

Hun Bok Jung

Associate Professor

Department of Earth and Environmental Sciences

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EDUCATION

2004-2009 Ph.D. Environmental Geochemistry & Hydrogeology, The Graduate Center, The City University of New York (CUNY), New York, NY

Thesis title: Fate, Reaction and Transport of Groundwater Arsenic during Discharge to Waquoit Bay, USA and Meghna River, Bangladesh

1997-1999 M.S. Environmental Geochemistry, Korea University, Seoul, South Korea

Thesis title: Geochemical behavior of trace elements in acid mine drainage of the Kwangyang mine area

1993-1997 B.S. Earth and Environmental Sciences, Korea University, Seoul, South Korea

EMPLOYMENT

Sept 2018-present Associate Professor, Earth and Environmental Sciences Department, New Jersey City University

Sept 2014-Aug 2018 Assistant Professor, Earth and Environmental Sciences Department, New Jersey City University

Jan 2011-Jan 2014 Postdoctoral Research Associate, Geosciences Group, Energy and Environment Directorate, Pacific Northwest National Laboratory

Sept 2009-Dec 2010 Postdoctoral Research Associate, Department of Geoscience, University of Wisconsin-Madison

Oct 1999-Jan 2003 Weather Forecaster (First lieutenant), Republic of Korea Air Force

RESEARCH INTEREST

1. Coupled hydrological and geochemical interaction between the terrestrial and marine environments
2. Biogeochemical cycling of nutrients and trace metals in urban estuaries
3. Role of nanopores and nanoparticles in sorption and redox behavior of toxic metals/metalloids and radionuclides

4. Impact of the leakage of carbon dioxide during geologic carbon sequestration on groundwater quality
5. Development of hydraulic fracturing fluid for enhanced geothermal systems and shale gas production
6. Hydrogeochemistry of arsenic in the aquifer of South Asia and USA
7. Reactive multi-component transport modeling in the subsurface
8. Geochemical behavior and speciation of heavy metals in coastal acid mine drainages

MEMBERSHIP

2015-present: American Chemical Society

2007-Present: American Geophysical Union

2006-Present: Geological Society of America

HONORS AND AWARDS

2016-2017: National Academies Education Fellow in Science

2013: Outstanding Performance Award (Pacific Northwest National Laboratory)

2008-2009: Mina Rees Dissertation Fellowship

2008: GSA Joint Annual Meeting Student Travel Fund

2007-2008: CUNY Graduate Center Doctoral Student Research Grant

2007-2008: The Sue Rosenberg Zalk Student Travel and Research Fund

2006-2007: CUNY Graduate Center University Fellowship

2004-2006: CUNY Graduate Center Science Fellowship

TEACHING EXPERIENCE

Fall 2014 – Fall 2018: Assistant & Associate Professor at NJCU; Principles of Environmental Science, Principles of Earth Science, Introduction to Oceanography, Our Planet Earth, Water Explorer, Earth Materials, Hydrology, Introduction to Geochemistry

Spring 2005 Spring – Spring 2008 (Total of 7 semesters): Adjunct Lecturer at Queens College, CUNY; Introduction to Environmental Science (ENSCI111) (Class consisted of a short lecture for scientific background, lab experimentation, or field trip; Topics covered air pollution, water quality, soil contamination, lake eutrophication, microbial contamination of water)

Spring 1998: Teaching Assistant at Korea Univ., Seoul; Introduction to Earth and Environmental Sciences (Topics covered petrology, stratigraphy, structural geology, geophysics, meteorology, oceanography)

