

Haizhou Liu

Bourns Hall A239
Department of Chemical & Environmental Engineering
University of California-Riverside
Riverside, CA 92521

Tel: (951) 827-2076
Fax: (951) 827-5696
Email: haizhou@engr.ucr.edu
<http://www.cee.ucr.edu/liu>

Educational History

- Ph.D., Environmental Engineering, University of Washington, 2010
- M.S., Civil Engineering, University of Washington, 2007
- B.S., Environmental Engineering, Sichuan University, China, 2006
Participant in Student Exchange Program, University of Washington, 2004-2005

Employment History

- Associate Professor (2018-present), Assistant Professor (2013-2018) – Department of Chemical and Environmental Engineering; cooperating Faculty (2013-present)– Program of Environmental Toxicology. University of California, Riverside.
- Postdoctoral Researcher (2010-2012) – Department of Civil and Environmental Engineering, University of California, Berkeley.
- Graduate Research Assistant (2006-2010) – Department of Civil and Environmental Engineering, University of Washington.

Honors and Awards

- Best Paper Award of the Year, *Environmental Science: Water Science & Technology*, 2019.
- Young Professional Award of the Year, International Ultraviolet Association, 2019.
- Best Research Paper Award, International Ultraviolet Association, 2019.
- *Environmental Science & Technology* Excellence in Review Award, American Chemical Society, 2018.
- Advisor to First-Place PhD Dissertation Academic Achievement Award, American Water Works Association California-Nevada Section, 2018 (my student Michelle Chebeir).
- Best Young Professional Presentation Award, International Ultraviolet Association, 2018 (Joint with my student Gongde Chen).
- National Science Foundation Faculty Early Career Development (CAREER) Award, 2017.
- Regents Faculty Development Award, University of California, 2017.
- First Place Innovator Award at World Water Forum, Metropolitan Water District of Southern California, 2017 (Joint with my student Tushar Jain).
- Hellman Family Fund Faculty Fellowship, University of California, 2016.
- Emerging Investigator in Water Engineering and Technology, Royal Society of Chemistry, 2016.

- Best Poster Award at Emerging Contaminant Summit, 2016 (Joint with my student Gongde Chen).
- Best Poster Award at International Symposium on Toxic Persistent Substances, 2015 (Joint with my student Wei Li).
- Honorable mention for Best Poster Award at California Groundwater Association Annual Meeting, 2014 (Joint with my student Michelle Chebeir).
- Honorable mention for Best Platform Presentation, 5th International Water Association Young Water Professionals Conference, International Water Association, 2010.
- Best Student Platform Presentation, Division of Environmental Chemistry, American Chemical Society Spring Annual Meeting, 2010.
- ACS Environmental Chemistry C. Ellen Gonter Graduate Student Paper Award, Division of Environmental Chemistry, American Chemical Society, 2009.
- 1st Place in Students and Young Professionals Poster Presentation, AWWA Annual Conference and Exposition, American Water Works Association, 2009.
- 1st Place in Students Poster Competition, Pacific Northwest Section Annual Conference, American Water Works Association, 2009.
- Paper Award to Attend International Water Association Young Water Professionals Conference, selected by WEF/AWWA/IWA US Committee, 2009.
- Joseph W. Richards Summer Research Fellowship, the Electrochemical Society, 2009.
- Graduate Student Award in Environmental Chemistry, Division of Environmental Chemistry, American Chemical Society, 2008.
- Petty-Stiles Memorial Scholarship, Pacific Northwest Section, American Water Works Association, 2008.
- 2nd Place in Environmental Challenge Student Design Competition, Pacific Northwest International Section Annual Conference, Air and Waste Management Association, 2007.
- Undergraduate Student Research Paper Award, Sichuan University, China, 2006.
- Honorable Mention for Best Overall Demo, Open House Demo Contest, Civil and Environmental Engineering, University of Washington, 2005.

Journal Publications

(Names with an underline are my students/postdocs at UCR; * represents my corresponding authorship)

33. Jain, T.; Sanchez, E.; Owens-Bennett, E.; Trussell, R.; Walker, S.; **Liu, H.*** Impacts of antiscalants on the formation of calcium solids: implication on scaling potential of brackish desalination concentrate. **2019**, under review.
32. Wang, Z.; Chen, G.; Patton, S.; Ren, C.; Liu, J.; **Liu, H.*** Degradation of nitrilotris-Methylenephosphonic acid (NTMP) antiscalant via persulfate photolysis: implications on desalination concentrate treatment. **2019**, under review.
31. Yu, X.; Niksa, D.; Ge, X.; **Liu, H.**; Hille, R.; Mulchandani, A. Synthesis of formate from CO₂ gas catalyzed by an O₂-tolerant NAD-dependent formate dehydrogenase and glucose dehydrogenase. *ACS Biochemistry*. **2019**, Accepted.

