

**Li Li, Ph.D**

Associate Professor

Department of Civil & Environmental Engineering

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**EDUCATION**

Princeton University	Environmental Engineering & Water Resources	Ph.D.	2005
Nanjing University (PRC)	Environmental Chemistry	M.S.	1999
Nanjing University (PRC)	Environmental Chemistry	B.S.	1996

**PROFESSIONAL EXPERIENCE**

8/2016 -	Associate Professor, Dept. Civil & Environmental Engr., Penn State University
7/2015- 8/2016	Associate Professor, Dept. Energy & Mineral Engr., Penn State University
9/2009-05/2015	Assistant Professor, Dept. Energy & Mineral Engr., Penn State University
9/2007-9/2009	Research Scientist Lawrence Berkeley National Laboratory (LBNL), Earth Sciences Division (ESD)
9/2005-8/2007	Geological Postdoctoral Fellow, LBNL, ESD

**RESEARCH INTERESTS**

My group works at the interface of water resources, multiphase flow, biogeochemistry, and environmental engineering. In particular, we are interested in understanding complex interactions between flow, transport, and multi-component biogeochemical reactions in natural systems. We are particularly interested in 1) understanding general principles that govern complex process coupling from scales as small as the pore scale to as large as the watershed scale; 2) developing process-based modeling tools for predictions and for solutions to water and energy related problems in changing climate. We have worked on multiple topics at the nexus of water, energy, and environment, including, for example, enhanced hydrocarbon and geothermal energy recovery, contaminant reactive transport and bioremediation, geological carbon sequestration, and water and biogeochemical cycles at the watershed scale.

**RECENT HONORS, AWARDS, AND RECOGNITIONS**

1. Invited participant for US Frontiers of Engineering Symposium, National Academy of Engineering, 2015
2. Wilson award for excellence in teaching, Penn State University, 2015
3. Wilson initiation award, Penn State University, 2010
4. One of the 10 most cited article since 2008 in the Journal of Contaminant Hydrology, by Li Li, Carl I. Steefel, Michael B. Kowalsky, Andreas Englert, and Susan S. Hubbard, 2010, 112(1-4): 45-63
5. One of the top 25 hottest articles in Geochimica Et Cosmochimica Acta, by Li Li, Carl I. Steefel, and Li Yang, 2008
6. One of the top 25 hottest articles in Advances in Water Resources, by Li Li, Catherine A. Peters, and Michael A. Celia, 2006

**AWARDS TO ADVISEES**

1. Michael Cavazza, 3rd place winner in the Society of Petroleum Engineers (SPE) student paper contest on September 28, 2016, at the SPE Annual Technical Conference and Exhibition in Dubai, United Arab Emirates

2. Miguel Santana and Cintia Vasquez, 1st place winner in research presentation competition in the Summer Experience in EMS (SEEMS) as part of the Upward Bound Math and Science (UBMS) Summer Residential Program. Miguel Santana and Cintia Vasquez are high school students working in the Li reactive transport lab under the guidance of graduate student Zhang Cai in June - July 2016.
3. Hang Wen, Best poster award to in the "Minerals/Gas/Fracking" categories on Energy Days, May 2016
4. Michael Cavazza, 1<sup>st</sup> place winnder in the SPE Northeastern region student paper contest, April, 2016
5. Gregory Kojadinovich, 3rd place winner in the Penn State SPE student paper contest, March, 2016
6. Michael Cavazza, 1<sup>st</sup> place winner in the Penn State SPE student paper contest, March, 2016
7. Michael Cavazza, 1st place winner in the Grundy Haven Student Paper Contest, February, 2016
8. Michael Cavazza, 2<sup>nd</sup> place winnder in the SPE Northeastern region student paper contest, April, 2015
9. Michael Cavazza, Undergraduate Merit Award (1 out of 200 students), Dept. Energy & Mineral Engineering, Penn State, April, 2015
10. Li Wang, student Travel Award from the DOE office of sciences Subsurface Biogeochemical Research (SBR) PI meeting in May 6-7, 2014
11. Chen Bao, Centennial Research Travel Award, College of the Earth and Mineral Sciences, Penn State, May 2014
12. Chen Bao, Graduate Merit award, Dept. Energy & Mineral Engineering, Penn State, May 2014
13. Peyman Heidari, Charles B. Darrow award, Dept. Energy & Mineral Engineering, Penn State, May 2013
14. Peilin Cao, 1<sup>st</sup> place in poster presentation competition in the Energy and Engineering category, Carbon Conference of CarbonEARTH, February, 2012
15. Evan Frye, Geological Society of America (GSA) Research Grant, 2010

**PUBLICATIONS** (Google scholar: >1,000, h-index: 17, [https://scholar.google.com/citations?user=DJvp\\_4EAAA AJ&hl=en](https://scholar.google.com/citations?user=DJvp_4EAAA AJ&hl=en))

\*Indicates my student and postdoc advisees

**A. Peer-reviewed journal publications - published:  
2017**

1. **Li, L.**, K. Maher, A. Navarre-Sitchler, J. Druhan, C. Meile, C. Lawrence, J. Moore, J. Perdrial, P. Sullivan, A. Thompson, L. Jin, E. W. Bolton, S. Brantley, W. Dietrich, K. U. Mayer, C. I. Steefel, A. Valocchi, J. Zachara, B. Kocar, J. Mcintosh, B. M. Tutolo, M. Kumar, E. Sonnenthal, C. Bao, J. Beisman. 2016. Expanding the Role of Reactive Transport Models in Earth Surface Processes. Earth Science Reviews. 10.1016/j.earscirev.2016.09.001
2. \*Bao, C., **L. Li**, Y. Shi, C. Duffy. Understanding hydrogeochemical processes at the watershed scale: 1. Development of RT-Flux-PIHM. Water Resources Research (in revision)
3. **L. Li**, C. Bao, Y. Shi, P. L. Sullivan, S. Brantley, C. Duffy. Understanding hydrogeochemical processes at the watershed scale: 2. Concentration-discharge relationships of chloride and magnesium. Water Resources Research (in revision)
4. \*Wen, H., and **L. Li**. A Rate Law of Magnesite Dissolution in Heterogeneous Porous Media: the Role of Residence Time and Effective Surface Area. Geochimica Et Cosmochimica Acta. (in revision)
5. Cheng, Y., C. G. Hubbard, L. Zhang, B. Arora, **L. Li**, J. B. Ajo-Franklin, and N. Bouskill. Next Generation Modeling of Microbial Souring – Parameterization through Genomic Information. International Biodeterioration & Biodegradation (in revision)

6. \*Qiao, C., R. Johns, and L. Li. 2017. Understanding the Chemical Mechanisms for Low Salinity Waterflooding in Carbonates. Journal of Petroleum Science & Engineering (in revision)
7. \*Heidari, P, L. Li, L. Jin, S. L. Brantley. Understanding Controls of Marcellus Shale Weathering Using Reactive Transport Modeling. Submitted to Geochimica Et Cosmochimica Acta (submitted August 2016)