INVITED TALKS

1. NJCU Practicing Professional Talks, April 25, 2016; Impacts of the Leakage of Carbon Dioxide on Wellbore Integrity and Groundwater Chemistry during Geologic Carbon Sequestration.
2. NJCU "Communication - Collaboration – Commendation" event for Earth Day, April 22, 2015; Arsenic in Groundwater Discharging to Surface Water.
3. Columbia Superfund Basic Research Program Seminar at Lamont-Doherty Earth Observatory, May 19, 2014; Spatial and temporal scales of redox trapping of groundwater arsenic through hyporheic zone in the Ganges-Brahmaputra-Meghna Delta.
4. The 4th International CCS (Carbon Capture and Storage) Forum, Seoul, South Korea, September 9-10, 2013; Geochemical Impacts of the Leakage of Carbon Dioxide on Wellbore Integrity and Groundwater Chemistry during Geologic Carbon Sequestration: Implications for the Development of Geochemical Monitoring Techniques.
5. Queens College Spring Colloquium, April 27, 2009; Geochemistry of Arsenic during Groundwater Discharge to Waquoit Bay, MA and Meghna River, Bangladesh.
6. Columbia Superfund Basic Research Program Seminar at Lamont-Doherty Earth Observatory, January 22, 2007; Arsenic and Groundwater Characteristics from Domestic Wells in Greater Augusta, Maine, USA.

PEER-REVIEWED JOURNALS

1. **Jung, H.B.**, Xu. H., Roden E.E. (2019) Long-term sorption and desorption of uranium in saprolite subsoil with nanoporous goethite. *Applied Geochemistry*, 102, 129-138.
2. **Jung, H.B.** (2017) Nutrients and Heavy Metals Contamination in an Urban Estuary of Northern New Jersey. *Geosciences (Switzerland)*, 7, 108.
3. **Jung, H.B.**, Zamora, F., Duzgoren-Aydin, N. S. (2017) Water Quality Monitoring of an Urban Estuary and a Coastal Aquifer Using Field Kits and Meters: A Community-Based Environmental Research Project. *Journal of Chemical Education*, 94, 1512–1516.
4. **Jung, H.B.**, Xu. H., Konishi, H., Roden E.E. (2016) Role of nano-goethite in controlling U (VI) sorption-desorption in subsurface soil. *Journal of Geochemical Exploration*, 169, 80-88.
5. Kabilan, S., **Jung, H.B.**, Kuprat, A.P., Beck, A.N., Varga, T., Fernandez, C.A., Um, W. (2016) Numerical Simulation of Permeability Change in Wellbore Cement Fractures after Geomechanical Stress and Geochemical Reactions using X-ray Computed Tomography Imaging. *Environmental Science and Technology*, 50, 6180-6188.
6. Um, W., Rod, K.A., **Jung, H.B.**, Brown, C.F. (2016) Geochemical alteration of wellbore cement by CO₂ or CO₂+ H₂S reaction during long-term carbon storage. *Greenhouse Gas: Science and Technology*, 6, 1–14; DOI: 10.1002/ghg.
7. **Jung, H.B.**, Zheng, Y., Rahman, M.W., Rahman, M.M., Ahmed, K.M. (2015) Redox zonation and oscillation in the hyporheic zone of the Ganges-Brahmaputra-Meghna Delta:

- Implications for the fate of groundwater arsenic during discharge. *Applied Geochemistry*, 63, 647-660.
8. Shao, H., Kabilan, S., Stephens, S., Suresh, N., Beck, A.N., Varga, T., Martin, P.F., Kuprat, A., **Jung H.B.**, Um, W., Bonneville, A., Heldebrant, D.J., Carroll, K.C., Moore, J., Fernandez, C.A. (2015) Environmentally friendly, rheoreversible, hydraulic-fracturing fluids for enhanced geothermal systems. *Geothermics*, 58, 22-31.
 9. **Jung, H.B.** Carroll, K.C., Kabilan, S., Heldebrant, D.J., Hoyt, D., Zhong, L., Varga, T., Stephens, S., Adams, L., Bonneville, A., Kuprat, A., and Fernandez, C.A. (2015). Stimuli-responsive/rheoreversible hydraulic fracturing fluids as a greener alternative to support geothermal and fossil energy production. *Green Chemistry (Royal Society of Chemistry)*, 17, 2799-2812.
 10. **Jung, H.B.**, Yang, J.S., and Um, W. (2015) Bench-scale electrokinetic remediation for cesium-contaminated sediment at the Hanford Site, USA. *Journal of Radioanalytical and Nuclear Chemistry*, 304, 615–625.
 11. **Jung, H.B.**, Kabilan, S., Carson, J.P., Kuprat, A.P., Um, W., Martin, P., Dahl, M., Kafentzis, T., Varga, T., Stephens, S., Arey, B., Carroll, K.C. Bonneville, A., Fernandez, C.A. (2014) Wellbore cement fracture evolution at the cement–basalt caprock interface during geologic carbon sequestration. *Applied Geochemistry*, 47, 1-16.
 12. **Jung, H.B.**, Um, W., Cantrell, K.J. (2013) Effect of Oxygen Co-Injected with Carbon Dioxide on Gothic Shale Caprock-CO₂-brine interaction during Geologic Carbon Sequestration. *Chemical Geology*, 354, 1-14.
 13. **Jung, H.B.** and Um, W. (2013) Experimental study of potential wellbore cement carbonation by various phases of carbon dioxide during geologic carbon sequestration. *Applied Geochemistry*, 35, 161-172.
 14. **Jung, H.B.**, Jansik, D., Um, W. (2013) Imaging wellbore cement degradation by carbon dioxide under geologic sequestration condition using X-ray computed microtomography. *Environmental Science and Technology*, 47, 283–289.
 15. **Jung, H.B.**, Boyanov, M., Konishi, H., Sun, Y., Mishra, B., Kemner, K., Roden, E., Xu, H. (2012) Redox Behavior of Uranium at the Nanoporous Aluminum Oxide-Water Interface: Implication for Uranium Remediation. *Environmental Science and Technology*, 46, 7301–7309
 16. Yang, Q., **Jung, H.B.**, Marvinney, R., Culbertson, C, Zheng, Y. (2012) Can arsenic occurrence rates in bedrock aquifers be predicted? *Environmental Science and Technology*, 46, 2080-2087.
 17. **Jung, H.B.**, Bostick, B., Zheng, Y. (2012) Field, Experimental, and Modeling Study of Arsenic Partitioning across a Redox Transition in a Bangladesh Aquifer. *Environmental Science and Technology*, 46, 1388-1395.
 18. **Jung, H.B.**, Yun, S.T., Kwon, J.S., Zheng, Y. (2012) Role of iron colloids in copper speciation during neutralization in a coastal acid mine drainage, South Korea: Insight from voltammetric analyses and surface complexation modeling. *Journal of Geochemical Exploration*, 112, 244-251.

19. Datta, S., Mailoux, B., **Jung, H.B.**, Hoque, M.A., Stute, M., Ahmed, K.M., Zheng, Y. (2009) Redox trapping of arsenic during groundwater discharge in sediments from the Meghna riverbank in Bangladesh. *Proceedings of the National Academy of Sciences*, 40, 16930-16935.
20. **Jung, H.B.**, Charette, M., Zheng, Y. (2009) Field, laboratory and modeling study of reactive transport of groundwater arsenic in a coastal aquifer. *Environmental Science and Technology*, 43, 5333-5338.
21. Yang, Q., **Jung, H.B.**, Culbertson, C.W., Marvinney, R.G., Loiselle, M.C., Locke, D.B., Cheek, H., Thibodeau, H., Zheng, Y. (2009) Spatial Pattern of Groundwater Arsenic Occurrence and Association with Bedrock Geology in Greater Augusta, Maine, USA. *Environmental Science and Technology*, 43(8): 2714-2719.
22. van Geen, A., Radloff, K., Aziz, Z., Cheng, Z., Huq, M.R., Ahmed, K.M., Weinman, B., Goodbred, S., **Jung, H.B.**, Zheng, Y., Berg, M., Trang, P.T.K., Charlet, L., Metral, J., Tisserand, D., Guillot, S., Chakraborty, S., Gajurel, A.P., Upreti, B.N. (2008) Comparison of arsenic concentrations in simultaneously-collected groundwater and aquifer particles from Bangladesh, India, Vietnam, and Nepal. *Applied Geochemistry*, 23 (11): 3244-3251.
23. **Jung, H.B.** and Zheng, Y. (2006) Enhanced recovery of arsenite sorbed onto synthetic oxides by L-ascorbic acid addition to phosphate solution: calibrating a sequential leaching method for the speciation analysis of arsenic in natural samples. *Water Research* 40 (11): 2168-2180.
24. **Jung, H.B.**, Yun, S.T., Kim, S.O., Jung, M.C., So, C.S., Koh, Y.K. (2006) In-situ electrochemical measurements of total concentration and speciation of heavy metals in acid mine drainage (AMD): assessment of the use of anodic stripping voltammetry. *Environmental Geochemistry and Health* 28 (3): 283-296.
25. Keimowitz, A.R., Zheng, Y., Chillrud, S.N., Mailloux, B., **Jung, H.B.**, Stute, M., Simpson, H.J. (2005) Arsenic redistribution between sediments and water near a highly contaminated source. *Environmental Science and Technology* 39 (22): 8606-8613.
26. **Jung, H.B.**, Yun, S.T., Mayer, B., Kim, S.O., Park, S.S., Lee, P.K. (2005) Transport and sediment-water partitioning of trace metals in acid mine drainage: An example from the abandoned Kwangyang Au-Ag mine area, South Korea. *Environmental Geology* 48 (4-5): 437-449.
27. Yun, S.T., **Jung, H.B.**, So, C.S. (2001) Transport, fate and speciation of heavy metals (Pb, Zn, Cu, Cd) in mine drainage: Geochemical modeling and anodic stripping voltammetric analysis. *Environmental Technology* 22 (7): 749-770.