30. Henrie, T.; Plummer, S.; Orta, J.; Bigley, S.; Seidel, C.; **Liu, H.*** Full-scale demonstration testing of hexavalent chromium reduction via stannous chloride application. *American Water Works Association Water Science*. **2019**, Accepted.
29. Fraiese, A.; Naddeo, V.; Uyguner-Demirel, C. S.; Prado, M.; Cesaro, A.; Zarra, T.; **Liu, H.**; Belgiorno, V.; Ballesteros, Jr. F. Removal of emerging contaminants in wastewater by sonolysis, photocatalysis and ozonation. *Global NEST Journal*. **2019**, *21* (2), 98-105.
28. Chen, G.; Hanukovich, S.; Chebeir, M.; Christopher, P.; **Liu, H.*** Nitrate removal via formate radical-induced homogeneous photochemical denitrification. *Environmental Science & Technology*. **2019**, *53* (1), 316-324.
27. Patton, S.; Li, W.; Romano, M.; Naddeo, V.; Ishida, K. P.; Mezyk, S. P.; **Liu, H.*** Impacts of chloramines on UV photolysis of hydrogen peroxide: removal of trace organic contaminants for potable reuse. *Environmental Science & Technology*. **2018**, *52* (20), 11720-11727.
26. Li, W.; Xu, E.; Schlenk, D.; **Liu, H.*** Cyto- and geno-toxicity of 1,4-dioxane transformation products during UV/AOP for potable water reuse. *Environmental Science: Water Research & Technology*. **2018**, *4* (9), 1213-1218.
25. Ngo-Duc, T.; Plank, J. M.; Chen, G.; Harrison, R.E.S.; Morikis, D.; **Liu, H.**; Haberer, E. D. M13 bacteriophage spheroids as scaffolds for directed synthesis of spiky gold nanostructures. *Nanoscale*. **2018**, *10* (27), 13055-13063.
24. Chebeir, M.; **Liu, H.*** Formation of Cr(VI) in drinking water via iron chromite oxidation by chlorine: role of iron, bromide, pH and carbonate. *Environmental Science & Technology*. **2018**, *52* (14), 7663-7670
23. Li, W.; Patton, S.; Ishida, K. P.; Mezyk, S. P.; **Liu, H.*** Simultaneous UV photolysis of chloramine and persulfate in reverse osmosis permeate for potable water reuse. *Environmental Science & Technology*, **2018**, *52* (11), 6417-6425.
22. Chen, G.; **Liu, H.*** Understanding the kinetics and mechanisms of aqueous vanadium(V) reductive reactions using electrochemical techniques. *Environmental Science & Technology*. **2017**, *51* (20), 11643-11651.
21. Orta, J.; Patton, S.; **Liu, H.*** Bromide-assisted catalytic oxidation of lead(II) solids by chlorine in drinking water distribution systems. *Chemical Communications*. **2017**, *53* (62), 8695-8698.
20. Li, W.; Orozco, R.; Camargos, N.; **Liu, H.*** Impacts of pH, alkalinity and chloride on heterogeneous persulfate activation for groundwater remediation. *Environmental Science & Technology*. **2017**, *51* (7), 3948-3959.
19. Wordofa, D.N., Walker, S.L., **Liu, H.*** Sulfate radical induced disinfection of a pathogenic strain of *Escherichia coli* by iron activated persulfate. *Environmental Science & Technology Letters*. **2017**, *4* (4), 154-160.
18. Chen, G.; Feng, J.; Wang, W.; Yin, Y.; **Liu, H.*** Synthesis and application of highly reductive TiO₂ nanocrystals to photo-catalytically remove hexavalent chromium. *Water Research*. **2017**, *108*, 383-390.
17. Patton, S.; Li, W.; Couch, K.; Mezyk, S.; Ishida, K.; **Liu, H.*** Impact of the UV photolysis of monochloramine on 1,4-dioxane removal: new insights into potable water reuse. *Environmental Science & Technology Letters*. **2017**, *4* (1), 26-30.

16. Pari, S.; Wang, I.; **Liu, H.***; Wong, B.M.* Assessment of sulfate radical oxidation reactions in aromatic contaminants using density functional theory and high-level quantum chemical methods. *Environmental Science: Process & Impact*. **2017**, *19* (3), 395-404. (selected for the journal front cover image)
15. Li, W.; Jain, T.; Ishida, K.; Remucal, K. C.; **Liu, H.*** Kinetics modeling of the degradation of trace organic contaminants in UV/hydrogen peroxide, UV/persulfate and UV/free chlorine. *Environmental Science: Water Research & Technology*. **2017**, *3* (6), 128-138.
14. Duan, W.; Chen, G.; Chen, C.; Sanghvi, R.; Walker, S.; **Liu, H.**; Ronen, A.; Jassby, D. In-situ hexavalent chromium removal via composite carbon nanotubes electrically conductive ultrafiltration membranes. *Journal of Membrane Science*. **2017**, *531*, 160-171.
13. Prado, M.; Borea, L.; Cesaro, A.; **Liu, H.**; Naddeo, V.; Belgiorno, V.; Ballesteros, F. Removal of emerging contaminant and fouling control in membrane bioreactors by combined ozonation and sonolysis. *International Biodeterioration & Biodegradation*. **2017**, *119*, 577-586.
12. Chebeir, M.; **Liu, H.*** Kinetics and mechanisms of Cr(VI) formation via the oxidation of Cr(III) solid phases by chlorine in drinking water. *Environmental Science & Technology*. **2016**, *50* (2), 701-710.
11. Chebeir, M.; Chen, G.; **Liu, H.*** Frontier review: occurrence and speciation of chromium in drinking water distribution systems. *Environmental Science: Water Research & Technology*. **2016**, *2* (6), 906-914. (selected for the journal front cover image)
10. **Liu, H.**; Bruton, T.; Li, W.; Van Buren, J.; Prasse, C.; Doyle, F.; Sedlak, D. L. Oxidation of benzene by persulfate in the presence of Fe(III)- and Mn(IV)-containing oxides: stoichiometric efficiency and transformation products. *Environmental Science & Technology*. **2016**, *50* (2), 890-898.
9. Qin, C.; **Liu, H.**; Liu, L.; Smith, S.; Sedlak, D. L.; Gu, A. Z. Bioavailability and characterization of dissolved organic nitrogen and dissolved organic phosphorus in wastewater effluents. *Science of the Total Environment*. **2015**, *511* (1), 47-53.
8. **Liu, H.**; Bruton, T.; Doyle, F.; Sedlak, D.L. *In situ* chemical oxidation of contaminated groundwater by persulfate: decomposition by Fe(III)- and Mn(IV)-containing oxides and Aquifer Materials. *Environmental Science & Technology*. **2014**, *48* (17), 10330-10336.
7. **Liu, H.***; Peng, C.Y.; Ferguson, J.F.; Meyerhofer, P; Luckenbach, H.; Desormeaux, E.; Korshin, G.V. Impacts of blending desalinated water with conventionally treated surface water on iron corrosion and released from drinking water distribution systems. *Water Research*. **2013**, *47* (11), 3817-3826.
6. **Liu, H.**; Jeong, J.; Gray, H.; Smith, S.; Sedlak, D.L. Algal uptake of hydrophobic and hydrophilic dissolved organic nitrogen in effluent from biological nutrient removal municipal wastewater treatment systems. *Environmental Science & Technology*. **2012**, *46* (2), 713-721.
5. **Liu, H.***; Kuznetsov, A. M.; Masliy, A. N.; Korshin, G.V.; Ferguson, J.F. Formation of Pb(III) intermediates in the electrochemically controlled Pb(II)/PbO₂ system. *Environmental Science & Technology*. **2012**, *46* (3), 1430-1438.
4. **Liu, H.***; Schonberger, K. D.; Korshin, G.V.; Ferguson, J.F. Meyerhofer, P; Desormeaux, E.; Luckenbach, H. Effects of blending of desalinated water with treated surface drinking water on copper and lead release. *Water Research*. **2010**, *44* (14), 4057-4066.

