

Curriculum vitae

Liange Zheng

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Biographical Summary

Liange Zheng was trained in environmental engineering, with deep expertise in hydrogeology and geochemistry. His research work is centered on numerical modeling of non-isothermal multiphase flow and reactive transport in porous media, also includes the modeling of coupled thermal, hydrological, mechanical, and chemical (THMC) processes in the subsurface and the inverse methodology of parameter estimation. During his Ph.D. work at the University of La Coruña, Spain, he conducted numerical simulations of geochemical evolution and corresponding thermo-hydro-mechanical processes in various porous media, in the context of performance assessment of geologic repositories for radioactive waste. After he joined LBNL in 2007 he has worked in a variety of subsurface energy related research projects including geologic carbon sequestration (GCS), radioactive waste disposal, enhanced geothermal system and reservoir souring issue during oil/gas production. His work related to the risk assessment of GCS and coupled processes in radioactive waste disposal had made significant impact on their perspective research field.

Education

2001-2006	University of La Coruña, Spain, Ph.D. in civil engineering, 2006.
1998-2001	Jilin University, China, Master in Environmental Engineering, 2001.
1994-1998	Changchun Geology College, China, Bachelor in Environmental Engineering, 1998

Ph.D Dissertation

Coupled thermo-hydro-mechanical-geochemical models for structured deformable porous media

Publication Metrics:

Web of Science metrics as of 7/2020:

Researcher ID: B-9748-2011 (<http://www.researcherid.com/rid/B-9748-2011>)

- Total number of publications: 49
- h-index: 18
- Total number of citations: 1445

Google Scholar: <https://scholar.google.com/citations?user=txZKXjUAAAAAJ&hl=en>

- h-index: 24
- Total number of citations: 2380

Working Experiences

06/2019 – Present. Nuclear Energy and Waste Program Head,

02/2014present. Lawrence Berkeley National Laboratory

Job title: Career Earth Staff Scientist

09/2010 – 02/2014. Lawrence Berkeley National Laboratory

Job title: Career-track Geological Research Scientist

03/2007 – 09/2010. Lawrence Berkeley National Laboratory

Job title: Geological Post Doctoral Fellow

09/2001 – 3/2007. University of la Coruña, Spain

Job title: Ph.D Candidate and Research Assistant

Current Major Research Projects

Spend Fuel and Waste Science and Technology (SFWST) program: crystalline disposal R&D, argillite disposal R&D and argillite international R&D

National Risk Assessment Partnership (NRAP)

Professional Affiliations

Member of American Geophysical Union (AGU)

Member of American Nuclear Society (ANS)

Professional Activities

Chair, Ph.D dissertation defense committee for Alba Mon Lopez, University of La Coruña, Spain, 2017.

Co-chair of Session at International High-Level Radioactive Waste Management (IHLRWM 2017), Session Title: Near-Field Environment Modeling, April, 2017.

Keynote speaker, title: Studying the impact of geological carbon sequestration (GCS) on groundwater water as part of the risk assessment for GCS. Dec 5-9, Orlando. Collaborative Conference on Resources and Environmental Science.

Organizing committee, 2015 TOUGH Symposium

Co-chair of Session at 2015 TOUGH Symposium, Session Title: optimization, parameter estimation, data - worth analysis.

Invited talk, title: Coupled THMC models for bentonite in clay repository for nuclear waste,

AGU fall meeting 2015, San Francisco.

Member of Advisory Committee, Thesis defense for Theodore C. Donovan, Department of Geological Sciences, The University of Alabama. 2012

2012-2015, Temporary Member of the Graduate Faculty of the University of Alabama.

Honors and Awards

A member of developers for National Risk Assessment Partnership Toolset, a Finalist for R&D 100 Award 2017

LBNL spot recognition award for orchestrating and organizing the 2015 TOUGH Symposium

American Geophysical Union 2013 Editor's citation for Excellence in Reviewing

Chinese Scholarship for outstanding student abroad, 2006 Chinese Scholarship Council

Publication List

Refereed journals:

1. He, J. Ju, Y.; Lammers, L. Kulasinski, K.; Zheng, L. G., Tortuosity of kerogen pore structure to gas diffusion at molecular- and nano-scales: A molecular dynamics simulation. *Chem. Eng. Sci.* 2020, 215, 11.
2. Cao, X., L. Zheng, D. Hou, D. O'Connor, L. Hu and J. Wu (2019). "Modeling the risk of U(VI) migration through an engineered barrier system at a proposed Chinese high-level radioactive waste repository." *Science of The Total Environment*: 135472.
3. Zheng, L., H. Xu, J. Rutqvist, M. Reagan, J. Birkholzer, M. V. Villar and A. M. Fernández (2019). "The hydration of bentonite buffer material revealed by modeling analysis of a long-term in situ test." *Applied Clay Science*: 105360.
4. Cao, X., L. Zheng, D. Hou and L. Hu (2019). "On the long-term migration of uranyl in bentonite barrier for high-level radioactive waste repositories: The effect of different host rocks." *Chemical Geology* 525: 46-57.
5. He, J., Y. Ju, K. Kulasinski, L. Zheng and L. Lammers 2019. Molecular dynamics simulation of methane transport in confined organic nanopores with high relative roughness. *Journal of Natural Gas Science and Engineering* 62: 202-213.
6. Ju, Y., J. He, E. Chang and L. Zheng 2019. Quantification of CH₄ adsorption capacity in kerogen-rich reservoir shales: An experimental investigation and molecular dynamic simulation. *Energy* 170: 411-422.
7. Guo, P., L. Zheng, X. Sun, M. He, Y. Wang and J. Shang 2018. Sustainability evaluation model of geothermal resources in abandoned coal mine. *Applied Thermal Engineering* 144: 804-811.
8. Shen, W., L. Zheng, C. M. Oldenburg, A. Cihan, J. Wan and T. K. Tokunaga 2018. Methane Diffusion and Adsorption in Shale Rocks: A Numerical Study Using the Dusty Gas Model in TOUGH2/EOS7C-ECBM. *Transport in Porous Media*.

