 2009 Dean's Award for Excellence in Teaching, 2008

Environmental Science and Technology Excellence in Review Award, 2005

Association of Graduate Students Big Fish Award, 2005

EnvESA Professor of the Year, 2004

Caltech Graduate Dean's Award for Outstanding Community Service, 2001

National Science Foundation Graduate Research Fellowship, 1996-1999

Andrew Carnegie Society Scholar, 1995-1996

Air and Waste Management Association, Western Pennsylvania Scholarship, 1995-1996 Carnegie Tradition Scholarship (half-tuition merit-based scholarship), 1992-1996

National Merit Scholarship, 1992-1996

Rhodes Scholarship State Finalist, 1995

Carnegie Mellon Community Service Award, 1995