3. **Liu, H.***; Korshin, G.V.; Ferguson, J.F. Interactions of Pb(II)/Pb(IV) solid phases with chlorine and their effects on lead release. *Environmental Science & Technology*. **2009**, *43* (9), 3278-3284.
2. **Liu, H.**; Korshin, G.V.; Ferguson, J.F. Investigation of the kinetics and mechanisms of the oxidation of cerussite and hydrocerussite by chlorine. *Environmental Science & Technology*. **2008**, *42* (9), 3241-3247.
1. **Liu, H.***; Korshin, G.V.; Ferguson, J.F.; Jiang, W. Key parameters and kinetics of oxidation of lead (II) solid phases by chlorine in drinking water. *Water Practice and Technology*. **2006**, *1* (4), doi: 10.2166/WPT.2006092.

Un-refereed Journal Articles

1. Liu, H. The motivational charge of AWWA conferences. *Journal of American Water Works Association*. **2010**, *102* (6), 38-39. (Invited article).

Invited Seminars

28. Potable reuse and design of photochemical process. Department of Civil and Environmental Engineering, University of Minnesota, Minneapolis, MN. March 1, 2019.
27. Potable reuse harnessing chloramine photochemistry. Bren School of Bren School of Environmental Science & Management, University of California, Santa Barbara, CA. January 14, 2019.
26. Harnessing water chemistry to solve a thirsty world. US Department of Agriculture, Salinity Lab, Riverside, CA. November 19, 2018.
25. Understanding the geochemistry of drinking water distribution systems. Department of Civil and Environmental Engineering, University of New Mexico, Albuquerque, NM. October 3, 2018.
24. Harnessing water chemistry for a thirsty world. Department of Environmental Engineering and Science, Peking University, Beijing, China, September 3, 2018.
23. Application of photochemistry for potable water reuse. Department of Civil and Environmental Engineering, University of California, Irvine. February 16, 2018.
22. Chloramine photochemistry and implications for potable water reuse. Department of Civil and Environmental Engineering, University of Colorado, Boulder, CO. February 7, 2018.
21. Chloramine photochemistry and its application in potable water reuse. Department of Chemical and Environmental Engineering, Yale University. New Haven, CT, September 27, 2017.
20. Redox chemistry of chromium and implications on its occurrence in drinking water. Department of Civil and Environmental Engineering, John Hopkins University, Baltimore, MD. September 26, 2017.
19. Impact of the UV photolysis of chloramines on 1,4-dioxane removal: new insights into potable water reuse. Trussell Technologies, Inc. Pasadena, CA. June 15, 2017.
18. UV-driven water reuse technologies. Department of Civil and Environmental Engineering, University of New South Wales, Sydney, Australia. March 22, 2017.

17. Redox chemistry of chromium and implications on its occurrence in drinking water. Department of Civil and Environmental Engineering, University of Missouri, Columbia, MO. December 9, 2016.
16. Application of aquatic chemical processes to improving water quality and water treatment. YTC America. Camarillo, California. June 22, 2016.
15. New advances in photochemical water reuse treatment and technologies. Department of Civil and Environmental Engineering, University of Salerno. Salerno, Italy, March 22, 2016.
14. Redox chemistry of chromium and implications on its occurrence in drinking water. Swiss Federal Institute of Aquatic Sciences (Eawag), Zürich, Switzerland. March 16, 2016.
13. The occurrence and transformation of hexavalent chromium in drinking water. Departmental of Civil and Environmental Engineering, Sichuan University, China. January 3, 2016.
12. The occurrence and transformation of hexavalent chromium in drinking water. Departmental of Environmental Engineering and Sciences, Perking University, China. December 24, 2015.
11. The redox chemistry of chromium in drinking water. Department of Environmental Engineering, Nankai University. Tianjin, China. December 21, 2015.
10. The challenges and opportunities on water reuse. Department of Chemical Engineering, Beijing University of Chemical Engineering. Beijing, China. December 15, 2015.
9. Transformation and reoccurrence of hexavalent chromium via redox pathways in drinking water: implications on Cr(VI) control. Department of Civil and Environmental Engineering, Georgia Tech. Atlanta, GA. November 18, 2014.
8. Recent advances in water reuse technologies and challenges on water quality with a changing climate. Department of Chemical Sciences, University of Baja California, Tijuana, Mexico. September 19, 2014.
7. Recent development in chromium removal technologies. Research Division Seminar, Metropolitan Water District of Southern California, CA. July 25, 2014.
6. Radical-Based photochemical advanced oxidation for water reuse applications. Research Division Seminar, Orange County Water District, Fountain Valley, CA. May 25, 2014.
5. Chemical remediation of contaminated groundwater and soil by activation of persulfate. Department of Civil and Environmental Engineering, University of California, Irvine, CA. February 1, 2013.
4. Chemical remediation of contaminated groundwater and soil by activation of persulfate. Department of Civil and Environmental Engineering, University of California, Berkeley, CA. September 28, 2012.
3. Water quality in distribution systems: effects of chlorine disinfection on lead release in drinking water. Department of Chemical and Environmental Engineering, University of California, Riverside, CA. March 7, 2012.
2. Water desalination: challenges on iron corrosion and iron release from drinking water distribution system. Curtin Water Quality Research Center, Curtin University. Perth, Australia. July 12, 2010.
1. Lead in drinking water: unexpected problems and the importance of redox chemistry. Environmental Engineering Spring Seminar Series, University of Washington. Seattle, WA. April 8, 2010.