**2016**

8. \*Zhang, C. and L. Li. 2016. How long do natural waters “remember” release incidents of Marcellus Shale waters: a first order approximation using reactive transport modeling. Geochemical Transactions. 17: 6. doi:10.1186/s12932-016-0038-4
9. Cheng, Y., C. G. Hubbard, L. Li, N. Bouskill, S. Molins, L. Zhang, E. Sonnenthal, A. Engelbrekton, J. D. Coates, and J. B. Ajo-Franklin. 2016. Understanding Microbial Reservoir Souring and Remediation: A Reactive Transport Model of Sulfur Cycling as Impacted by Nitrate and Perchlorate Treatments. Environmental Science & Technology. 50(13), 7010-7018. Doi: 10.1021/acs.est.6b00081
10. \*Cao, P., Z. T. Karpyn, L. Li. 2016. The role of host rock properties in determining potential CO<sub>2</sub> migration pathways. International Journal of Greenhouse Gas Control 45: 18-26. doi: 10.1016/j.ijggc.2015.12.002
11. \*Brunet, J. L., L. Li, Z. T. Karpyn, N. J. Huerta. 2016. Fracture opening or self-sealing: Critical residence time as a unifying parameter for diverging cement fracture evolution during CO<sub>2</sub>-cement-brine interactions. International Journal of Greenhouse Gas Control. 47: 25–37. doi:10.1016/j.ijggc.2016.01.024
12. \*Qiao, C., R. Johns, L. Li. 2016. Modeling low salinity flooding in mineralogically different carbonate reservoirs. Energy & Fuels, 30 (2), pp 884–895. doi: 10.1021/acs.energyfuels.5b02456
13. Carroll, S., J. W. Carey, D. Dzombak, N. J. Huerta, L. Li, T. Richard, W. Um, S. D.C. Walsh, L. Zhang. 2016 Review: Role of Chemistry, Mechanics, and Transport on Well Integrity in CO<sub>2</sub> Storage Environments. International Journal of Greenhouse Gas Control. 49 (2016): 149–160. doi:http://dx.doi.org/10.1016/j.ijggc.2016.01.010
14. \*Wen, H., L. Li, D. Crandall, A. Hakala. 2016. Where Lower Calcite Abundance Creates More Alteration: Enhanced Rock Matrix Diffusivity Induced by Preferential Dissolution. Energy & Fuels. DOI: 10.1021/acs.energyfuels.5b02932

**2015**

15. \*Cao, P., Z. T. Karpyn, L. Li. 2015. Self-healing of cement fractures under dynamic flow of CO<sub>2</sub>-rich brine. Water Resources Research, 51, 4684–4701, doi:10.1002/2014WR016162.
16. \*Qiao, C., L. Li, R.T. Johns, and J. Xu. 2015. Compositional modeling of reaction-induced injectivity alteration during CO<sub>2</sub> flooding in carbonate reservoirs. SPE Journal
17. \*Qiao, C., L. Li, R.T. Johns, J. Xu. 2015. A mechanistic model for wettability alteration by chemically tuned water flooding in carbonate reservoirs. SPE Journal, DOI: 10.2118/170966-PA
18. \*Salehikhoo, F., L. Li. 2015. The role of mineral spatial patterns in determining magnesite dissolution rates: when does it matter? Geochimica Et Cosmochimica Acta. doi; 10.1016/j.gca.2015.01.035.
19. \*Wang, L. and L. Li. 2015. Illite spatial distribution patterns regulate Cr(VI) sorption macrocapacity and macrokinetics. Environmental Science & Technology. 49: 1374-1383, doi: 10.1021/es503230f

**2014**

20. \*Zhang, L., D. Li, L. Li, D. Lu. 2014. Development of a new compositional model with multi-component sorption isotherm and slip flow in tight gas reservoirs. Journal of Natural Science & Engineering. 21: 1061–1072. doi:10.1016/j.jngse.2014.10.029
21. \*Heidari, P., and L. Li. Solute transport in low heterogeneous sandboxes: the role of correlation length and permeability variance. Water Resources Research. doi:10.1002/2013WR014654

22. Hubbard, C. G., Cheng, Y., Engelbrekton, A., Druhan, J. L., **Li, L.**, Ajo-Franklin, J. B., John D Coates, J. D., Conrad, M. E., 2014. Isotopic insights into microbial sulfur cycling in oil reservoirs. Frontiers in Microbiology. doi: 10.3389/fmicb.2014.00480
23. \*Bao, C., \*Wu, H., **Li, L.**, Williams, K. H., Long, P., and Newcomer, D., 2014. Uranium bioreduction rates across scales: biogeochemical hot moments and hot spots during a field biostimulation experiment at Rifle, Colorado. Environmental Science & Technology 48(17): 10116 - 10127. doi: 10.1021/es501060d.
24. **Li, L.**, \*Salehikhoo, F., Brantley, S. L., \*Heidari, P. 2014. Spatial zonation limits magnesite dissolution in porous media. Geochimica Et Cosmochimica Acta. 10.1016/j.gca.2013.10.051
25. Wu, Y., \*Surasani, V. K., **Li, L.**, Hubbard, S. S. 2014. Geophysical monitoring and reactive transport simulations of bioclogging processes induced by *leuconostoc mesenteroides*. Geophysics. 79(1), E61–E73. doi: 10.1190/geo2013-0121.1

### 2013

26. \*Surasani, V.K., **Li, L.**, Ajo-Franklin, J. B., Hubbard, C., Hubbard, S. S., and Wu, Y. 2013. Controls of selective bioclogging by *L. mesenteroides*: a reactive transport modeling study in a sandstone reservoir. Energy & Fuels. DOI: 10.1021/ef401446f
27. Zhang, L., Dzombak, D., Nakles, D., \*Brunet, J., **Li, L.** 2013. “Reactive transport modeling of interactions between acid gas (CO<sub>2</sub> + H<sub>2</sub>S) and pozzolan-amended wellbore cement under geologic carbon sequestration conditions.” Energy & Fuels. DOI: 10.1021/ef401749x
28. \*Vilcáez, J., **Li, L.**, Hubbard, S. S. 2013. A new model for the biodegradation kinetics of dispersed oil droplets: Application to marine oil spills. Geochemical Transactions. 14:4. DOI: 10.1186/10.1186/1467-4866-14-4.
29. \*Brunet, J. L., **Li, L.**, Karpyn, Z. T., Kutchko, B. G., Strazisar, B., Bromhal, G. 2013. Dynamic evolution of compositional and transport properties under conditions relevant to geological carbon sequestration. Energy & Fuels. 27 (8), pp 4208–4220. DOI: 10.1021/ef302023v.
30. \*Cao, P., Karpyn, Z. T., **Li, L.** 2013. Dynamic changes in wellbore cement integrity due to geochemical reactions in CO<sub>2</sub>-rich environments. Water Resources Research. 49(7): 4465-4475. DOI: 10.1002/wrcr.20340.
31. \*Vilcaez, J., **Li, L.**, Wu, D., and S. S. Hubbard. 2013. Reactive transport modeling of induced selective plugging by *L. Mesenteroides* in carbonate formations. Geomicrobiology Journal 30, 813–828, doi: 10.1080/01490451.2013.774074
32. \*Salehikhoo, F., **Li, L.**, Brantley, S. L. 2013. Magnesite dissolution rates at different spatial scales: effects of mineral spatial distribution and flow velocity. Geochimica Et Cosmochimica Acta. 108: 91-106.

### 2012

33. \*Frye, E., Bao, C., **Li, L.**, Blumsack, S. 2012. Environmental controls of cadmium desorption during CO<sub>2</sub> leakage. Environmental Science & Technology. 46(8): 4388–4395. doi: 10.1021/es3005199

### 2011

34. **Li, L.**, \*Gawande, N., Kowalsky, M. B., Steefel, C. I., and Hubbard, S. S. 2011. Physicochemical heterogeneity controls of uranium, bioreduction rates at the field scale. Environmental Science & Technology. 45 (23): 9959–9966. doi: 10.1021/es201111y.
35. Singha, K., **Li, L.**, Day-Lewis, F. D., and Regberg, A. B. 2010. Quantifying solute transport processes: are chemically “conservative” tracers electrically conservative? Geophysics. 76: F53-F63. doi: 10.1190/1.3511356.

### 2010

36. **Li, L.**, Steefel, C. I., Kowalsky, M. B., Englert, A., and Hubbard, S. S. 2010. Effects of physical and geochemical heterogeneities on mineral transformation and biomass accumulation during a biostimulation experiment at Rifle, Colorado. Journal of Contaminant Hydrology. 112: 45-63. doi: 10.1016/j.jconhyd.2009.10.006 (one of the 25 hottest articles of JCH during the period of January to March 2010).