9. Cheng, Y., C. G. Hubbard, L. Zheng, B. Arora, L. Li, U. Karaoz, J. Ajo-Franklin and N. J. Bouskill 2018. Next generation modeling of microbial souring – Parameterization through genomic information. *International Biodeterioration & Biodegradation* 126: 189-203.
10. Zheng, L. and N. Spycher 2018. Modeling the potential impacts of CO₂ sequestration on shallow groundwater: The fate of trace metals and organic compounds before and after leakage stops. *Greenhouse Gases: Science and Technology* 8(1): 161-184.
11. Zheng, L., J. Rutqvist, H. Xu, J. T. Birkholzer, 2017 Coupled THMC models for bentonite in an argillite repository for nuclear waste: illitization and its effect on swelling stress under high temperature, *Engineering Geology*, 230: 118-129.
12. Bacon, D. H., R. A. Locke II, E. Keating, S. Carroll, A. Iranmanesh, K. Mansoor, B. Wimmer, L. Zheng, H. Shao and S. E. Greenberg. 2017. Application of the Aquifer Impact Model to support decisions at a CO₂ sequestration site. *Greenhouse Gases: Science and Technology*: 7: 1020–1034.
13. Guo, P., M. He, L. Zheng and N. Zhang 2017. A geothermal recycling system for cooling and heating in deep mines. *Applied Thermal Engineering* 116: 833-839.
14. Qafoku, N. P., A. R. Lawter, D. H. Bacon, L. Zheng, J. Kyle and C. F. Brown 2017. Review of the impacts of leaking CO₂ gas and brine on groundwater quality. *Earth-Science Reviews* 169: 69-84.
15. Sun, X., H. Xu, L. Zheng, M. He and W. Gong 2016. An experimental investigation on acoustic emission characteristics of sandstone rockburst with different moisture contents. *Science China Technological Sciences* 59(10): 1549-1558.
16. Keating, E., D. Bacon, S. Carroll, K. Mansoor, Y. Sun, L. Zheng, D. Harp and Z. Dai 2016. Applicability of aquifer impact models to support decisions at CO₂ sequestration sites. *International Journal of Greenhouse Gas Control* 52: 319-330.
17. Du, S., L. Zheng and W. Zhang 2016. Assessment of shallow aquifer remediation capacity under different groundwater management conditions in CGS field. *Arabian Journal of Geosciences* 9(6): 1-17.
18. Bianchi, M., L. Zheng and J. T. Birkholzer 2016. Combining multiple lower-fidelity models for emulating complex model responses for CCS environmental risk assessment. *International Journal of Greenhouse Gas Control* 46: 248-258.
19. Zheng, L., N. P. Qafoku, A. Lawter, G. Wang, H. Shao and C. F. Brown 2016. Evaluating impacts of CO₂ intrusion into an unconsolidated aquifer: II. Modeling results. *International Journal of Greenhouse Gas Control* 44: 300-309.
20. Zheng, L., N. Spycher, M. Bianchi, J. D. Pugh, C. Varadharajan, R. M. Tinnacher, J. T. Birkholzer, P. Nico and R. C. Trautz 2016. Impacts of elevated dissolved CO₂ on a shallow groundwater system: Reactive transport modeling of a controlled-release field test. *Chemical Geology* 447: 117-132.
21. Zheng, J., Y. Ju, H.-H. Liu, L. Zheng and M. Wang 2016. Numerical prediction of the decline of the shale gas production rate with considering the geomechanical effects based on the two-part Hooke's model. *Fuel* 185: 362-369.
22. Cheng, Y., C. G. Hubbard, L. Li, N. J. Bouskill, S. Molins, L. Zheng, E. Sonnenthal, M. E. Conrad, A. Engelbrektsen, J. D. Coates and J. Ajo-Franklin 2016. A Reactive Transport Model of Sulfur Cycling as Impacted by Perchlorate and Nitrate Treatments. *Environmental Science & Technology* 50(13): 7010-7018.