Conference Oral Presentations

45. Patton, S.; Ishida, K.; Plumlee, M.; Liu, H. Chloramine Photochemistry for Potable Water Reuse. 255th American Chemical Society National Meeting and Exposition. New Orleans, LA. March 17-21, 2018.
44. Chen, G.; Liu, H. Formate-Assisted Photochemical Denitrification: Synergistic Effect of Nitrate Photolysis with Highly Reductive Formate Radicals. International Ultraviolet Association Americas Conference. Redondo Beach, CA. February 26-28, 2018.
43. Patton, S.; Ishida, K.; Plumlee, M.; Liu, H. Chloramine Photochemistry for Potable Water Reuse. International Ultraviolet Association Americas Conference. Redondo Beach, CA. February 26-28, 2018.
42. Patton, S.; Ishida, K.; Plumlee, M.; Liu, H. UV Photolysis of Chloramines on 1,4-Dioxane Removal: New Insights Into Potable Water Reuse. American Water Works Association International Symposium on Potable Reuse. Austin, TX. January 22-23, 2018.
41. Chebeir, M.; Chen, G.; Liu, H. Control of Redox-driven in situ Release of Accumulated Inorganic Contaminants from Water Distribution Infrastructure. Biennial Conference of Association of Environmental Engineering and Science Professors, University of Michigan, Ann Arbor, MI. June 20-22, 2017.
40. Patton, S.; Li, W.; Ishida, K.; Mezyk, S.; Liu, H. Chloramine-Driven Photochemistry for Water Reuse Applications. 253rd American Chemical Society National Meeting and Exposition. San Francisco, CA. April 2-6, 2017. (Invited)
39. Chen, G.; Feng, J.; Wang, W.; Yin, Y.; Liu, H. Synthesis and Application of Highly Reductive TiO₂-based Photocatalysts for Hexavalent Chromium and Nitrate removal. 253rd American Chemical Society National Meeting and Exposition. San Francisco, CA. April 2-6, 2017.
38. Li, W.; Schlenk, D.; Liu, H. Toxicity Implications of Sulfate Radical-Based Oxidative Treatment for Groundwater Remediation. 253rd American Chemical Society National Meeting and Exposition. San Francisco, CA. April 2-6, 2017.
37. Patton, S.; Li, W.; Ishida, K.; Liu, H. Impact of the UV Photolysis of Monochloramine on 1,4-dioxane Removal: New Insights into Potable Water Reuse. 253rd American Chemical Society National Meeting and Exposition. San Francisco, CA. April 2-6, 2017.
36. Chebeir, M.; Liu, H. Understanding chromium redox reaction pathways in drinking water distribution systems. 2016 CA-NV American Water Works Association Annual Fall Conference. San Diego, CA. October 24-27, 2016. (Invited)
35. Liu, H. Redox chemistry in water distribution infrastructure with residual disinfectants: the control of metals and metalloids. 2016 CA-NV American Water Works Association Annual Fall Conference. San Diego, CA. October 24-27, 2016. (Invited)
34. Chebeir, M.; Chen, G.; Liu, H. Kinetics and mechanisms of Cr(VI) formation via the oxidation of Cr(III) solid phases by chlorine in drinking water. 252nd American Chemical Society National Meeting and Exposition. Philadelphia, PA. August 21-25, 2016.

33. Li, W.; Patton, S.; Ishida, K.; Liu, H. Comparison of four UV/AOPs for water reuse: implications on the removal of emerging contaminants. Water Reuse Research Conference, Denver, CO. May 22-24, 2016.
32. Li, W.; Schlenk, D.; Wong, B.; Liu, H. Identification of transformation products and toxicity implications in sulfate radical based groundwater remediation. 251st American Chemical Society National Meeting and Exposition. San Diego, CA. March 13-17, 2016.
31. Jain, T.; Liu, H. Resource recovery from reverse osmosis concentrate. 251st American Chemical Society National Meeting and Exposition. San Diego, CA. March 13-17, 2016.
30. Chen, G.; Liu, H. Development and application of magnetically reductive TiO₂ photocatalyst for hexavalent chromium removal. 251st American Chemical Society National Meeting and Exposition. San Diego, CA. March 13-17, 2016.
29. Chen, G.; Liu, H. Development and application of magnetically reductive TiO₂ photocatalyst for hexavalent chromium removal. Emerging Contaminant Summit. Westminster, CO. March 1-2, 2016.
28. Liu, W.; Patton, S.; Liu, H. Kinetics modeling and comparison of three UV/AOP treatment processes on contaminant degradation. ACS Western Regional Annual Meeting, Irvine, CA. November 15-17, 2015.
27. Li, W.; Patton, S.; Tushar, J.; Liu, H. Fundamental understanding of radical transformations in UV/AOPs: implications on treatability of persistent toxic substances. 12th International Symposium on Persistent Toxic Substances. Riverside, CA. November 16-20, 2015.
26. Li, W.; Liu, H. Blending desalinated water into the drinking water distribution system: effects of NOM on iron corrosion and iron release. IWA Specialist Conference on Natural Organic Matter in Water. Malmö, Sweden, September 7-10, 2015.
25. Chen, G.; Chen, M.; Liu, H. Development and application of magnetically reductive TiO₂ photocatalyst for hexavalent chromium removal. 2015 American Water Works Association Annual Conference and Exposition. Anaheim, CA. June 10-15, 2015.
24. Li, W.; Schlenk, D.; Liu, H. Impact of aquifer minerals and chemicals on sulfate radical based in situ chemical oxidation for groundwater remediation. 2015 American Water Works Association Annual Conference and Exposition. Anaheim, CA. June 10-15, 2015.
23. Chebeir, M.; Liu, H. Impact of chemical redox conditions on the formation of hexavalent chromium in drinking water. 2015 American Water Works Association Annual Conference and Exposition. Anaheim, CA. June 10-15, 2015.
22. Chen, G.; Chen, M.; Yin, Y.; Liu, H. Photocatalytic reductive treatment of hexavalent chromium using barium doped TiO₂. 249th American Chemical Society National Meeting and Exposition. Denver, CO. March 22-26, 2015.
21. Chebeir, M.; Liu, H. Transformation of hexavalent chromium via redox pathways in drinking water: Implications on Cr(VI) control and treatment. 249th American Chemical Society National Meeting and Exposition. Denver, CO. March 22-26, 2015.
20. Li, W.; Liu, H. Toxicity implications of sulfate radical based oxidative treatment for groundwater remediation. 249th American Chemical Society National Meeting and Exposition. Denver, CO. March 22-26, 2015.