BOOKS AND REPORTS

1. Serne, R.J., Westsik, J.H., Williams, B.D., **Jung, H.B.**, Wang, G. (2015) Extended Leach Testing of Simulated LAW Cast Stone Monoliths. PNNL-24297, Pacific Northwest National Laboratory, Richland, WA.
2. Um, W, **Jung, H.B.**, Kabilan, S., Suh, D.M., and Fernandez, C.A. (2014) Geochemical and Geomechanical Effects on Wellbore Cement Fractures: Data Information for Wellbore Reduced Order Model. PNNL-23148, Pacific Northwest National Laboratory, Richland, WA.

3. Um, W.; **Jung, H.B.**; Wang, G.; Westsik, J.H.; Peterson, R.A. (2013) Characterization of Technetium Speciation in Cast Stone. PNNL-22977. Pacific Northwest National Laboratory, Richland, WA.
4. Um, W.; Wang, G.; **Jung, H.B.**; Peterson, R.A. (2013) Technetium Removal Using Tc-Goethite Coprecipitation. PNNL-22967. Pacific Northwest National Laboratory, Richland, WA.
5. Cantrell, K.J.; Shao, H.; Zhong, L; Thompson, C.J.; **Jung, H.B.**; Um, W. (2012) FY 12 ARRA-NRAP Report – Studies to Support Risk Assessment of Geologic Carbon Sequestration. NRAP Technical Report Series, NRAP-TRS-III-001-2012.
6. Um, W., **Jung, H.B.** (2012) Results of Laboratory Scale Fracture Tests on Rock/Cement Interfaces. PNNL-21446, Pacific Northwest National Laboratory, Richland, WA.
7. Xu, H. and **Jung, H.B.** (2012) Role of Nanopores in Regulating Reactivity and Transport of Uranium in Subsurface Sediments. In: Barnard A.S. and Guo H. (Eds.), Nature's nanostructure. Pan Stanford Publishing, Australia, pp. 195-216.
8. Hess NJ, M Oostrom, MA Celia, M Hilpert, Q Kang, LJ Pyrak-Nolte, TD Scheibe, AM Tartakovsky, CJ Werth, D Wildenschild, C Zhang, SE Bialkowski, TA Ghezzehei, G Tang, F Doster, J Kumar, R Parashar, R Gerlach, H Yoon, GD Redden, T Zhang, H Huang, J Nogues, W Deng, H Resat, KA Rod, DR Baer, RT Kelly, W Um, G Wang, MC Richmond, DR Rector, ML Stewart, **HB Jung**, and C Plata. (2011) EMSL Pore Scale Modeling Challenge/Workshop. PNNL-21086, Pacific Northwest National Laboratory, Richland, WA.
9. Um, W., **Jung, H.B.**, Martin, P.F., McGrail, B.P. (2011) Effective Permeability Change in Wellbore Cement with Carbon Dioxide Reaction. PNNL-20843. Pacific Northwest National Laboratory, Richland, WA.