#### 2009

37. **Li, L.**, Steefel, C. I., Williams, K. H., Wilkins, M. J., and Hubbard, S. S. 2009. Mineral transformation and biomass accumulation during uranium bioremediation at Rifle, Colorado. Environmental Science & Technology. 43(14): 5429–5435. doi: 10.1021/es900016v.
38. Englert, A., Hubbard, S. S., Williams, K. H., **Li, L.**, Steefel, C. I. 2009. Feedbacks Between Hydrological Heterogeneity and Bioremediation Induced Biogeochemical Transformations. Environmental Science & Technology. 43 (14): 5197–5204 doi: 10.1021/es803367n.
39. Chen, J. S., Hubbard, S. S., Williams, K. H., Pride, S., **Li, L.**, Steefel, C., Slater, L. 2009. A state-space Bayesian framework for estimating biogeochemical transformations using time-lapse geophysical data. Water Resources Research. 45, W08420. DOI: 10.1029/2008WR007698

#### 2008

40. **Li, L.**, Steefel, C. I., and Yang, L. 2008. Scale dependence of mineral dissolution kinetics within single pores and fractures. Geochimica Et Cosmochimica Acta. 72: 360-377, doi:10.1016/j.gca.2007.10.027. (one of the 25 hottest articles of the journal during the period of January to March 2008).

#### 2007

41. **Li, L.**, Peters, C. A., and Celia, M. A. 2007. Effects of mineral spatial distributions on reaction rates in porous media. Water Resources Research, 43, W01419, doi:10.1029/2005WR004848.
42. **Li, L.**, Peters, C. A., and Celia, M. A. 2007. Applicability of averaged concentrations in determining reaction rates in heterogeneous porous media. American Journal of Science, 307: 1146-1166, doi: 10.2475/10.2007.02.
43. **Li, L.**, Peters, C. A., and Celia, M. A. 2007. Reply to “comments on upscaling geochemical reaction rates using pore-scale network modeling” by Peter C. Lichtner and Qingjun Kang. Advances in Water Resources. 30: 691-695.

#### 2006

44. **Li, L.**, Peters, C. A., and Celia, M. A. 2006. Upscaling geochemical reaction rates using pore-scale network modeling. Advances in Water Resources 29: 1351—1370 (one of the 25 hottest articles of the journal during the period of September to December 2006).

#### 2005 and earlier

45. Xu, S., **Li, L.**, Tan, Y., Feng, J., Wei, Z., and Wang, L. 2000. Prediction and QSAR analysis of toxicity to *Photobacterium phosphoreum* for a group of heterocyclic nitrogen compounds. Bulletin of Environmental Contamination and Toxicology. 64(3): 316--322.
46. **Li, L.**, Yang, H., Ding, Y., and Wang, L. 1999. Prediction of  $\log K_w$  using MCIs and LSER methods for heterocyclic nitrogen compounds. Journal of Liquid Chromatography & Related Technologies. 22(6): 897--907.
47. **Li, L.**, Wang, L., Han, S., and Zhang, Z. 1999. Comparison of four methods of predicting newly measured octanol/water coefficients ( $\log K_{ow}$ ) for heterocyclic nitrogen compounds and the partition mechanism. Environmental Toxicology & Chemistry, 18(12): 2723--2728.

#### B. Peer-reviewed journal publications – in review:

#### C. Conference Papers

1. Qiao, C., Johns, R. T., Li, L., Xu, J. 2015. Modeling Low Salinity Waterflooding in Mineralogically Different Carbonates. 2015. SPE Annual Technical Conference and Exhibition, Houston, Texas, USA.

2. Li, L., K. Maher, and A. Navarre-Sitchler. 2014. Expanding the Role of Reactive Transport Modeling in Biogeochemical Sciences. *Eos Transactions*, American Geophysical Union. 95(35): 316-316.
3. Duffy, C., Y. Shi, K. Davis, R. Slingerland, L. Li, P. L. Sullivan, Y. Godd eris, S. L. Brantley. 2014. Designing a System of Models to Understand the Critical Zone. *Procedia in Earth and Planetary Sciences*. August 18-22, 2014 Coll ge des Bernardins, Paris 5th, France.
4. Qiao, C., L. Li, R.T. Johns, and J. Xu. 2014. Compositional modeling of reaction-induced injectivity alteration during CO2 Flooding in carbonate reservoirs. *SPE Annual Technical Conference and Exhibition*, Amsterdam, The Netherlands, 27–29 October 2014. SPE 170930.
5. Qiao, C., L. Li, R.T. Johns, J. Xu. 2014. A mechanistic model for wettability alteration by chemically tuned water flooding in carbonate reservoirs. *SPE Annual Technical Conference and Exhibition*, Amsterdam, The Netherlands, 27–29 October 2014. SPE 170966.
6. Crandall, D., Wen, H., Li, L., and Hakala, A. 2014. Reactive geochemical flow modeling with scanned rock fractures. Proceedings of the ASME 2014 4th Joint US-European Fluids Engineering Division Summer Meeting and *11th International Conference on Nanochannels, Microchannels, and Minichannels*. FEDSM2014-21579, August 3-7, 2014, Chicago, Illinois, USA
7. Deng H., J.P. Fitts, C.A. Peters, L. Li, D. Crandall, G.S. Bromhal. 2013. Experimental study of reactive flow in an Eau Claire fracture exposed to CO2-rich brine. *American Rock Mechanics Association*, paper 13-592.
8. Binning, P.J., Celia, C.A., and Li, L. 2006. Pseudokinetics arising from the upscaling of equilibrium. In *proceedings of the XVI International Conferences on Computational Methods in Water Resources*, edited by P.J. Binning, P.K.Engesgaard, H.K. Dhale, G.F. Pinder, and W.G. Gray, Copenhagen, Denmark.
9. Peters, C.A., Lewandowski, J.A., Maier, M.L., Celia, C.A., and Li, L. 2006. Mineral grain spatial patterns and reaction rate up-scaling. In *Proceedings of the XVI International Conferences on Computational Methods in Water Resources*, edited by P.J. Binning, P.K.Engesgaard, H.K. Dhale, G.F. Pinder, and W.G. Gray, Copenhagen, Denmark.
10. Li, L., Peters, C.A., and Celia, M.A. 2004. Upscaling calcite dissolution rates using network model simulations. (Peer Reviewed). In *Water-rock Interactions: Proceedings of the Eleventh International Symposium on Water-rock Interactions*, edited by R. B. Wanty and R.R. Seal II, p961-965.

#### ADVISEES:

**Completed:** (current position in parenthesis)

##### Postdocs:

1. Nitin Gawande 2011 (research scientist, Pacific Northwestern National Laboratory)
2. Javier Vilcaez 2011 (assistant professor, Oklahoma State University)
3. Hongfei Wu 2012 (engineer at Halliburton, Houston)
4. Vikranth K. Surasani 2013 (assistant professor, Birla Institute of Science and Technology, India)

##### PhD students:

5. Peilin Cao 2014 (engineer, Chevron)
6. Fatemeh Salehikhoo 2014 (postdoc, University of Wyoming)
7. Peyman Heidari 2014 (assistant professor, Missouri University of Science & Technology)
8. Li Wang 2015 (assistant professor, Xi'an Jiaotong University, China)
9. Changhe Qiao 2015 (Quantitative research associate, Susquehanna International Group)
10. Chen Bao 2015 (engineer, Shell)

##### Msc students:

11. Rebecca Fogarty 2014 (engineer, Baker Hughes)
12. Mariya Skocik 2014 (engineer, Chevron)
13. Jessie Tse-Hua Chao 2014 (research assistant, University of British Columbia)

14. Evan Frye 2011 (U.S. Energy Information Administration (EIA))

Undergraduate students with honors thesis:

15. Robert Follet 2012 (engineer, Chevron)  
16. Michael Cavazza 2016 (engineer, Shell)

**In progress:**

PhD students:

17. Jean-Patrick Leopold Brunet (expected 2017)  
18. Hang Wen (expected 2017)  
19. Zhang Cai (expected 2017)  
20. Dacheng Xiao (expected 2019)  
21. Wei Zhi (expected 2019)

Undergraduate Schreyer honors scholars:

22. Gregory Kojadinovich (expected 2018)  
23. Sruthi Kakuturu (expected 2017)

Undergraduate for Research Experience:

24. Christian Alvarado  
25. Megan Smajda  
26. Kriston Ramdass

**INVITED SEMINARS AND PRESENTATIONS**

**2016**

1. “Synchronized hydrogeochemical processes drive chemostatic behavior,” AGU fall session, Dec. 12 – 16, 2016
2. “Understanding hydrogeochemical processes at the watershed scale”, University of Tübingen, Tübingen, October 13, 2016
3. “Bridging computational bridges between biogeochemistry, hydrology, and climate sciences”, Advances in Mathematical and Computational Climate Modeling Workshop, aka: AXICCS workshop, Rockville, MD, September 12-13, 2016
4. “Biogeochemical interactions across scales”, Jilin University, Jilin, July 25, 2016

**2015**

5. “Predictive Understanding of Biogeochemical Reactions in Heterogeneous Porous Media.” Annual meeting of Geological Society of America, Baltimore, Maryland, November 1-4, 2015.
6. “Reactive transport modeling as a powerful tool for understanding and predicting transport and fate of contaminants in natural waters”, Penn State Water Resources Webinar, October 28, 2015.
7. “RT-Flux-PIHM: A Coupled Hydrological, Land Surface, and Reactive Transport Model for Hydrogeochemical Processes at the Watershed Scale.”, Peking University, July 20, 2015
8. “Controls of biogeochemical processes across scales.” Tsinghua University, July 17, 2015
9. “Controls of biogeochemical processes across scales and across disciplines”, China University of Geosciences, July 15, 2015
10. “Nature is an artist: why and how does it relate to water and energy?” Today at Millennium Café. Penn State University, Feb. 17, 2015

**2014**

11. “When water meets rock: controls of spatial heterogeneities across scales”, Dept. Energy and Mineral Engineering, Penn State University, University Park, Sept 18, 2014.
12. “When water meets rock: controls of spatial heterogeneities across scales”, Dept. Energy, Environmental, and Chemical Engineering, departmental colloquium, Washington University at St. Louis, Sept 5, 2014.
13. “When water meets rock: chemical weathering across scales.” 4th CUAHSI Biennial Colloquium on Hydrologic Science and Engineering, Shepherdstown, WV, July 28 -30, 2014.

14. “Unravelling Controls on Marcellus Shale Weathering”, session 16e, Goldschmidt conference, Sacramento, June 6 - 11, 2014.
15. “Expanding the role of reactive transport modeling in biogeochemical sciences.” DOE Office of Sciences TES-SBR joint PI meeting, Washington, DC, May 6-7, 2014.

**2013**

16. “Heterogeneity controls of water-rock interactions.” Dept. Civil & Environmental Engineering, University of Illinois at Urbana-Champaign, July 17, 2013.
17. “Cement-CO<sub>2</sub> interactions: chemistry-induced porosity and permeability evolution.” NETL Reduced Order Models (ROM) workshop, Carnegie Mellon University, June 7th, 2013.
18. “Geologic Carbon Sequestration: Possibility and Impacts of CO<sub>2</sub> Leakage.” Saint Francis University, Feb. 1st, 2013.

**2012**

19. “Water-rock interaction: what is the role of geochemical hot spots?” PSU water talks, University Park, PA, Nov. 5, 2012.
20. “Reactive transport modeling: an integration tool for understanding subsurface geochemical processes.” Geochemistry workshop, National Energy and Technology Laboratory, Pittsburgh, PA, June 18, 2012.
21. “Microbe-Enhanced hydrocarbon recovery and Marcellus related water issues”, Department of Energy Office of Sciences Subsurface Biogeochemistry Research Program PI meeting breakout session on “Subsurface Biogeochemical Processes Associated with Energy Production, Usage, and Storage”, Washington, D. C., April 30 – May 2, 2012.
22. “Cement degradation under conditions relevant to geological carbon sequestration.” graduate seminar, Dept. Civil and Environmental Engineering, Geotechnical program, Penn State University, State College, PA, April 27, 2012.
23. “Understanding controls of physicochemical heterogeneity on field scale U(VI) bioreduction rates: challenges and future directions.” Lawrence Berkley National Laboratory Scientific Focus Area (SFA) All Hands meeting, Berkeley, CA, Jan. 12-13, 2012.

**2011**

24. “Geologic carbon sequestration: possibility and environmental impacts of CO<sub>2</sub> leakage.” graduate seminar, Dept. Civil and Environmental Engineering, Penn State University, State College, PA, November 9, 2011.
25. “Environmental Impacts of Geological Carbon Sequestration.” Penn State - Peking University Multi-workshops on PKU-Penn State University Academic Exchange Day, Peking, China, May 18, 2011.
26. “The Issue of Scaling in Understanding Reactive Transport Processes in Subsurface.” DOE Office of Science Subsurface Biogeochemistry Research (SBR) PI meeting, Washington DC, April 26-28, 2011.

**2010**

27. “When is Small Scale Information Important in Determining Large Scale Mineral Dissolution Rates?”, Abstract H44A-07 presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec. 2010.
28. “Geological carbon sequestration research at Penn State.” Penn State Energy Day, Washington, DC, Nov. 19, 2010.
29. “Effects of physical and chemical heterogeneities on biogeochemical processes associated with uranium bioremediation at Rifle, Colorado.” DOE Office of Science Environmental Remediation Science Program (ERSP) PI meeting, Washington DC, March 29-31, 2010.

**2009**

30. “Reactive transport processes in natural porous media: research opportunities and applications.” EME 590 colloquium, October 15, 2009.
31. “Effects of physical and geochemical heterogeneities in biogeochemical processes and implications for uranium bioremediation.” CEKA All Hands meeting, October 1, 2009.

32. “Mineral Reaction Kinetics in Heterogeneous Porous Media during Geologic CO<sub>2</sub> Sequestration.” Dept. Energy and Mineral Engineering, Penn State University, April 27, 2009.

#### 2008

33. “Effects of physical and chemical heterogeneities on biogeochemical processes associated with uranium bioremediation at Rifle, Colorado.” American Geophysical Union 2008 Fall Meeting, San Francisco, December 15--19, 2008.
34. “Geochemical reaction kinetics under conditions relevant to geological carbon sequestration. ” Dept. Geosciences, Penn State University, May 1st, 2008.
35. “Uranium bioremediation and biogeochemical reaction rates in heterogeneous porous media. ” University of Iowa, March 11, 2008.

#### 2007

36. “Biogeochemical reaction rates in heterogeneous porous media at multiple spatial scales.” Lehigh University, March 27, 2007.
37. “Biogeochemical reaction rates in heterogeneous porous media at multiple spatial scales.” Harvard University, March 12, 2007.

#### 2005

38. “Scaling of geochemical reaction kinetics using pore-scale network modeling.” University of California, Davis, October 24, 2005.
39. “Scaling of geochemical reaction kinetics using pore-scale network modeling.” Penn State University, Center of Environmental Kinetic Analysis (CEKA) All Hands meeting, September 14, 2005.
40. “Scaling of geochemical reaction kinetics using pore-scale network modeling.” Lawrence Berkeley National Lab, Earth Sciences Division, May 9, 2005.