19. Liu, H.; Chen, M.; Sohn, H.; Alkhamis, L.; Wang, W.; Yin, Y. Application of sulfur-containing radical treatment for water reuse and recycling. AICHE Annual Meeting. Atlanta, GA. November 17-20, 2014.
18. Liu, H.; Chebeir, M.; Sohn, H.; Chen, M.; Wang, W.; Yin, Y. Transformation and reoccurrence of hexavalent chromium via redox pathways in drinking water: implications on Cr(VI) control and treatment. California-Nevada Sectional Conference of American Water Works Association Annual Fall Conference. Reno, NV. October 22-24, 2014.
17. Liu, H.; Chebeir, M.; Sohn, H. Impacts of redox chemical conditions on the occurrence and transformation of hexavalent chromium in drinking water. 249th American Chemical Society National Meeting and Exposition. San Francisco, CA. August 10-14, 2014.
16. Liu, H.; Bruton, T.; Doyle, F.; Sedlak, D.L. Oxidation of groundwater contaminants by metal oxide activation of persulfate: radical chain mechanisms and product formation. 246th American Chemical Society National Meeting and Exposition. New Orleans, LA. April 7-11, 2013.
15. Liu, H.; Bruton, T.; Sedlak, D.L.; Doyle, F. Oxidation of groundwater contaminants by persulfate: implications of radical chain mechanisms for kinetics and transformation product formation. Gordon Research Conference on Environmental Science: Water. Holderness, NH. June 24-29, 2012.
14. Liu, H.; Ackerman, A.; Pham, A.; Doyle, F.; Sedlak, D.L. Oxidation of organic contaminants by activation of persulfate and hydrogen peroxide. Superfund Research Program Annual Meeting. Lexington, KY. October 23-25, 2011.
13. Liu, H.; Schonberger, K.D.; Ferguson, J.F.; Luckenbach, H.; Desormeaux, E.; Meyerhofer, P.; Korshin, G.V. Changes of iron corrosion and prevention of red water events after blending desalinated water with treated surface water. American Water Works Association Water Quality and Technology Conference. Savannah, GA. November 14-18, 2010.
12. Liu, H.; Kasinathan, N.; Korshin, G.V.; Ferguson, J.F. Roles of Pb(III) intermediates and hydroxyl radicals in the formation of PbO₂ in Pb(II) oxidation by chlorine. 31st Society of Environmental Toxicology and Chemistry North America Annual Meeting. Portland, OR. November 7-11, 2010.
11. Liu, H.; Korshin, G.V.; Ferguson, J.F. Impacts of blending desalinated water into the drinking water distribution system on iron corrosion and colloidal iron release. 5th International Water Association Young Water Professional Conference. Sydney, Australia. July 5-7, 2010 (highly commended platform presentation).
10. Liu, H.; Korshin, G.V.; Ferguson, J.F. Colloidal lead release in drinking water distribution system: an ignored and difficult aspect of lead release control. Annual Conference of Pacific Northwest Section of American Water Works Association. Tacoma, WA. May 12-14, 2010.
9. Liu, H.; Kasinathan, N.; Korshin, G.V.; Ferguson, J.F. Roles of Pb(III) intermediates and hydroxyl radicals in the formation of PbO₂ in Pb(II) oxidation by chlorine. 239th American Chemical Society National Meeting and Exposition. San Francisco, CA. March 21-25, 2010 (student presentation award).
8. Liu, H.; Schonberger, K. D.; Korshin, G.V.; Ferguson, J.F. Meyerhofer, P; Desormeaux, E.; Luckenbach, H. Desalination and sustainability of drinking water distribution systems:

effects of blending of desalinated and conventionally treated surface water on iron corrosion and release. 239th American Chemical Society National Meeting and Exposition. San Francisco, CA. March 21-25, 2010.

7. Liu, H.; Korshin, G.V.; Ferguson, J.F. Colloidal mobilization of PbO₂ by chloramine and NOM in distribution system and effects of phosphate corrosion inhibitors. American Water Works Association Water Quality and Technology Conference. Seattle, WA. November 15-19, 2009.
6. Liu, H.; Korshin, G.V.; Ferguson, J.F. Interactions of Pb(II)/Pb(IV) solids with chlorine and their Effects on Lead Release. 238th American Chemical Society National Meeting and Exposition. Washington, DC. August 16-20, 2009 (graduate student paper award).
5. Liu, H.; Korshin, G.V.; Ferguson, J.F. Colloidal mobilization of lead by chlorine in drinking water distribution system. American Water Works Association Water Quality and Technology Conference. Cincinnati, OH. November 16-20, 2008.
4. Liu, H.; Korshin, G.V.; Ferguson, J.F. Kinetics and impact of water chemistry parameters on the oxidation of typical lead(II) phases by chlorine. 4th International Water Association Young Water Professionals Conference. Berkeley, CA. July 16-19, 2008.
3. Liu, H.; Ekrem, J.; Chang, A.; Mills, D. Collaborative solutions for odor control and water treatment. Environmental Challenge Student Design Competition, 47th Annual Conference Pacific Northwest International Section of Air and Waste Management Association. Boise, ID. October 17-19, 2007.
2. Liu, H.; Korshin, G.V.; Ferguson, J.F.; Jiang, W. Key parameters and kinetics of oxidation of lead (II) solid phases by chlorine in drinking water. 5th International Water Association Water Congress and Exposition. Beijing, China. September 10-14, 2006.
1. Liu, H.; Korshin, G.V.; Ferguson, J.F.; Jiang, W. Kinetics and mechanisms of oxidation of lead(II) solid phases by chlorine in drinking water. 3rd International Water Association Young Water Professionals Conference. Singapore. May 24-26, 2006.