23. Zheng, L. and J. Samper 2015. Dual-continuum multicomponent reactive transport with nth-order solute transfer terms for structured porous media. *Computational Geosciences*: 1-18. DOI 10.1007/s10596-015-9477-8
24. Zheng, L., J. Rutqvist, J. T. Birkholzer and H.-H. Liu 2015. On the impact of temperatures up to 200 °C in clay repositories with bentonite engineer barrier systems: A study with coupled thermal, hydrological, chemical, and mechanical modeling. *Engineering Geology* 197: 278-295.
25. Zheng, L., N. Spycher, C. Varadharajan, R. M. Tinnacher, J. D. Pugh, M. Bianchi, J. Birkholzer, P. S. Nico and R. C. Trautz 2015. On the mobilization of metals by CO₂ leakage into shallow aquifers: exploring release mechanisms by modeling field and laboratory experiments. *Greenhouse Gases: Science and Technology*:5:1–16 (2015)
26. Zheng, J., L. Zheng, H.-H. Liu and Y. Ju 2015. Relationships between permeability, porosity and effective stress for low-permeability sedimentary rock. *International Journal of Rock Mechanics and Mining Sciences* 78: 304-318.
27. Zheng, L., J. Rutqvist, H.-H. Liu, J. T. Birkholzer and E. Sonnenthal 2014. Model evaluation of geochemically induced swelling/shrinkage in argillaceous formations for nuclear waste disposal. *Applied Clay Science* 97–98(0): 24-32.
28. Rutqvist, J., L. Zheng, F. Chen, H.-H. Liu and J. Birkholzer.(2013). Modeling of coupled thermo-hydro-mechanical processes with links to geochemistry associated with bentonite-backfilled repository tunnels in clay formations. *Rock Mechanics and Rock Engineering*: 1-20, DOI 10.1007/s00603-013-0375-x.
29. Varadharajan, C., R. Tinnacher, J. Pugh, R. Trautz, L. Zheng, N. Spycher, J. Birkholzer, H. Castillo-Michel, R. Esposito, P. Nico. (2013) A laboratory study of the initial effects of dissolved carbon dioxide (CO₂) on metal release from shallow sediments, submitted to *International Journal of Greenhouse Gas Control*, 19(0): 183-211.
30. Zhang, S., D. J. DePaolo, T. Xu and L. Zheng 2013. Mineralization of carbon dioxide sequestered in volcanogenic sandstone reservoir rocks. *International Journal of Greenhouse Gas Control* 18(0): 315-328.
31. Zheng L., N. Spycher, J. Birkholzer, T. Xu, J. Apps and Y. Kharaka. (2013) On modeling the potential impacts of CO₂ sequestration on shallow groundwater: Transport of organics and co-injected H₂S by supercritical CO₂ to shallow aquifers. *International Journal of Greenhouse Gas Control* 14(0): 113-127.
32. Trautz, R. C., J. D. Pugh, C. Varadharajan, L. Zheng, M. Bianchi, P. S. Nico, N. F. Spycher, D. L. Newell, R. A. Esposito, Y. Wu, B. Dafflon, S. S. Hubbard and J. T. Birkholzer. (2013). Effect of Dissolved CO₂ on a Shallow Groundwater System: A Controlled Release Field Experiment. *Environmental Science & Technology* 47(1): 298-305.
33. Viswanathan, H., Z. Dai, C. Lopano, E. Keating, J. A. Hakala, K. G. Scheckel, L. Zheng, G. D. Guthrie and R. Pawar. (2012) Developing a robust geochemical and reactive transport model to evaluate possible sources of arsenic at the CO₂ sequestration natural analog site in Chimayo, New Mexico. *International Journal of Greenhouse Gas Control* 10(0): 199-214.
34. Zheng L., J.A. Apps, N. Spycher, J. T. Birkholzer, Y.f K. Kharaka, J. Thordsen, S. R. Beers, W. N. Herkelrath, E. Kakouros, and R. C. Trautz, (2012) Geochemical Modeling of Changes in Shallow Groundwater Chemistry Observed During the MSU-ZERT CO₂ Injection Experiment, *International Journal of Greenhouse Gas Control*. 7(0): 202-217.

35. Xu T. and L. Zheng, H. Tian. (2011), Reactive Transport Modeling for CO₂ Geological Sequestration, *Journal of Petroleum Science and Engineering*, 78(3–4): 765–777.
36. Zheng L., J. Samper, and L. Montenegro. (2011) A coupled THC model of the FEBEX in situ test with bentonite swelling and chemical and thermal osmosis, *Journal of Contaminant Hydrology*, 126(1–2): 45–60.
37. Xu, T., E. Sonnenthal, N. Spycher, G. Zhang, L. Zheng, and K. Pruess. (2011) TOUGHREACT version 2.0: a simulator for subsurface reactive transport under non-isothermal multiphase flow conditions. *Computer & Geoscience*, 37: 763–774.
38. Zheng L., J. Samper, L. Montenegro, A. M. Fernández. (2010) A coupled THMC model of a heating and hydration laboratory experiment in unsaturated compacted FEBEX bentonite. *Journal of Hydrology*, 386(1-4): 80-94.
39. Apps J. A., L. Zheng, Y. Zhang, T. Xu, J. T. Birkholzer. (2010) Evaluation of groundwater quality changes in response to CO₂ leakage from deep geological storage. *Transport in Porous Media*, 82: 215–246.
40. Kharaka, Y.K., J.J. Thordsen, E. Kakouros, G. Ambats, W.N. Herkelrath, J.T. Birkholzer, J.A., Apps, N. Spycher, L. Zheng, R.C. Trautz, H.W. Rauch and K. Gullickson. (2010) Changes in the chemistry of shallow groundwater related to the 2008 injection of CO₂ at the ZERT field site, Bozeman, Montana. *Env. Earth Sciences*, 60(2): 273-284.
41. Zheng L., J. A. Apps, Y. Zhang, T. Xu, J. T. Birkholzer. (2009) On mobilization of lead and arsenic in groundwater in response to CO₂ leakage from deep geological storage. *Chemical geology*, 268(3-4): 281-297.
42. Zheng L., J. Samper, L. Montenegro, J.-C. Mayor. (2008) Multiphase flow and multicomponent reactive transport model of Ventilation Experiment in Opalinus clay, *Physics and Chemistry of the Earth*, 33:S186-S195.
43. Zheng L. and J. Samper. (2008) A Coupled THMC model of FEBEX mock-up test, *Physics and Chemistry of the Earth*, 33:S486-S498.
44. Zheng L., J. Samper and L. Montenegro. (2008) Inverse hydrochemical models of aqueous extracts tests, *Physics and Chemistry of the Earth*, 33(1009-1018).
45. Samper, J., S. Dewonck, L. Zheng, Q. Yang, and A. Naves. (2008) Normalized sensitivities and parameter identifiability of in situ DIR diffusion experiments on Callovo-Oxfordian clay at Bure site, *Physics and Chemistry of the Earth*, 33: 1000-1008.
46. Samper, J., L. Zheng, L. Montenegro, A. M. Fernández and P. Rivas. (2008) Coupled thermo-hydro-chemical models of compacted bentonite after FEBEX in situ test, *Applied geochemistry*, 23(5): 1186-1201.
47. Samper, J., L. Zheng, A. M. Fernández, L. Montenegro. (2008) Inverse modeling of multicomponent reactive transport through single and dual porosity media, *Journal of Contaminant Hydrology*, 98(3-4): 115-127.