#### INVITED WORKSHOP AND PANEL PARTICIPATION

1. Advances in Mathematical and Computational Climate Modeling Workshop, aka: AXICCS workshop, Washington, DC, September 12-13, 2016
2. Invited participant, U.S. Department of Energy’s (DOE) Office of Biological and Environmental Research (BER) workshop on “Multiscale Computation: Needs and Opportunities for BER Science”, Washington, D.C., August 26, 2014
3. Invited participant, presenter, and session summary writer for the breakout session on “Building better models for model practitioners”, DOE Office of Sciences TES-SBR joint PI meeting, Washington, DC, May 6-7, 2014.
4. Invited panelist, plenary session titled “Fossil Fuel Microbiology/Souring, The Energy Bioscience Institute (EBI) Retreat Planning Committee (ERPC), University of Illinois at Urbana Champaign, July 15 – 17, 2013.
5. Invited participant, National Science Foundation (NSF): An Earth Cube Domain Workshop integrating the inland-waters geochemistry, biogeochemistry and fluvial sedimentology communities. Boulder, Colorado, April 24-26, 2013.
6. Invited participant, Community Surface Dynamics Modeling Systems (CSDMS) 2.0: moving forward. Boulder, Colorado, March 23 – 25, 2013.
7. Invited panelist, Department of Energy Office of Sciences Subsurface Biogeochemistry Research Program PI meeting breakout session on “Subsurface Biogeochemical Processes Associated with Energy Production, Usage, and Storage”, Washington, D. C., April 30 – May 2, 2012.
8. National Science Foundation (NSF) Science, Engineering, and Education for Sustainability (SEES) Workshop: Natural and Engineered Carbon Sequestration. Minneapolis, Minnesota, Oct. 7-8, 2011.
9. Department of Energy Office of Sciences Subsurface Biogeochemical Research (SBR) workshop on data management, Washington, D. C., April 28-29, 2011.

10. Department of Energy joint workshop on carbon sequestration and geothermal energy science (“To identify key issues common to carbon sequestration and geothermal energy”), Maryland, June 15-17, 2010.

**COMPLETED AND CURRENT PROJECTS (my share totals \$2,821,682, out of approximately \$7,500, 000)**

<b>Project Description (In progress)</b>		<b>Role</b>	<b>Period</b>	<b>Amount</b>
<b>1</b>	Li et al. “Understanding Ecohydrological Controls of Biogeochemical Reactions and Fluxes at the Watershed Scale”, DOE Subsurface Biogeochemistry Research (SBR)	PI (co-PI: Kaye, Shi)	09/01/2016 – 08/30/2018	\$180,000
<b>2</b>	Li, L. “Redefining Reactive Surface Area: Understanding Reactive Interfaces in Heterogeneous Porous Media”, National Science Foundation (NSF)	PI	07/01/15 - 06/30/18	\$193,050
<b>3</b>	Brantley et al. “Using the Susquehanna - Shale Hills CZO to Project from the Geological Past to the Anthropocene Future.” National Science Foundation (NSF)	Co-PI	10/01/13 – 9/30/18	\$700,000 out of 5,000,000
<b>4</b>	Silva et al., “Understanding characteristics of hyper saline waters from deep aquifers for geological carbon sequestration.”	Co-PI with J. Silva et al.	09/01/15 – 02/28/17	\$99,825
<b>Project Description (Completed)</b>				
<b>5</b>	Li, L. “Understanding, predicting, and preventing reservoir souring.” BP, subcontract through Energy Biosciences Institute (EBI) at UC Berkeley.	PI	01/01/14 – 12/31/15	\$95,000
<b>6.</b>	Li, L. “Geochemical transformations caused by CO <sub>2</sub> injection or leakage.” Department of Energy National Energy Technology Laboratory (NETL).	PI	01/01/11 – 12/31/11	\$38,038
<b>7.</b>	Li, L. “Multiphase Reactive Transport Processes Associated with Wellbore Cement Degradation during CO <sub>2</sub> Leakage.” Department of Energy National Energy Technology Laboratory (NETL).	PI	01/01/11 – 02/29/12	\$62,100
<b>8.</b>	Li, L. “Quantifying the environmental impacts of carbon leakage on water quality.” College of Earth and Mineral Sciences, Wilson Initiation research grant	PI	07/01/10 – 06/31/11	\$10,000
<b>9.</b>	Li, L. “Reactive transport processes associated with microbe-enhanced oil recovery.” BP, subcontract through Energy Biosciences Institute (EBI) at UC Berkeley.	PI	12/11/09 – 08/14/11	\$59,771
<b>10.</b>	Li, L. “Biodegradation of oil spill and their environmental impacts.” BP, subcontract through Energy Biosciences Institute (EBI) through UC Berkeley.	PI	12/11/09 – 12/31/11	\$99,771

11.	Li, L. “Reactive Transport Processes in Microbe-Enhanced Hydrocarbon Recovery (MEHR): Process Understanding and Optimization.” BP, subcontract through Energy Biosciences Institute (EBI) at UC Berkeley.	PI	01/01/2012 – 12/31/2013	\$175,000
12.	Li, L. “Geochemical modeling integration of isotope signatures.” Department of Energy National Energy and Technology Laboratory (NETL)	PI	11/15/12 – 09/30/13	\$66,040
13.	Li, L. “Development of reactive transport models for CO <sub>2</sub> leakage”, Department of Energy National Energy and Technology Laboratory (NETL)	PI	10/01/11 – 6/30/13	\$180,000
14.	Li, L. “Develop a General Quantitative Framework to Understand, Quantify, and Predict the Evolution of Single Fracture Properties and to Accommodate the Opposing Observations on "Fracture Opening"”, Department of Energy National Energy and Technology Laboratory (NETL)	PI	10/23/2013 - 06/30/2014	\$70,000
15.	Li, L. “Clogging process during field scale biostimulation.” Department of Energy Office of Sciences Subsurface Biogeochemical Research (SBR). Subcontract through Lawrence Berkeley National Laboratory (LBNL).	PI	12/11/09 – 09/30/13	\$279,414
16.	Li, L. and Brantley, S. L. “Development of a Subsurface Reactive Transport Model for Predicting Potential Water Quality Problems at Marcellus Shale.” The Pennsylvania Water Resources Research Center (PA-WRRC).	PI	03/01/11 – 05/31/13	\$9,000 out of \$18,000
17.	Blumsack, S., Li, L., Nieto, A., and Riggs, R. J. “Risk-informed Site Assessment and Selection for the Long-term Geologic Disposal of CO <sub>2</sub> .” Department of Energy National Energy Technology Laboratory (NETL).	Co-PI	01/01/11 – 02/29/12	\$18,389 out of \$73,436
18.	Li, L. “NRAP 3rd Generation ROM Release and Transport Through Wells.” Department of Energy National Energy and Technology Laboratory (NETL)	PI	11/15/2013 – 11/14/2014	\$89,277
19.	Li, L. “Integration of Multiple Natural Tracer Signals in Reactive Transport Modeling.” Department of Energy National Energy and Technology Laboratory (NETL)	PI	11/15/2013 – 11/14/2014	\$63,000
20.	Li, L., Russel Johns. “Development of a coupled compositional and reactive transport model for gas flooding reservoir applications.” Gas Flooding Joint Industry Project.	Co-PI	08/01/11 – 05/31/15	\$108,894
21.	Li, L, Maher K., and Navarre-Sitchler, A. “Expanding the role of Reactive Transport Modeling	PI	02/01/14 – 02/28/15	\$50,000

	(RTM) within the Biogeochemical Sciences.” National Science Foundation.			
22.	Li, L. “Optimizing parameters for predicting the geochemical behavior and performance of discrete fracture networks in geothermal systems “, U.S. Department of Energy Efficiency and Renewable Energy Golden Field Office (DOE EERE)	co-PI	06/01/12 – 11/15/14	\$149,628 Out of \$1,050,000
23.	Li, L. “Scaling effects of Cr(VI) reduction kinetics: the role of geochemical heterogeneities”, Department of Energy Subsurface Biogeochemical Research Program (DOE SBR).	PI	9/01/11 – 5/31/15	\$150,000
24.	Liu et al., “3D Data Acquisition and 3D Printing to Construct “Digital Twins”, PSIEE seed grant	co-PI with X. Liu (PI) and W. Burgos	03/15/15 – 06/30/16	\$8,000 out of \$25,000
<b>Total of my share of completed and current funding</b>				<b>\$2,821,682</b>