Conference Poster Presentations

26. Liu, H. Harnessing Water Chemistry to Address Complex Water Challenges for a Thirsty World. 6th National Academy of Engineering US-Arab Frontier Symposium. Kuwait City, Kuwait, November 3-5, 2018.
25. Patton, S.; Schlenk, D.; Ishida, K.; Plumlee, M.; Liu, H. Chloramine Photochemistry for Potable Water Reuse. Gordon Research Conference: Water. Holderness, NH. June 24-29, 2018.
24. Chen, G.; Patton, S.; Liu, H. Treatment of perfluoroalkyl substances using carbon dioxide radical-based reductive processes. Department of Defense Strategic Environmental Research and Development Program (SERDP) Symposium. Washington, DC. November 27-30, 2017.
23. Paton, S.; Liu, H. Impacts of monochloramine photolysis on 1,4-dioxane removal in water reuse scenarios. Gordon Research Conference: Drinking Water Disinfection By-Products. South Hadley, MA. July 30-August 4, 2017.

22. Liu, W.; Patton, S.; Ishida, K.; Plumlee, M.; Schlenk, D.; Liu, H. Chloramine photolysis in advanced oxidation process for water reuse. Gordon Research Conference: Drinking Water Disinfection By-Products. South Hadley, MA. July 30-August 4, 2017.
21. Liu, W.; Patton, S.; Ishida, K.; Plumlee, M.; Liu, H. Impact of monochloramine on UV-driven advanced oxidation processes for 1,4-dioxane removal. 11th International Water Association Water Reclamation and Reuse Conference. Long Beach, CA. July 23-27, 2017.
20. Chen, G.; Liu, H. Synthesis and application of highly reductive TiO₂-based photocatalyst for hexavalent chromium and nitrate removal. Gordon Research Conference: Environmental Nanotechnology. Stowe, VT. June 18-23, 2017.
19. Chebeir, M.; Liu, H. Understanding hexavalent chromium formation in drinking water. American Water Works Association Annual Conference and Exposition, Philadelphia, PA. June 11-14, 2017.
18. Chebeir, M.; Liu, H. Minimizing hexavalent chromium in California water: understanding hidden reaction pathways in drinking water. American Water Works Association California-Nevada Sectional Conference, Anaheim, CA. April 10-13, 2017.
17. Chebeir, M.; Chen, G.; Liu, H. *In situ* generation of Cr(VI) via Cr(III) solid phase oxidation in drinking water distribution systems. Gordon Research Conference: Water. Holderness, NH. June 26-July 1, 2016.
16. Patton, S.; Li, W.; Ishida, K.; Liu, H. Comparison of two UV-based advanced oxidation processes (UV/AOPs) on 1,4-dioxane removal for water reuse application. 251st American Chemical Society National Meeting and Exposition. San Diego, CA. March 13-17, 2016.
15. Chen, G.; Yin, Y.; Liu, H. Synthesis and application of highly reductive TiO₂ nanocrystals to photo-catalytically remove hexavalent chromium. Emerging Contaminant Summit. Westminster, CO. March 1-2, 2016. (Advisor to Best Student Poster Presentation).
14. Li, W.; Schlenk, D.; Liu, H. Groundwater remediation and toxicity implications of sulfate radical based oxidative treatment. 12th International Symposium on Persistent Toxic Substances. Riverside, CA. November 16-20, 2015. (Advisor to Best Student Poster Presentation).
13. Li, W.; Liu, H. Impacts of blending desalinated water into the drinking water distribution System on iron corrosion and colloidal iron release. 6th International Water Association Specialist Conference on Natural Organic Matter in Water. Malmö, Sweden. September 7-11, 2015.
12. Patton, S.; Liu, H. Investigating the impacts of bromide on metal release from drinking water distribution system. 2015 American Water Works Association Annual Conference and Exposition. Anaheim, CA.
11. Tushar, J.; Liu, H. Harvesting energy from desalination concentrate by an electric double-layer capacitor. 2015 American Water Works Association Annual Conference and Exposition. Anaheim, CA. (Advisor to Best Student Poster Presentation).
10. Chen, G.; Yin, Y.; Liu, H. Synthesis and application of highly Reactive TiO₂ nanocrystals to catalytically remove hexavalent chromium. 2015 American Water Works Association Annual Conference and Exposition. Anaheim, CA.