Report

1. Zheng, L., J. Rutqvist, H. Xu, K. Kim, X. Cao (2017), Investigation of Coupled Processes and Impact of High Temperature Limits in Argillite Rock: FY17 Progress. Prepared for U.S. Department of Energy Used Fuel Disposition Campaign, SFWD-SFWST-2017-000040, Lawrence Berkeley National Laboratory, LBNL No. 2001014.
2. Zheng, L., K. Kim, H. Xu, and J. Rutqvist (2016), DR Argillite Disposal R&D at LBNL, Prepared for U.S. Department of Energy Used Fuel Disposition Campaign, FCRD-UFD-2016-000437, Lawrence Berkeley National Laboratory.
3. Nikolla P. Qafoku, Liange Zheng, Diana H. Bacon, Amanda R. Lawter and Christopher F. Brown, 2016 A critical review of the impacts of leaking CO₂ gas and brine on groundwater quality
4. Zheng L., Rutqvist J. Kim, K. and Houseworth J. (2015), Investigation of Coupled Processes and Impact of High Temperature Limits in Argillite Rock. FCRD-UFD-2015-000362, LBNL-187644.
5. Zheng, L., C. Jove-Colon, M. Bianchi, J. Birkholzer. Generic Argillite/shale disposal reference case. FCRD-UFDC-2014-000319
6. Zheng, L., Rutqvist, J., Steefel, C., Kim, K., Chen, F., Vilarrasa, V., Nakagawa, S., Houseworth, J., and Birkholzer, J. (2014), Investigation of Coupled Processes and Impact of High Temperature Limits in Argillite Rock. Prepared for U.S. Department of Energy, Used Fuel Disposition, FCRD-UFD-2014-000493, Lawrence Berkeley National Laboratory, LBNL-6719E.
7. Spycher, N. Liange Zheng, Lehua Pan. Development of TMVOC-REACT-EOSG, CO2CRC-LBNL Collaborative Project, Final Report, March 24, 2015
8. Robert C. Trautz, John D. Pugh, R. Esposito, Jens T. Birkholzer, Liange Zheng, Ruth M. Tinnacher, Charuleka Varadharajan, Nicolas F. Spycher, Marco Bianchi, Peter S. Nico. Potential Impact of Carbon Dioxide on Potable Groundwater: A Controlled Release Experiment 2013 Final Report, EPRI #3002001000
9. Zheng L. J. Houseworth. (2013), Report on THMC Effects on Radionuclide Transport in a Clay Repository, Lawrence Berkeley National Laboratory, FCRD-UFD-2013-000245.
10. Liu, H.H., J. Houseworth, J. Rutqvist, L. Zheng, D.e Asahina, L. Li, V. Vilarrasa, F. Chen, S. Nakagawa, S. Finsterle, C. Doughty, T. Kneafsey and J. Birkholzer. (2013) Report on THMC modeling of the near field evolution of a generic clay repository: Model validation and demonstration, Lawrence Berkeley National Laboratory, August, 2013, FCRD-UFD-2013-0000244.
11. Davis, J. J. Rutqvist, C. Steefel, R. Tinnacher, V. Vilarrasa, L. Zheng, I. Bourg, H.H. Liu, J. Birkholzer. (2013) Investigation of Reactive Transport and Coupled THMC Processes in the EBS: FY13 Report, Lawrence Berkeley National Laboratory, July 16, 2013, FCRD-UFD-2013-000216
12. Carroll, S. A., Bianchi, M., Mansoor, K., Zheng, L., Sun, Y., Spycher, N., and Birkholtzer, J. Reduced Order Model for Estimating Impacts from CO₂ Storage Leakage to Alluvium Aquifers: 3rd Generation Combines Physical and Chemical Processes; NRAP-TRS-II-###-2014; NRAP Technical Report Series; U.S. Department of Energy, National Energy Technology Laboratory: Morgantown, WV, 2013; p xx.