**COURSES in Civil & Environmental Engineering**

1. CE 370: Introduction to Environmental Engineering (SP17)
2. CE 475: Water Quality Chemistry (SP18)
3. CE 574: Reactive Transport Processes (SP17, SP18)
4. CE 592: Literature Review (FA 16)
5. CE 591: Kappe Seminar series (FA 17)

**COURSES in Energy & Mineral Engineering**

1. PNG 410: Applied reservoir engineering (SP10, SP11, SP12, SP13, SP14, SP15)
2. PNG 420: Reservoir analysis and secondary recovery (FA10, FA11, FA12, FA13, FA14, FA15)
3. PNG 411: Introduction to oil and gas extraction (FA 12, FA13, FA14, FA15)
4. PNG 550: Reactive transport in subsurface (FA 10, FA11, FA12, SP26)

**SERVICE TO THE DISCIPLINE AND PROFESSION**

1. Conference session organizer:
  - 1) Computational Methods in Water Resources (CMWR) session organizer (with Christof Meile), “Modeling hydrobiogeochemical processes across scales”, June 20 – 24, Toronto, Canada
  - 2) AGU Fall meeting session organizer (with Sally Thompson, Harry Vereecken, and Lejo Flores) “Modeling the Critical Zone: Integrating Processes and Data across Disciplines and Scales”, Dec. 12 – 16, 2016, San Francisco, CA
  - 3) AGU Fall meeting session organizer (with Pamela Sullivan, Tom Meixner, Hari Rajaram) “Modeling the Critical Zone: Integrating Processes and Data across Disciplines and Scales, Dec. 14 – 18, 2015, San Francisco, CA
  - 4) Session co-organizer with Peter Jaffe, Phil Long, and Lucie N'Guessan. American Geophysical Union (AGU) Fall meeting, Session H17: Bioreductive immobilization of Trace Metals and Radionuclides: Mechanisms, Models, and Sustainability. December 11 – 15, San Francisco, CA
2. Workshop organizer:

- 1) Organizer of NSF workshop with Kate Maher (Stanford University) and Alexis Navarre-Stichler (Colorado School of Mines). “Expanding the role of reactive transport modeling in biogeochemical sciences.” Washington, DC, April 13 – 15, 2014
3. Invited proposal review panel:
  - 1) NSF, Low temperature geochemistry and geobiology, April 27 – 29, 2015
  - 2) DOE, SBR, Oak Ridge National Laboratory scientific focus area on Mercury Biogeochemistry by SBR, DOE, April 17, 2015
4. Invited workshop participation
  - 1) “Multiscale Computation: Needs and Opportunities for BER Science”, sponsored by the Environmental Molecular Sciences Laboratory (EMSL) in coordination with DOE Office of Biological and Environmental Research (BER), Washington, DC, August 26, 2014
  - 2) National Science Foundation (NSF): An EarthCube Domain Workshop integrating the inland-waters geochemistry, biogeochemistry and fluvial sedimentology communities. Boulder, Colorado, April 24-26, 2013.
  - 3) Community Surface Dynamics Modeling Systems (CSDMS) 2.0: moving forward. Boulder, Colorado, March 23 – 25, 2013.
  - 4) Invited panelist, National Science Foundation (NSF) Science, Engineering, and Education for Sustainability (SEES) Workshop: Natural and Engineered Carbon Sequestration. Minneapolis, Minnesota, Oct. 7-8, 2011.
  - 5) Invited panelist, Department of Energy Office of Science Subsurface Biogeochemical Research (SBR) workshop on Data Management, Washington, D. C., April 28 - 29, 2011.
  - 6) Invited panelist, plenary session titled “Fossil Fuel Microbiology/Souring”, The Energy Bioscience Institute (EBI) Retreat Planning Committee (ERPC), University of Illinois at Urbana Champaign, July 15 – 16, 2013.
  - 7) Invited panelist, Department of Energy Office of Sciences, Biological and Environmental Research Program, PI meeting breakout session on “Subsurface Biogeochemical Processes Associated with Energy Production, Usage, and Storage”, Washington, D. C., April 30 – May 2, 2012.
  - 8) Invited panelist and writer, Department of Energy joint workshop on carbon sequestration and geothermal energy science (“To identify key issues common to carbon sequestration and geothermal energy”), Maryland, June 15-17, 2010.
  - 9) “Geological carbon sequestration research at Penn State.” Penn State Energy Day, Washington, DC, Nov. 19, 2010.
5. Committee:

2015 – present, PSU representative, Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI)
6. Journal Reviewer:

Advances in Water Resources, Chemical Geology, Critical Reviews in Environmental Science & Technology, Energy & Fuels, Environmental Science & Technology, Fuel Processing Technology, Geochimica Et Cosmochimica Acta, Geofluids, Industrial & Engineering Chemistry Research, Journal of Contaminant Hydrology, Journal of Hydrology, Journal of Natural Gas Science & Engineering, Journal of Petroleum Exploration and Production Technology, Journal of Petroleum Science and Engineering, Mathematical Geosciences, Science of the Total Environment, Scientific Reports, Water Resources Research, Vadose Zone Journal,
7. Proposal Reviewer and review panel:

NSF, Division of Earth Sciences (Hydrology, Geobiology and low-temperature geochemistry, Marine geosciences), DOE (Basic Energy Sciences, Subsurface Biogeochemical Research (SBR), Office of Sciences), US-Israel Binational Foundation, Stanford Synchrotron beamline, Consortium for Clean Coal Utilization (CCCU), Canadian Research Councils (the Social

Sciences and Humanities Research Council (SSHRC), the Natural Sciences and Engineering Research Council (NSERC), and the Canadian Institutes of Health Research (CIHR)

### **SERVICE TO THE DEPARTMENT, COLLEGE, AND UNIVERSITY**

1. Record of committee work at campus, college, department, and university levels
  - 1) CEE Teaching Performance and Review Committee (Fall 2016 – Spring 2017)
  - 2) CEE Geotechnical engineering search committee (Fall 2016 – Spring 2017)
  - 3) Earth system modelling search committee (Fall 2016)
  - 4) EME Faculty activity evaluation committee (Spring 2015)
  - 5) EME Faculty search committee member in CEE (InGaR position) (Fall 2014 - 2015)
  - 6) EME Faculty search committee member in PNG E (InGaR position) (Fall 2014 - 2015 )
  - 7) Rotating member of the SSHCZO executive committee (Fall 2014 – 2015 )
  - 8) Data management contact for SSHCZO (Spring 2014 – )
  - 9) Chair for SSHCZO seed grant proposals (Fall 2013 – Summer 2014)
  - 10) Host for Darcy Lecturer, Dorte Wildenschild (Oct. 1-2, 2014)
  - 11) Member, 2013 Faculty Activity Analysis Committee for EME, April 2014
  - 12) Reviewer for PSIEE seed grant (Spring 2014)
  - 13) EME departmental representative of the EMS Diversity council (Fall 2013 – Spring 2016)
  - 14) Member, EME Leone Chair search committee (Spring 2013)
  - 15) Member, EME energy engineering faculty search committee (Spring 2013)
  - 16) Member, 2013 Faculty Activity Analysis Committee for Department of Energy and Mineral Engineering, Spring 2013
  - 17) Member, 2012 Faculty Activity Analysis Committee for Department of Energy and Mineral Engineering, Spring 2013
  - 18) Member, PSIEE water series committee, August 2012 – May 2013
  - 19) Member, 2011 Faculty Activity Analysis Committee for Department of Energy and Mineral Engineering, April 2012
  - 20) Member, PSIEE competitive postdoc committee, May – December 2012
  - 21) Member on PhD Candidacy exam committees for 16 students, as noted in the previous section
  - 22) Member, PNG senior faculty search committee (Fall 2009 – Spring 2010)
  - 23) Member, Earth and Environmental Systems Institute (EESI) committee on annual workshop series (Spring 2010)
2. Record of contribution to the University's programs to enhance equal opportunity and cultural diversity
  - 1) In summer 2016, my group, together with Roman Dibiase's group, hosted two students supported by Research Experience for Undergraduates (REU): Perri Hannah Silverhart and Martin Connor. Perry presented her work at the annual meeting of Geological Society of America (GSA), 2016.
  - 2) In summer 2016, my group hosted a high school student team from underrepresented group in my laboratory (Miguel Santana and Cintia Vasquez), as part of the 2016 Summer Experience in the Earth and Mineral Sciences (SEEMS) program within the Penn State Upward Bound Math and Science (UBMS) Summer Academy for UBMS scholars. The goal of this activity is to enhance education opportunities for underrepresented high school students. One of my graduate students, Zhang Cai, led this activity. In the final research presentation competition, our team won the first place within all SEEMS teams, and won first place in all SEEMS and SEECoS (College of Science) teams.
  - 3) In summer 2012, my group hosted a high school student team from underrepresented group in my laboratory (Sierra Anderson , Chris Zurita, Fonseca, and Jermayne Jones), as part of the 2012 Summer Experience in the Earth and Mineral Sciences (SEEMS) program within the Penn State Upward Bound Math and Science (UBMS) Summer Academy for UBMS scholars. The goal of this