9. Liu, H.; Chebeir, M.; Sohn, H. Transformation and reoccurrence of hexavalent chromium via redox pathways in drinking water. Gordon Research Conference on Environmental Science: Water. Holderness, NH. June 22-27, 2014.
8. Alkhamis, L.; Sohn, H.; Liu, H. Effective removal of hexavalent chromium by sulfite radical in UV Process. California-Nevada Sectional Conference of American Water Works Association Annual Spring Conference. Anaheim, CA. March 22-24, 2014. (Advisor to Best Student Poster Presentation).
7. Li, W.; Liu, H. Groundwater remediation and toxicity implications of sulfate radical based oxidative treatment. California-Nevada Sectional Conference of American Water Works Association Annual Spring Conference. Anaheim, CA. March 22-24, 2014. (Advisor to Best Student Poster Presentation).
6. Wodorfa, D.; Liu, H. Application of iron activated persulfate for disinfection in water treatment. California-Nevada Sectional Conference of American Water Works Association Annual Spring Conference. Anaheim, CA. March 22-24, 2014.
5. Wodorfa, D.; Bruton, T.; Sedlak, D.L.; Liu, H. Applications of sulfate radical based oxidation system for groundwater remediation and water treatment. Association of Environmental Engineering and Science Professors Biennial Conference. Golden, CO. July 13-15, 2013.
4. Liu, H.; Bruton, T.; Sedlak, D.L.; Doyle, F. Oxidation of groundwater contaminants by persulfate: implications of radical chain mechanisms for kinetics and transformation product formation. Gordon Research Conference on Environmental Science: Water. Holderness, NH. June 24-29, 2012.
3. Liu, H.; Korshin, G.V.; Ferguson, J.F. Effects of desalinated water and its blends with treated surface water on copper and lead release. 5th International Water Association Young Water Professional Conference. Sydney, Australia. July 5-7, 2010 (poster).
2. Liu, H.; Korshin, G.V.; Ferguson, J.F. Blending of desalinated and surface water into a distribution system: effects on lead and copper corrosion. American Water Works Association Annual Conference and Exposition. San Diego, CA. June 14-18, 2009 (best students and young professionals poster).
1. Liu, H.; Korshin, G.V.; Ferguson, J.F. Blending of desalinated and surface water into a distribution system: effects on lead and copper corrosion. Annual Conference of Pacific Northwest Section of American Water Works Association. Salem, OR. May 6-8, 2009 (best student poster presentation).

Funded Research Projects

21. Graduate Assistance in Areas of National Need (GAANN) Fellowships in Chemical and Environmental Engineering (PI); *Department of Education*; 10/1/2018 – 9/30/2021; \$1,119,374.
20. Data-driven modeling and experimental investigation for discovery of aquatic chemistry reaction kinetics: new tools for water reuse applications (Co-PI, with Bryan Wong at UCR); *National Science Foundation – Environmental Chemical Science Program*; 12/1/2018 – 11/31/2021; \$439,301 (\$219,651 to my group)

19. NSF INTERN: Non-Academic Research Internships for Graduate Students Supplemental Funding (PI); *National Science Foundation – Environmental Engineering Program*; 9/1/2018– 8/31/2019; \$50,000
18. Understanding chromium accumulation in drinking water distribution system (PI); Coachella Valley Water District; 1/1/2018-12/31/2018; \$10,000
17. CAREER: Beyond conventional drinking water management: control of redox-driven *in situ* release of accumulated inorganic contaminants from water distribution infrastructure (PI); *National Science Foundation Faculty Early Career Development (CAREER) Program*; 4/1/2017 – 3/31/2022; \$512,320
16. GOALI: SusChEM: Experimental investigation of chloramine and persulfate aqueous photochemistry and development of efficient UV-based water reuse treatment (PI); *National Science Foundation – Environmental Chemical Science Program*; 9/1/2016 – 8/31/2019; \$300,000
15. Alliances for Graduate Education and the Professoriate - Graduate Research Supplements: chloramine and persulfate aqueous photochemistry and development of efficient UV-based water reuse treatment (PI); *National Science Foundation – Environmental Chemical Science Program*; 1/1/2017 – 12/31/2019; \$120,000
14. EAGER: Development of a novel *in situ* electrochemical tool to understand redox pathways of hexavalent chromium and its intermediate formation (PI); *National Science Foundation – Environmental Engineering Program*; 4/1/2016 – 3/31/2017; \$78,403
13. Deployment of a spectrum of bactericides to cure and prophylactically treat citrus green Huanglongbing (co-PI, with five UCR faculty members in Plant Pathology); *US Department of Agriculture – National Institute of Food and Agriculture*; 1/1/2017 – 12/31/2021; \$5,112,000 (\$380,301 to my group)
12. Fighting drought with stormwater: from research to practice (co-PI; with Stanley Grant at UC Irvine and seven faculty members at five UC campuses); *University of California Multi-campus Research Programs and Initiatives (MRPI)*; 01/01/2017 – 12/31/2019; \$1,135,304 (\$157,527 to my group)
11. Kinetics modeling and experimental investigation of chloramine photolysis in ultraviolet-driven advanced water treatment (PI); *Water Research Foundation*; 5/1/2017 – 9/1/2018; \$50,000
10. Cultivating diversity in agriculture - agriculture in the K-12 classroom challenge grants program (co-PI; with Milt McGiffen at UCR); US Department of Agriculture; 7/1/2016 – 9/31/2018; \$90,490 (\$30,163 to my group)
9. Development of efficient chloramine-based photochemical advanced oxidation processes for potable water reuse (PI); *Hellman Family Fund Foundation Fellowship*; 9/1/2016 – 8/31/2017; \$30,000
8. UCR-HBCU collaboration program: a summer program in research engineering (co-PI; with three faculty members at UCR); *UC Riverside Graduate Division*; 7/1/2016 – 8/31/2019; \$254,104 (\$84,701 to my group)

7. Beneficial treatment of inland desalination membrane concentrate (PI); *National Water Research Institute*; 1/1/2016 – 12/31/2016; \$15,000
6. Recovery of phosphorus from inland membrane concentrate waste (PI); *Metropolitan Water District of Southern California*; 9/1/2016 – 8/31/2017; \$15,000
5. Treatment of hexavalent chromium in brine waste (PI); *Corona Environmental Engineering Inc.*; 9/1/2015 – 11/30/2016; \$15,000
4. Understanding radical chemistry in UV/AOP system by pilot UV reactor studies (PI); *Orange County Water District*; 9/1/2015 – 8/31/2016; \$15,000
3. UCR collaborative seed grant on water engineering (PI); *UC Riverside Research Economic Development Program*; 7/1/2014 – 6/30/2016; \$32,000
2. Quantification of mercury valence states and its speciation in soil and subsurface at a historically contaminated hazardous site. *Department of Energy*; 5/1/2013 – 4/30/2015; \$28,043
1. Minimizing hexavalent chromium in Californian water: understanding hiding reaction pathways in drinking water and reinventing treatment Process (PI). *Department of Interior - US Geological Survey*; 4/1/2013 – 3/31/2014; \$25,000

Research Supervision

PhD Research

Graduated (3):

- Gongde Chen (Ph.D., 2018)
Topic: Reaction Mechanism and Kinetics of Reductive Transformation of Toxic Heavy Metals and Nitrate
Current Position: Postdoctoral Researcher at Penn State University.
- Lucy Li (Ph.D., 2017)
NSF Graduate Research Fellow
Topic: Sulfate radical-based oxidative processes for groundwater remediation and potable water reuse.
Current Position: Research Chemist at Metropolitan Water District of Southern California
- Michelle Chebeir (Ph.D., 2017)
NSF Graduate Research Fellow
Topic: Redox chemistry of chromium in drinking water distribution systems.
Current Position: Consulting Engineer with Hazen and Sawyer, Inc.