13. Zheng L., L. Li, J. Rutqvist, H.H. Liu and J. Birkholzer, Modeling radionuclide transport in clays, 05/2012, FCRD-UFD-2012-000128.
14. Annie Kersting, Mavrik Zavarin, Pihong Zhao, Zurong Dai, Susan A. Carroll, Yifeng Wang, Andrew Miller, Scott James, Paul Reimus Liange Zheng, Lianchong Li, Jonny Rutqvist, Huihai Liu and Jens Birkholzer, Radionuclide interaction and transport in representative geologic media, FCRD-UFD-2012-000154, 2012
15. Varadharajan, C., Tinnacher, R., Nico, P.S. and Zheng, L., Laboratory and Synchrotron Analysis of Metal Sediment Associations. NRAP Technical Report Series, 2012, NRAP-TRS-III-003-2012, 24 pages.
16. Liange Zheng, Nicolas Spycher, Diana Bacon, and Jens Birkholzer, The Surface Complexation Reactions for Trace Elements on Goethite, HFO, Illite, Kaolinite, Montmorillonite and Calcite, NRAP deliverable 3.5.1f, 2012
17. Liange Zheng, Nicolas Spycher, Diana Bacon, Generation II equilibrium and kinetic reactions for groundwater reduced order models, NRAP deliverable 3.5.1d and 3.5.1e, 2012
18. Bianchi, M., Zheng, L., Spycher, N., Birkholzer, J. *Reduced Order Models for Prediction of Groundwater Quality Impacts from CO₂ and Brine Leakage: Application to the High Plains Aquifer*, NRAP-TRS-III-xxx-2013; NRAP Technical Report Series; U.S. Department Energy, National Energy Technology Laboratory: Morgantown, WV, 2013; p52.
19. Zheng L., H.H. Liu, J. Birkholzer and M. Nutt, 2011, Diffusion Modeling in a Generic Clay Repository, Lawrence Berkeley National laboratory 07/2011.
20. Zheng L., J. Rutqvist, J. Houseworth, J. Davis, R. Tinnacher, L. Li and H.H. Liu, 2011, Investigation of near-field THMC coupled processes, Lawrence Berkeley National Laboratory, Project Report 07/29/2011
21. Robert C. Trautz, John D. Pugh, Charuleka Varadharajan, Liange Zheng, Marco Bianchi, Peter S. Nico, Nicolas F. Spycher, Dennis L. Newell, Jens T. Birkholzer, Richard A. Esposito, Yuxin Wu, Baptiste Dafflon, and Susan S. Hubbard. Potential Impact of Carbon Dioxide on Potable Groundwater: A Controlled Release Experiment, 2011 Annual Report. EPRI, Palo Alto, CA: 2011. 1021809.
22. Zheng L., N. Spycher, J. Birkholzer, T. Xu, J. Apps, Y. Kharaka, 2010. Modeling Studies on the Transport of Benzene and H₂S in CO₂-Water Systems, Lawrence Berkeley National Laboratory, Project Report LBNL-2931E
23. Ambats, G., J.A. Apps, S. Beers, J.T. Birkholzer, K.S. Gullickson, W.N. Herkelrath, E. Kakouros, Y.K. Kharaka, L.H. Spangler, N. Spycher, J. Thordsen, L. Zheng. (Authors by alphabetical order). (2009) Groundwater chemistry changes as a result of CO₂ injection at the ZERT field site in Bozeman, Montana. Lawrence Berkeley National Laboratory, Project Report LBNL-2931E.
24. Birkholzer, J., J. Apps, L. Zheng, Y. Zhang, T. Xu, C. Tsang. Research Project on CO₂ Geological Storage and Groundwater Resources: Water Quality Effects Caused by CO₂ Intrusion into Shallow Groundwater. Lawrence Berkeley National Laboratory Technical Report No. LBNL-1251E. (2008), 450 p.
25. Samper, J., L. Zheng, and L. Montenegro, 2005. Final THG modelling report (Deliverable D25). 70-udc-m-6-20, E.T.S ingenieros de Caminos, Universidad de La Coruña, a coruña.

26. Samper, J., L. Zheng, A. Vázquez & C. B. Yang, Modelización hidrogeoquímica de la arcilla española de referencia, Informe Técnico elaborado para ENRESA, L. Montenegro, E. T. S. Ingenieros de Caminos. Universidade da Coruña, La Coruña, Agosto, 2003 (Spanish)
27. Samper j.; C. Yang, B. Veiga, L. Montenegro, L. Zheng, & J. Molinero, ACTUALIZACIÓN DEL MODELO DE FLUJO Y TRANSPORTE DE ANDÚJAR, Report, Enresa and Universidad da Coruña, August, 2004 (Spanish).
28. Samper, J. M. Bonilla, L. Zheng, J. Molinero. Evaluación del impacto de las obras del eje atlántico de alta velocidad en el tramo padrón-osebe sobre las captaciones de agua y calculo de aporte de agua al túnel, Universidades de a Coruña y Santiago de Compostela. Agosto, 2004
29. Samper J. and L. Zheng, deliverable (D-Nº: D5.1.2) report on mass balance and mass flow—contribution of UDC: V Calculation of H₂ buildup and diffusion through the bentonite for a repository in granite. NF-PRO project, Contract Number: FI6W-CT-2003-02389, 30/07/2005
30. Samper J. and L. Zheng, deliverable (D-Nº: D5.1.2) report on mass balance and mass flow—contribution of UDC: VI. Geochemical evolution during the hydration phase in a SF carbon steel repository in granite. NF-PRO project, Contract Number: FI6W-CT-2003-02389, 30/07/2005
31. Samper, J. C. Yang, Q. Yang, L. Montenegro, L. Zheng, and M. Bonilla deliverable (D-Nº: D5.1.2) report on mass balance and mass flow—contribution of UDC: IV. calculations of the long term geochemical evolution of a spent-fuel carbon-steel canister repository in clay: sensitivity analysis to bentonite accessible porosity. NF-PRO project, Contract Number: FI6W-CT-2003-02389, 30/07/2005
32. Samper, J. C. Yang, C. Lu, L. Montenegro, L. Zheng, and M. Bonilla deliverable (D-Nº: D5.1.2) report on mass balance and mass flow—contribution of UDC: III. Calculations of the long term geochemical evolution of a spent-fuel carbon-steel canister repository in granite. NF-PRO project, Contract Number: FI6W-CT-2003-02389, 30/07/2005

Book chapters:

1. T. Xu, E. Sonnenthal, N. Spycher, G. Zhang, L. Zheng, K. Pruess, TOUGHREACT: A Simulation Program for Subsurface Reactive Chemical Transport under Non-isothermal Multiphase Flow Conditions, in book "Groundwater Reactive Transport Models" Editors: Fan Zhang, Gour-Tsyh (George) Yeh, Jack C. Parker. eISBN: 978-1-60805-306-3.
2. J. Samper, C. Yang, L. Zheng, L. Montenegro, T. Xu, Z. Dai, G. Zhang, C. Lu, S. Moreira, CORE2D V4: A Code for Water Flow, Heat and Solute Transport, Geochemical Reactions, and Microbial Processes, in book "Groundwater Reactive Transport Models" Editors: Fan Zhang, Gour-Tsyh (George) Yeh, Jack C. Parker. eISBN: 978-1-60805-306-3.
3. J. Samper, L. Zheng, L. Montenegro. Direct and inverse modeling of multicomponent reactive transport in single and dual porosity media, In: Advances in Understanding Engineered Clay Barriers, E. Alonso and A. Ledesma Eds, Balkema Pub., ISBN: 04 1536 544 9, 493-503, 2005.