CONFERENCE ABSTRACTS

1. American Chemical Society National Meeting & Exposition, Philadelphia, August 21-25, 2016. **Jung, H.B.**, Xu, H., Konishi, H., Roden, E.E. Nanoporous Goethite Controlling the Mobility of Uranium in Saprolite Subsoil: Long-term Sorption and Desorption Experiments
2. Geological Society of America Annual Meeting, Baltimore, November 1-4, 2015. Zamora, F., **Jung, H.B.**, McAlinden, J., Rivera, C., Mejia, D., Bryant, J., Aydin, N. Water and Sediment Quality of Urban Rivers in New Jersey.
3. Geological Society of America Annual Meeting, Baltimore, November 1-4, 2015. Zamora, F., **Jung, H.B.** Submarine Groundwater Discharge of Nutrients from Urban Coastal Aquifers in New York.
4. AGU Annual Fall Meeting, San Francisco, December 9-13, 2013. **Jung, H.B.**, Kabilan, S., Carson, J., Kuprat, A., Um, W., Carroll, K.C., Bonneville, A., Fernandez, C. "Coupled X-ray Microtomography Imaging and Computational Fluid Dynamics Modeling for Evaluation of Wellbore Cement Fracture Evolution"
5. AGU Annual Fall Meeting, San Francisco, December 3-7, 2012. **Jung, H.B.**, Um, W. "Experimental Study of Potential Wellbore Cement Carbonation by Various Phases of Carbon Dioxide during Geologic Carbon Sequestration"

6. The 11th Annual Carbon Capture, Utilization & Sequestration Conference, Pittsburgh, April 30-May 3, 2012. **Jung, H.B.** Um. W., Cantrell K.J. “Effect of impurity oxygen on mobilization of toxic contaminants from a seal rock by supercritical carbon dioxide”
7. The 11th Annual Carbon Capture, Utilization & Sequestration Conference, Pittsburgh, April 30-May 3, 2012. Um. W., **Jung, H.B.** “Cement carbonation by various phases of carbon dioxide along the wellbore”
8. GSA Annual Meeting, Denver, October 31-November 3, 2010. **Jung, H.B.**, Xu, H., Konishi, H. Roden, E. “Redox Behavior of Uranium on Nanoporous Surfaces of Aluminum Oxide”
9. Goldschmidt Conference, Knoxville, June 13-18, 2010. Sun, Y., Xu, H., **Jung, H.B.**, Konishi, H., Chen, T., Roden, E.E. “The effect of nanopores on U(VI) adsorption/desorption at mineral-solution interface”
10. AGU Chapman Conference on Arsenic in Groundwater of Southern Asia, Siem Reap, Cambodia, March 24-27, 2009. **Jung, HB**, Zheng, Y, Bostick, B, Ahmed, KM “Geochemistry of Arsenic during Groundwater Discharge in the Ganges-Brahmaputra-Meghna Delta”
11. GSA Annual Meeting, Houston, October 5-9, 2008. **Jung, HB**, Charette, MA, Zheng, Y, “A Field, Laboratory and Modeling Study on Reactive Transport of Arsenic in a Coastal Aquifer”
12. GSA Annual Meeting, Houston, October 5-9, 2008. Zheng, Y, **Jung, HB**, Bostick, B “Arsenic Speciation and Iron Mineralogy in Sediment from Meghna and Brahmaputra River Banks of Bangladesh”
13. Second International Congress: Arsenic in the environment, Valencia, Spain, May 21-23, 2008. **Jung, HB**, Zheng, Y, Datta, S, Rahman, MW, Rahman, MM, and Ahmed, KM, “Geochemical Characterization of a Natural Reactive Barrier for Arsenic in the Sediments of Brahmaputra and Meghna River Banks, Bangladesh”
14. Ra-Rn workshop: Measurement and Application of Radium and Radon Isotopes in Environmental Sciences. Venice, Italy, April 7-11, 2008 **Jung, HB**, Charette, MA, Zheng, Y, “Immobilization of Groundwater Arsenic by Oxidation and Sorption to Iron Oxyhydroxides during Groundwater Discharge in a Subterranean Estuary”
15. Maine Water Conference, Augusta, March 21, 2007. **Jung HB**, Yang, Q, Culbertson, C, Marvinney, R, Loiselle, M, Locke, D, Cheek, H, Thibodeau, H, and Zheng, Y, “Groundwater Arsenic from Domestic Wells in Greater Augusta, Maine, USA”