activity is to enhance education opportunities for underrepresented high school students. One of my graduate student, Jessie Chao, led this activity. In the final research presentation competition, our team won the first place within all SEEMS teams, and won third place in all SEEMS and SEECoS (College of Science) teams.

- 4) I mentored 3 undergrads from underrepresented groups, including 2 females. Among these, Stephanie Troutman is the first 3+2 student from Fort Valley State University, a Historically Black College in Georgia. Stephanie is the first African American female FVSU student who graduated with an Engineering degree from PSU.

### 3. Assistance to student organizations

- 1) Judge for student presentation in the 19th Annual Environmental Chemistry and Microbiology Student Symposium, April, 2016.
- 2) Judge for student presentation in the 18th Annual Environmental Chemistry and Microbiology Student Symposium, March, 2015.
- 3) Judge for student presentation in the 17th Annual Environmental Chemistry and Microbiology Student Symposium, March 29, 2014.
- 4) Judge for EMS Annual Graduate Student Poster Exhibition, September 29, 2011.
- 5) Judge for 27th Graduate Exhibition, March 23 -25, 2012
- 6) Judge for 2012 Undergraduate Exhibition, April 11, 2012
- 7) “Shell Robert Camp”.

I was the faculty coordinator for the Shell Robert Camp in 2010 and 2012. Shell camp is an Engineering training at Shell's Robert training center. Penn State students from geosciences, petroleum and natural gas, chemical, and mechanical engineering receive training in petroleum production operations, drilling techniques, and state-of-the-art subsea technologies in Robert, Louisiana. I was the faculty coordinator for Shell camp in May 9-14, 2010 and May 13-17, 2012. Forty four (44) participated in 2010 and Twenty five (25) participated in 2012. My role in the Shell camp include setting up information session, coordinating with Shell personnels for scheduling the camp, arranging for transportations, and travelling together with the students to the camp in Robert, Louisiana.

### SERVICE TO THE SOCIETY

- 1) Critical Zone concept exhibition, Shaver's Creek Nature's Center, May 27, 2016
- 2) “Climate change and why it is a global problem?”, Radio Park Elementary School, 2<sup>nd</sup> grade classroom (Mrs. Mary Robert), State College, March 2016
- 3) “Climate change and why it is a global problem?”, Radio Park Elementary School, 4<sup>th</sup> grade classroom (Mrs. Julie Jobe), State College, March 2016
- 4) Science demonstration on “Water” for kindergarteners at Bennett Center, PSU, May, 2012, 2014
- 5) Science demonstration on “Water” for 3rd graders at Radio Park Elementary school, State College, December, 2014

### CONFERENCE PRESENTATIONS

1. Bao, C., Li, L., Shi, Y., Sullivan, P., Brantley, S. L., Duffy, C. Development of RT-Flux-PIHM: Understanding Hydrogeochemical Processes at the Watershed Scale. The XXI International Conference Computational Methods in Water Resources (CMWR), University of Toronto, Canada, June 20-24, 2016.
2. Wen, H., Li, L. How Much Detail is Detailed Enough? Assessing the Importance of Flow Field Complexity in Predicting Fractured Rock Property Evolution Induced by Mineral Dissolution. The XXI International Conference Computational Methods in Water Resources (CMWR), University of Toronto, Canada, June 20-24, 2016.

3. Wen, H., Li, L., Salehikhoo, F. Mineral Dissolution Rates in Physically and Geochemically Heterogeneous Media. The XXI International Conference Computational Methods in Water Resources (CMWR), University of Toronto, Canada, June 20-24, 2016.
4. Xiao, D., Shi, Y., and L. Li. Using the COsmic-ray Soil Moisture Observing System to understand the hydrological response at Garner Run. Susquehanna Shale Hills Critical Zone Observatory (SSHCZO) All Hands meeting, May 17, 2016
5. Xiao, D., Shi, Y., Brantley, S.L., and L. Li. Developing Regolith-PIHM: a regolith formation model at the hillslope scale. Susquehanna Shale Hills Critical Zone Observatory (SSHCZO) All Hands meeting, May 17, 2016
6. Bao, C., Li, L., Shi, Y., Sullivan, P. L., Duffy, C., and Brantley, S. L. 2015. Understanding the Concentration-Discharge Relationship of Chloride and Magnesium in Shale Hills Using RT-Flux-PIHM. AGU Fall Meeting, San Francisco, CA, Dec. 14-18, Abstract No. H53E-1700
7. Xiao, D., Shi, Y., and Li, L. 2015. Assimilating the Cosmic-Ray Soil Moisture Observing System Measurements for Land Surface Hydrologic Model Parameter Estimation Using the Ensemble Kalman Filter. AGU Fall Meeting, San Francisco, CA, Dec. 14-18 Dec. Abstract No. H53E-1703
8. Qiao, C., Johns, R. T., Li, L., Xu, J. 2015. Modeling Low Salinity Waterflooding in Mineralogically Different Carbonates. 2015. SPE Annual Technical Conference and Exhibition, Houston, Texas, USA.
9. Bao, C., Li, L., Shi, Y., Duffy, C., and Brantley, S. L. RT-Flux-PIHM: A Coupled hydrological, land Surface, and reactive transport Model. CSDMS annual meeting, Boulder, CO, May 26 -28th, 2015
10. Hubbard, C. G., Wu, Y., Li, L., Piceno, Y M, Bill, M, Coates, J. D., Andersen, G. L., Conrad, M. E.. 2014. Monitoring and Modeling Microbial Sulfate Reduction and Inhibition in a Mesoscale Tank Experiment. American Geophysical Union (AGU) Fall meeting, San Francisco, CA, Dec. 15-19, 2014. Abstract No. B23D-0233
11. Li, L., Cheng, Y, Bouskill, N, Hubbard, C G, Engelbrektson, A L, Coates, J D, Ajo Franklin, J B. 2014. Integrated Microbial Trait Based-Reactive Transport Modeling Approach Towards Understanding Microbial Reservoir Souring and Desouring. American Geophysical Union (AGU) Fall meeting, San Francisco, CA, Dec. 15-19, 2014. Abstract No. B31B-0023
12. Wang, L., and Li, L. 2014. Understanding Cr(VI) sorption in heterogeneous porous media using column experiments and reactive transport modeling. American Geophysical Union (AGU) Fall meeting, San Francisco, CA, Dec. 15-19, 2014. Abstract No. B33B-0172
13. Wen, H., Li, L., Crandall, D., and Hakala, A. 2014. Evolving Spatial Heterogeneity Induced by Preferential Carbonate Dissolution in Fractured Media. American Geophysical Union (AGU) Fall meeting, San Francisco, CA, Dec. 15-19, 2014. Abstract No. H53D-0882.
14. Cai, Z., Li, L., and Hakala, A. 2014. Strontium Isotopes as Tracers for Contamination from Potential Marcellus Shale Waters. American Geophysical Union (AGU) Fall meeting, San Francisco, CA, Dec. 15-19, 2014. Abstract No. B11C-0035.
15. Qiao, C., L. Li, R.T. Johns, and J. Xu. 2014. Compositional modeling of reaction-induced injectivity alteration during CO<sub>2</sub> Flooding in carbonate reservoirs. SPE Annual Technical Conference and Exhibition held in Amsterdam, The Netherlands, 27–29 October 2014. SPE 170930.
16. Qiao, C., L. Li, R.T. Johns, J. Xu. 2014. A mechanistic model for wettability alteration by chemically tuned water flooding in carbonate reservoirs. SPE Annual Technical Conference and Exhibition held in Amsterdam, The Netherlands, 27–29 October 2014. SPE 170966.
17. Duffy, C., Y. Shi, K. Davis, R. Slingerland, L. Li, P. L. Sullivan, Y. Godd ris, S. L. Brantley. 2014. Designing a System of Models to Understand the Critical Zone. Geochemistry of the Earth Surface Symposium (GES-10), August 18-22, 2014 Coll ge des Bernardins, Paris 5th, France.