4. J. Samper, L. Zheng, J. Molinero, L. Montenegro. Reactive solute transport mechanisms in nonisothermal unsaturated compacted clays, In: *Advances in Understanding Engineered Clay Barriers*, E. Alonso and A. Ledesma Eds, Balkema Pub., ISBN: 04 1536 544 9, 525-533, 2005.
5. J. Samper, L. Zheng, L. Montenegro, P. Rivas, A. Vázquez, Testing coupled thermo-hydro-geochemical models with geochemical data from FEBEX in situ test, In: *Advances in Understanding Engineered Clay Barriers*, E. Alonso and A. Ledesma Eds, Balkema Pub., ISBN: 04 1536 544 9, 565-575, 2005

Paper and/or abstract of Non-refereed journals, conferences:

1. Liange Zheng, Jonny Rutqvist, Hao Xu, Jens T. Birkholzer, Coupled THMC models for bentonite in an argillite host rock repository for nuclear waste: illitization and its effect on stress under high temperature, conference proceeding for IHLRWM 2017, Charlotte, NC. April 9-13, 2017
2. Ju. Y., Yang Y M, Chen J L, Liu P., Dai, T., Guo Y. Zheng L. 3D reconstruction of low-permeability heterogeneous glutenites and numerical simulation of hydraulic fracturing behavior. *Chin Sci Bull*, 2016, 61: 82–93, doi: 10.1360/N972015-00292
3. Liange Zheng, Nicolas Spycher, Charuleka Varadharajan, Ruth M. Tinnacher, John D. Pugh, Marco Bianchi, Jens Birkholzer, Peter S. Nico, and Robert C. Trautz, John A. Apps, Yingqi Zhang, Tianfu Xu. 2016, Studying the impact of geological carbon sequestration (GCS) on groundwater water as part of the risk assessment for GCS. Dec 5-9, Orlando. Collaborative Conference on Resources and Environmental Science. Keynote speaker.
4. Liange Zheng. 2016, Research work at Energy Geoscience Division at LBNL. Seminar at China University of Mining and Technology, Beijing, Dec 22, 2016.
5. Liange Zheng. 2017, LBNL's research on radioactive waste disposal---study the THMC processes in bentonite. Seminar at Beijing Normal University. Jan 10, 2017.
6. Liange Zheng, Hao Xu, Jonny Rutqvist, Jens Birkholzer, 2016, Understanding the THMC evolution of bentonite barrier — modeling an in situ test for bentonite backfilled engineered barrier system, GSA annual meeting, Denver, September 23, 2016.
7. Liange Zheng, Jonny Rutqvist and Jens T. Birkholzer. Studying long-term geochemical alterations and geochemically-induced stress changes in bentonite using coupled THMC models, *Computational Methods in Water Resources* 2016, Toronto, Canada.
8. Yaning Liu, Liange Zheng, and George Pau. Reduced-order modeling with sparse polynomial chaos expansion and dimension reduction for evaluating the impact of CO₂ and brine leakage on groundwater. AGU, 2016
9. Liange Zheng, Hao Xu, Jonny Rutqvist, Jens Birkholzer, 2016, Understanding the THMC evolution of bentonite barrier — modeling an in situ test for bentonite backfilled engineered barrier system, AGU, 2016
10. Liange Zheng, Jonny Rutqvist, Jens T. Birkholzer, Studying long-term geochemical alterations and geochemically-induced stress changes in bentonite using coupled THMC models, *CMWR* 2016, Toronto, Canada.
11. Liange Zheng, Jonny Rutqvist, Jens T. Birkholzer, Coupled THMC models for bentonite in clay repository for nuclear waste, AGU fall meeting 2015, San Francisco.

12. Liange Zheng, Jonny Rutqvist, Jens T. Birkholzer, Coupled THMC models for bentonite in clay repository for nuclear waste using TOUGHREACT-FLAC3D. TOUGH Symposium
13. Liange Zheng, Nicolas Spycher, Charuleka Varadharajan, Ruth M. Tinnacher, John D. Pugh, Marco Bianchi, Jens Birkholzer, Peter S. Nico, and Robert C. Trautz. Modeling and Interpretation of Laboratory and Field Data Showing CO₂-induced Groundwater Changes, AGU fall meeting, 2013
14. Liange Zheng, Jonny Rutqvist, Jens T. Birkholzer, Hui-Hai Liu, Illitization within benotnite engineered barrier system in clay repositories for nuclear waste and its effect on the swelling stress: a coupled THMC modeling study, Goldschmidt 2014, June 8-13, Sacramento.
15. Zheng L., et al., Numerical interpretation of Laboratory and Field Data Showing CO₂-induced Groundwater Changes, AGU fall meeting, 2012
16. Liange Zheng, Jonny Rutqvist, Hui-Hai Liu, Jens T. Birkholzer, Eric Sonnenthal, Chemical-mechanical Coupling Related to THMC Modeling of Clay Formations, International High-Level Radioactive Waste Management Conference, 2013
17. Liange Zheng, Marco Bianchi, Nicolas Spycher, Jens Birkholzer, Robert Trautz, Richard Esposito, Peter Nico, John Pugh, Charuleka Varadharajan, Reactive transport modeling of dissolved CO₂-induced groundwater change in a field experiment, 11th annual conference of Carbon Capture, Utilization and Storage (<http://www.carbonsq.com>), Pittsburgh, May 2012.
18. Varadharajan C., Tinnacher R., Birkholzer J., Esposito R., Nico P., Pugh J., Spycher N., Trautz R. and Zheng L., Effects of Dissolved CO₂ on Mobility of Naturally Occurring Trace Metals in Groundwater Using Laboratory Leaching Experiments, 11th annual conference of Carbon Capture, Utilization and Storage (<http://www.carbonsq.com>), Pittsburgh, May 2012.
19. John Pugh, Marco Bianchi, Jens Birkholzer, Baptiste Dafflon, Tom Daley, Kirk Ellison, Richard Esposito, Susan Hubbard, Dennis Newell, Peter Nico, Dan Patel, John Peterson, Nic Spycher, Rob Trautz, Charuleka Varadharajan, Yuxin Wu, Liange Zheng, Assessing the Impact of Elevated Dissolved Carbon Dioxide on Groundwater Quality through a Controlled Release Field Test: Test Design and Implementation, 11th annual conference of Carbon Capture, Utilization and Storage (<http://www.carbonsq.com>), Pittsburgh, May 2012.
20. Zheng, L.; Liu, H.; Birkholzer, J. T.; Houseworth, J. E.; Sonnenthal, E. L. Evaluating the geochemically induced swelling/shrinkage of the near-field host clay rock using a THMC model and the diffuse double layer theory, American Geophysical Union, Fall Meeting 2011.
21. Elizabeth H. Keating, Liange Zheng, Nicolas Spycher, Hari Viswanathan, Assessing risk to shallow groundwater from CO₂ leaks: synthesis of two field studies with contrasting results, 10th annual conference of Carbon Capture and Storage, Pittsburgh, May 2011.
22. Charuleka Varadharajan, Peter Nico, John Pugh, Liange Zheng, Yuxin Wu, Nicolas Spycher, Jens Birkholzer, Susan Hubbard and Rob Trautz. Evaluating the Effects of CO₂ Intrusion on Trace Metal Mobility in Groundwaters, 10th annual conference of Carbon Capture and Storage, Pittsburgh, May 2011.