PROFESSIONAL EXPERIENCE

Peer reviewer for “Environmental Science and Technology”, “Geochimica et Cosmochimica Acta”, “Chemical Geology”, “Chemosphere”, “Environmental Pollution”, “Environmental Earth Sciences”, “Journal of Geochemical Exploration”, “Environmental Engineering Science”, “Journal of Hazardous Materials”, “Current Pollution Report”, “Applied Water Science”, “Water Science and Technology” and “Geobiology and Low-Temperature Geochemistry Program of the National Science Foundation”

TRAINING AND WORKSHOPS

1. Earth Educators' Rendezvous 2017; July 17-21, 2017, University of New Mexico, Albuquerque
2. Workshop for Early Career Geoscience Faculty; July 24-28, 2016, University of Maryland
3. The 2016 Helmsley/National Academies Summer Institute on Undergraduate Education; June 12-16, 2016, University of Connecticut
4. NSF's Improving Undergraduate STEM Education (IUSE) Proposal Writing Workshop ; May 14-17, 2015, University of South Florida, Tampa, FL
5. Productivity Seminar of Thermo Scientific; September 23, 2014, Princeton Marriott Hotel, Princeton, NJ
6. Fundamentals of CO₂ Capture & Storage; July 31-August 1, 2012, PNNL
7. EMSL User Meeting 2011-Microscopy Workshop; September 13 and 14, 2011, EMSL, PNNL
8. Pore-scale Modeling Workshop; August 9 and 10, 2011, Environmental Molecular Sciences Laboratory (EMSL), PNNL
9. Short course in X-ray absorption fine-structure (XAFS) spectroscopy: Introduction to XAFS: Experiment, Theory, Data Analysis; October 30-November 1, 2008, Brookhaven National Laboratory
10. Short Course in Coupled Geochemical & Transport Modeling; August 6-10, 2007, Colorado School of Mines, Golden, CO

RESEARCH GRANT PROPOSALS

1. 2018 PI, NJCU Separately Budgeted Research (SBR), Title: Submarine Groundwater Discharge of Anthropogenic Nutrients from Urban Coastal Aquifers to the Newark Bay in New Jersey. \$4,550, funded
2. 2017 PI, NJCU Separately Budgeted Research (SBR), Title: Environmental Impacts of Combined Sewer Overflows on Water Quality in an Urban Watershed of Hudson County, New Jersey. \$4,250, funded
3. 2017 PI (with Co-PIs, EunSu Lee, Deborah Freile, Natalia Coleman, Kaixuan Bu), Environmental Protection Agency, Title: Geospatial Association between Risk of Chromium Exposure and House and Street Dust Chromium in Hudson County, New Jersey, an Urban Community Impacted by Historic Chromate Production Wastes. \$607,705, unfunded.
4. 2017 PI (with Co-PIs, Deborah Freile), National Fish and Wildlife Foundation – Five Star and Urban Waters Restoration Program, Title: Citizen Science Water Quality Monitoring in the Urban Watershed of the Newark Bay and Lower Hackensack River Estuary. \$40,295, unfunded.