18. Crandall, D., Wen, H., Li, L., and Hakala, A. 2014. Reactive geochemical flow modeling with scanned rock fractures. Proceedings of the ASME 2014 4th Joint US-European Fluids Engineering Division Summer Meeting and 11th International Conference on Nanochannels, Microchannels, and Minichannels. FEDSM2014-21579, August 3-7, 2014, Chicago, Illinois, USA
19. Salehikhoo, F., Li, L., and Brantley, S. L. 2014. Spatial patterns control mineral dissolution rates. Goldschmidt, Sacramento, 2014, June 8-13, 2014.
20. Li, L., Heidari, P., Jin, L., and Brantley, S.L. 2014. Unravelling Controls on Marcellus Shale Weathering. Goldschmidt, Sacramento, 2014, June 8-13, 2014.
21. Qiao, C., Li Li, Chen Bao, Xiaozhe Hu, Russell Johns, and Jinchao Xu. Development of a New and Fast Linear Solver for Multi-component Reactive Transport Simulation. American Geophysical Union (AGU) Fall meeting, San Francisco, CA, Dec. 9- 13, 2013. Abstract No. H14A-03.
22. Li, L., Salehikhoo, F., and Brantley, S. Mineral Spatial Distribution in Determining Rates: When does it matter? American Geophysical Union (AGU) Fall meeting, San Francisco, CA, Dec. 8- 13, 2013. Abstract No. H23L-06
23. Bao, C, Li, L., Shi, Y, Qiao, C, Sullivan, P L, Brantley, S L, Duffy, C. Understanding the Hydrological Controls on the Water Chemistry at the Watershed Scale Using an Integrated Hydro-Thermo-Geochemical Model PIHM-RT. American Geophysical Union (AGU) Fall meeting, San Francisco, CA, Dec. 8- 13, 2013. Abstract No. H51A-1174
24. Bao, C, Li, L, Wu, H, Williams, K H, Newcomer, D, Long, P E. Uranium Bioreduction Rates Across Scales During a Biostimulation Field Experiments at Rifle, Colorado. American Geophysical Union (AGU) Fall meeting, San Francisco, CA, Dec. 8- 13, 2013. Abstract No. H24A-07
25. Cao, P., Karpyn, Z. T., Li, L. 2013. Porosity and Permeability Evolution in Cemented Rock Cores under Reactive Flowing Conditions: Comparative Analysis between Limestone and Sandstone Host Rocks. American Geophysical Union (AGU) Fall meeting, San Francisco, CA, Dec. 8- 13, 2013. Abstract No. H23B-1237
26. Wang, L. and L. Li. 2013. Illite spatial distribution controls Cr(VI) adsorption capacity and kinetics. American Geophysical Union (AGU) Fall meeting, San Francisco, CA, Dec. 8- 13, 2013. Abstract No. H31D-1206
27. Cheng, Y, Bouskill, N, Hubbard, C G, Hubbard, S S, Ajo-Franklin, J B, Li, L., Engelbrekton, A L, Coates, J D, Surasani, V. New Concepts and Approaches in Petroleum Reservoir Biogeochemistry. American Geophysical Union (AGU) Fall meeting, San Francisco, CA, Dec. 8- 13, 2013. Abstract No. B43B-0477.
28. Zhang, C., and Li, L., 2013. Developing predictive models for detecting potential leakage of flowback water in Marcellus Shale: Integration of isotopic and chemical signatures. Pennsylvania Groundwater Symposium. May 8, 2013, Penn State University.
29. Deng, H., Peters, C. A., Crandall, D. and Li, L. 2013. Estimation of hydrodynamic property evolution for fractured caprock due to reactive flow. 47th U.S. Rock Mechanics / Geomechanics Symposium.
30. Surasani, V. K.; Commer, M.; Ajo-Franklin, J. B.; Li, L.; Hubbard, S.S. Reactive Transport Modeling and Geophysical Monitoring of Bioclogging at Reservoir Scale. American Geophysical Union (AGU) Fall meeting, San Francisco, CA, Dec. 3- 7, 2012. Abstract No. B23B-0444.
31. Hubbard, S. S.; Wainwright, H.; Bea, S. A.; Spycher, N.; Li, L.; Sassen, D.; Chen, J. Geophysical Characterization and Reactive Transport Modeling to Quantify Plume Behavior (Invited). American Geophysical Union (AGU) Fall meeting, San Francisco, CA, Dec. 3- 7, 2012. Abstract No. H33N-01.
32. Hubbard, C. G.; Hubbard, S.S.; Wu, Y.; Surasani, V. K.; Ajo-Franklin, J. B.; Commer, M.; Dou, S.; Kwon, T.; Li, L.; Fouke, B. W.; Coates, J. D. Toward Optimized Bioclogging and Biocementation Through Combining Advanced Geophysical Monitoring and Reactive Transport Modeling

- Approaches. American Geophysical Union (AGU) Fall meeting, San Francisco, CA, Dec. 3- 7, 2012. Abstract No. B23B-0447.
33. Heidari, P.; Li, L. Quantifying Effective Flow and Transport Properties in Heterogeneous Porous Media. American Geophysical Union (AGU) Fall meeting, San Francisco, CA, Dec. 3- 7, 2012. Abstract No. H23B-1360.
  34. Cao, P.; Karpyn, Z. T.; Li, L. Property Evolution of Fractured Wellbore Cement under Dynamic Flow Conditions Relevant to Geological Carbon Sequestration. American Geophysical Union (AGU) Fall meeting, San Francisco, CA, Dec. 3- 7, 2012. Abstract No. H23A-1326.
  35. Salehikhoo, F., Li, L., and Brantley, S. L.. The Role of Spatial Distributions of Reactive Minerals and Flow Velocity in Determining Overall Dissolution Rates. American Geophysical Union (AGU) Fall meeting, San Francisco, CA, Dec. 3- 7, 2012. Abstract No. H51B-1345.
  36. Zhang, L., Dzombak, D. A., Nakle, D., Hawthorne, S. B., Kutchko, B., Lopano, C., Strazisar, B., Brunet, L., and Li, L. Reactive transport modeling to evaluate interactions between pozzolan-amended wellbore cement and acid gas (CO<sub>2</sub> + H<sub>2</sub>S) under typical acid gas sequestration conditions. AIChE conference, Pittsburgh, PA, Oct. 28 – Nov. 2, 2012.
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