23. Robert Trautz, Jens Birkholzer, Richard Esposito, Susan Hubbard, Peter Nico, John Pugh, Nickolas Spycher, Charuleka Varadharajan, and Liange Zheng. An Integrated Field Experiment for Measuring Dissolved CO₂-Induced Metals Mobilization in Groundwater, 10th annual conference of Carbon Capture and Storage, Pittsburgh, May 2011.
24. Liange Zheng, Nicolas, Spycher, Jens T. Birkholzer, John A. Apps, Groundwater quality changes in response to CO₂ leakage from deep geological storage, 239th ACS National Meeting & Exposition, March 21-25, 2010, San Francisco, California.
25. Liange Zheng, Nicolas, Spycher, Jens T. Birkholzer, The mobilization of organic compounds by supercritical CO₂ and the fate of co-injected H₂S in case of CO₂ leakage from deep geological storage, Ninth Annual Carbon Capture and Sequestration Conference, Pittsburgh, May 2010.
26. Apps, John A.; Zheng, Liange; Spycher, Nicolas; et al. Transient changes in shallow groundwater chemistry during the MSU ZERT CO₂ injection experiment: Energy Procedia Volume: 4 Pages: 3231-3238 Published: 2011 DOI: 10.1016/j.egypro.2011.02.24.
27. Jens T. Birkholzer, Liange Zheng, Nicholas Spycher, Charuleka Varadharaja, Peter Nico, Groundwater quality changes in response to CO₂ leakage from deep geological storage, 2010 GSA Annual Meeting, 31 October – 3 November, Denver, Colorado USA.
28. Charuleka Varadharajan, Peter Nico, John Pugh, Liange Zheng, Nicolas Spycher, Jens Birkholzer and Rob Trautz, Evaluating the effects of CO₂ intrusion on trace metal mobility in freshwater aquifers, 2010 GSA Annual Meeting, 31 October – 3 November, Denver, Colorado USA.
29. Zheng, L., Spycher, N., Apps, J. and Birkholzer, J. 2010. Potential impacts of CO₂ leakage on the quality of fresh water aquifers Water-Rock Interaction 2010, Guanajuato, Mexico, Taylor & Francis Group, London.
30. Liange Zheng, John A. Apps, Nicolas, Spycher, Jens T. Birkholzer, Yousif Kharaka, James Thordsen, Evangelos Kakouros and Robert Trautz, Transient changes in shallow groundwater chemistry during the msu-zert CO₂ injection experiment, American Geophysical Union, Fall Meeting 2009.
31. Zheng, Liange, Apps, John, Spycher, Nicolas, Birkholzer, Jens, Kharaka, Yousif, Thordsen, James, Kakouros, Evangelos, Trautz, Robert, Rauch, Henry, Gullickson, Kadie, Changes in Shallow Groundwater Chemistry at the 2008 ZERT CO₂ Injection Experiment: II- Modeling Analysis, Eighth Annual Carbon Capture and Sequestration Conference, Pittsburgh, May 2009.
32. Liange Zheng, Jens T. Birkholzer, John A. Apps, Yousif, Kharaka, James, Thordsen, Evaluation of Groundwater Quality Changes in Response to CO₂ Leakage from Deep Geological Storage, 2009 Groundwater Protection Council Water/Energy Sustainability Symposium, Salt Lake City, Utah September 13-16, 2009.
33. Zheng, L., Apps, John, Spycher, Nicolas, Birkholzer, Jens, Kharaka, Yousif, Thordsen, James, Kakouros, Evangelos, Trautz, Robert, Geochemical Modeling of Changes in Shallow Groundwater Chemistry Observed in the ZERT CO₂ Injection Experiment. TOUGH Symposium 2009
34. Zheng, L.; Apps, J. A.; Zhang, Y.; Xu, T.; Birkholzer, J. T. Prediction of Groundwater Quality Changes in Response to CO₂ Leakage from Deep Geological Storage, American Geophysical Union, Fall Meeting 2008.