5. 2016 Co-PI (with PI, Natalia Coleman), National Science Foundation, Title: NSF REU Site at NJCU: Distribution and Impact of Contaminants in an Urban Environment, \$281,808, unfunded.
6. 2016 PI, NJCU Separately Budgeted Research (SBR), Title: Human Impact on Biogeochemical Cycling of Nutrients in the Passaic and Hackensack Rivers in Urban New Jersey, \$4,250, funded
7. 2015 PI (with Co-PIs, Nurdan Aydin and Vanashri Nargund), National Science Foundation, Title: Getting Their Feet Wet: A Transformative Research Experience for First Year Environmental Science Students, \$298,290, unfunded.
8. 2015 PI, NJCU Separately Budgeted Research (SBR), Title: Coupled Geochemical and Hydrological Control on the Transport and Fate of Anthropogenic Contaminants in the Hyporheic Zone of Urban Coastal Aquifers, \$4,100, funded.
9. 2012 Co-PI (with Kenneth Carroll, Carlos Fernandez, David Heldebrandt, and Alain Bonneville) EMSL (Environmental Molecular Science Laboratory) User Proposal, Title: Fracking optimization and in-situ characterization of rock permeability and fracture distributions, approved.
10. 2012 Co-PI (with Eirik Krogstad and Kirk Cantrell) EMSL (Environmental Molecular Science Laboratory) User Proposal, Title: Elemental mobility in carbon dioxide reservoir caprocks, approved.
11. 2012 Co-PI (with Wooyong Um, Jaehun Chun, and Guohui Wang), Title: Development of supercritical CO₂-in-water macroemulsion for both enhancing shale gas production and reducing environmental contamination. FY-2013 Laboratory Directed Research and Development (LDRD) projects, \$400,000, declined.
12. 2010 Co-PI (with Huifang Xu and Chongxuan Liu), Title: Remediation of U(VI) Contaminated Aquifer Using Colloidal Nanoporous Alumina: Laboratory Column Experiments for In-situ Application of Chemical Barrier. DOE/ Office of Biological and Environmental Research, \$479,473, declined.

SKILLS

Aqueous analysis: HR ICP-MS (High-Resolution Inductively coupled plasma mass spectrometry), IC (Ion Chromatography), Cathodic or Anodic Stripping Voltammetry, AAS (Atomic Absorption Spectroscopy), Auto-titrator

Solid analysis: XRD, XAS (X-ray Absorption Spectroscopy), Surface Area and Pore Size Analyzer, SEM-EDS, XMT

Numerical modeling: Visual MINTEQ, PHREEQC, and Visual MODFLOW

FIELDWORK EXPERIENCES

1. Hackensack River, Passaic River, and Newark Bay (June and July 2015-2018): Sampling of river water, riverbed sediments, groundwater and field measurements of water quality.

2. Staten Island (June and July 2015): Sampling of coastal groundwater and seawater, as well as aquifer sediments; Field measurement of water quality; Permeability measurements and sediment particle size analyses.
3. Waquoit Bay, MA (June 2007): Sampling of coastal groundwater and aquifer sediment; Field measurement of Fe and As; Sorption experiment of As.
4. Vietnam (April 2006): Sampling of riverbank sediment and well groundwater.
5. Bangladesh (Jan 2006, Oct-Nov 2007): Sampling of riverbank sediment, pore water, and well groundwater; Seepage meter measurement of groundwater discharge; Field measurement of Fe and As; Sorption experiment of As.

COLLABORATORS

Yan Zheng (SUSTech; LDEO, Columbia Univ.), Alexander van Geen, Martin Stute, Steven Chillrud, Benjamin Bostick (LDEO, Columbia Univ.), Brian Mailloux (Barnard College, Columbia Univ.), Matthew Charette (Woods Hole Oceanographic Institution), Saugata Datta (Kansas State University), Alison Keimowitz (Vassar College), Kazi Matin Ahmed (Dhaka University), Huifang Xu, Eric Roden (UW-Madison), Seong-Taek Yun (Korea University). Maxim Boyanov (Argonne National Lab), Wooyong Um (POSTECH), Nik Qafoku, Kirk Cantrell, Carlos A. Fernandez, David Heldebrant (Pacific Northwest National Lab), Kenneth Carroll (New Mexico State University)