In progress (6):

- Samuel Patton (2014-present, Ph.D. expected in 2019)
NSF Graduate Research Fellow
Topic: UV photolysis of chloramines and its application in potable water reuse
- Tushar Jain (2014-present, Ph.D. expected in 2019)
Topic: Recovery and conversion of phosphorus antiscalant in membrane concentrate.
- John Orta (2016-present, advancement to candidacy expected in 2019)

Topic: Control of *in situ* release of inorganic contaminants from drinking water distribution systems.

- Cheng Tan (2017-present, advancement to candidacy expected in 2019)
Topic: Photochemically based reductive treatment of inorganic oxyanions.
- Liang Wu (2017-present, advancement to candidacy expected in 2019)
Topic: Bioassay-based toxicity investigation of transformation products in water reuse.
- Andrew Sanchez (2018-present, advancement to candidacy expected in 2020)
Topic: Physical-chemical process on the removal of chemical and biological contaminants.

Postdoctoral Research

In progress (3):

- Kiranmayi Mangalgi (2017-present)
Topic: UV advanced oxidation process for water reuse application.
- Sumant Avasarala (2017-present)
Topic: Metal speciation and removal in storm water by bio-retention units.
- Yiming Su (co-supervised, 2017-present)
Topic: Deployment of nanotechnology to cure and prophylactically treat citrus green Huanglongbing.

Masters Research

Graduated (2):

- Dawit Wordofa (M.S., 2015)
- Matthew Chen (M.S., 2016)

Undergraduate Research

- 30+ undergraduate students supervised from UC Riverside, Riverside Community College and San Bernardino Valley Community College.

High School Research

- 7 high school students supervised from Middle College High School in San Bernardino, and Martin Luther King High School in Riverside.

Courses Taught

Undergraduate:

ENVE 120: Unit Operation Processes in Environmental Engineering (4 quarter units)
ENVE 121: Biological Unit Processes (4 quarter units)
ENVE 142: Hazardous Waste Management (4 quarter units)
ENVE 160C: Environmental Engineering Lab (3 quarter units)

Graduate:

CEE 241: Water Chemistry (4 quarter units)
CEE 225: Unit Operation Processes in Environmental Engineering (concurrent with ENVE 120)
CEE 226: Biological Unit Processes (concurrent with ENVE 121)
CEE 250: Special Topics on Water Quality Engineering (1 quarter unit)
ENTX 200: Fate and Transport of Environmental Toxicants (co-taught, 4 quarter units)

Scholarly Activities

- Symposium organizer. *2013 IWA Conference on Metals in Water; 2013 ACS Colloidal Symposium; 2015 ACS Spring Meeting; 2015 Emerging Contaminant Summit; 2015 International Symposium on Persistent Toxic Substances; 2016 ACS Spring Meeting; 2016 ACS Fall Meeting; 2018 ACS Spring Meeting; 2019 ACS Fall Meeting.*
- Liaison, between the *Association of Environmental Engineering and Science Professors (AEESP)* and the *National Water Research Institute (NWRI)*, 2017- present.
- Committee Member, *American Water Works Association Emerging Contaminants Committee*, 2014-present.
- Executive Committee Member, *International Water Association Specialist Group on Metals and Toxic Substances in Drinking Water*. 2010-2016.
- Journal Reviewer, *ACS Sustainable Chemistry & Engineering; Applied Biochemistry and Biotechnology; Chemical Engineering Journal; Chemosphere; Desalination; Environmental Engineering Science; Environmental Science & Technology; Environmental Science & Technology Letters; Environmental Science: Nano; Environmental Science: Water Research & Technology; International Journal of Environmental Analytical Chemistry; PLOS Neglected Tropical Diseases; Journal of American Water Works Association; Journal of Applied Catalysis B: Environmental; Journal of Physical Chemistry; Science of the Total Environment; Water Research*, 2008-present.
- Proposal Review Panelist. *National Science Foundation; US Department of Agriculture; USGS Water Resources Program*, 2014-present.
- CEE Departmental Committee Service, Faculty Search Committee (2017-2018); Graduate Committee (2013-2016); Preliminary and Comprehensive Exam Committee (2013-present); AIChE Organizing Committee (2014); Graduate Preparation Program Committee (2015); Lecturer Review Committee (2015); departmental seminar organizer (2015-present).
- College of Engineering Committee Service, Lecturer Search Committee (2016); MS Online Program Instructor (2015-present).
- UCR Campus-level Service, Committee on Charges (2018-2021), serving on 29 PhD Candidacy Committees (16 CEE, 4 Environmental Toxicology, 4 Environmental Sciences, 2 Chemistry, 2 Mechanical Engineering and 1 Bioengineering); 13 Dissertation/Thesis Committees (6 CEE, 4 ETOX and 3 Environmental Sciences); 1 Search Committee (Environmental Sciences).
- Panelist, University of Washington Graduate Research Workshop. 2008-2010.
- Co-organizer, University of Washington College of Engineering Discovering Day, Development of scientific demonstration for public education service. 2006-2009.

Professional Affiliations

- American Chemical Society, 2007-present
- American Institute of Chemical Engineers, 2014-present
- American Water Works Association, 2007-present
- Association of Environmental Science and Engineering Professors, 2013-present
- International Water Association, 2005-present