35. Zheng, L.; Apps, J. A.; Zhang, Y.; Xu, T.; Birkholzer, J. T. Prediction of Groundwater Quality Changes in Response to CO₂ Leakage from Deep Geological Storage, Computational Methods in Water Resources XVII International Conference, July 6-10, 2008, San Francisco, CA, USA.
36. J.T. Birkholzer, L. Zheng, J.A. Apps, Y. Zhang, T. Xu. Prediction of Groundwater Quality Changes in Response to CO₂ Leakage from Deep Geological Storage, European Geosciences Union General Assembly 2008 Vienna, Austria, 13 – 18 April 2008.
37. Apps, J.A., Y. Zhang, L. Zheng, T. Xu, J.T. Birkholzer, Identification of Thermodynamic Controls defining the Concentration of Hazardous Elements in Potable Ground Waters and the Potential Impact of Increasing Carbon Dioxide Partial Pressure, GHGT-9, Energy Procedia 1 (2008) 1917–1924, Washington DC
38. Zheng, L., J.A. Apps, Y. Zhang, T. Xu, J.T. Birkholzer, Reactive Transport Simulations to Study Groundwater Quality Changes in Response to CO₂ Leakage from Deep Geological Storage, Energy Procedia 1 (2008) 1887–1894, Washington DC.
39. J.T. Birkholzer, J.A. Apps, Y. Zhang, L. Zheng, T. Xu, Prediction of Groundwater Quality Changes in Response to CO₂ Leakage from Deep Geological Storage, American Geophysical Union, Fall Meeting 2007.
40. L. Zheng, J. Samper, Coupled THMC Model for the FEBEX in Situ Test, American Geophysical Union, Fall Meeting 2007.
41. Liange Zheng, F. Javier Samper Calvete, Modelos acoplados de flujo multifásico no isotermo y transporte reactivo en medios porosos estructurados y deformables, Estudios en la Zona no Saturada del Suelo. Córdoba, Spain, 2007
42. L. Zheng, J. Samper, L. Montenegro. Inverse hydrochemical models of aqueous extracts tests, Eleventh MIGRATION conference, Munich, Germany, 2007.
43. J. Samper, S. Dewonck, L. Zheng, Q. Yang, and A. Naves. Normalized sensitivities and parameter identifiability of in situ DIR diffusion experiments on Callovo-Oxfordian clay at Bure site, Eleventh MIGRATION conference, Munich, Germany, 2007.
44. L. Zheng, J. Samper, L. Montenegro and J.C. Mayor, Flow and reactive transport model of a ventilation experiment in opalinus clay, Third International Meeting Of Clays In Natural & Engineered Barriers For Radioactive Waste Confinement, 17th-20th September, 2007, Lille, France.
45. L. Zheng, J. Samper, A Coupled THMC model of FEBEX mock-up test, Third International Meeting Of Clays In Natural & Engineered Barriers For Radioactive Waste Confinement, 17th-20th September, 2007, Lille, France.
46. Zheng, L. and J. Samper. A dual continuum flow and reactive transport model for a long-term permeability test of FEBEX bentonite, in: GeoProc2006, 2006 International Conference on Coupled T-H-M-C Processes in Geosystems: Fundamentals, Modelling, Experiments and Applications, p350-356.
47. J. Samper and Zheng, L. Coupled THMC model for the FEBEX in situ test, in: GeoProc2006, 2006 International Conference on Coupled T-H-M-C Processes in Geosystems: Fundamentals, Modelling, Experiments and Applications, p97-108.
48. Zheng, L. and J. Samper. A dual continuum reactive transport model with n-th order solute transfer term for structured unsaturated soils, XVI International Conference on Computational Methods in Water Resources, 18-22 June 2006 Copenhagen, Denmark.

49. Samper, J., C. Yang, L. Zheng, L. Montenegro Z. Dai and G. Zhang, CORE: A general purpose code for groundwater flow, heat and solute transport, chemical reactions and biological processes in porous and fractured media, EGU, Vienna, Austria, 24 – 29 April 2005.
50. Zheng, L., J. Samper, Dual continuum models of fully coupled non-isothermal multiphase flow and reactive transport in porous media. EGU, Vienna, Austria, 24 – 29 April 2005.
51. Samper, J., L. Zheng and L. Montenegro, THC modelling of the interface of granite-engineering barrier, 1st. Annual Workshop Proceedings 6TH EC FP - FUNMIG IP. Saclay (France) 28th Nov.- 1st. Dec. 2005.
52. Zheng, L. and J. Samper. A dual continuum coupled multiphase flow model with mixed second order water transfer term for structured soil: I theory. VII Jornadas de investigación en la Zona no Saturada de Suelo, ISBN 84-9749-171-8, ZNS'05, *Coruña, noviembre 16-17, pp295-301, 2005.*
53. Zheng, L., J. Samper and L. Montenegro. A dual continuum coupled multiphase flow model with mixed second order water transfer term for structured soil: part II. Testing with synthetic cases and application to a real experiment. VII Jornadas de investigación en la Zona no Saturada de Suelo, ISBN 84-9749-171-8, ZNS'05, *Coruña, noviembre 16-17, pp301-307, 2005.*
54. Zheng, L. and J. Samper. Inverse problem of non-isothermal multiphase flow and reactive transport in deformable porous media. VII Jornadas de investigación en la Zona no Saturada de Suelo, ISBN 84-9749-171-8, ZNS'05, *Coruña, noviembre 16-17, pp307-313, 2005.*
55. Zheng, L. and J. Samper. Formulation of the inverse problem of non-isothermal multiphase flow and reactive transport in porous media, En: *Computer Methods in Water Resources*, pp. 1317-1327, 2004.
56. Samper, J., A. M. Fernández, L. Zheng, L. Montenegro, P. Rivas, and Z. Dai. Forward and inverse modelling of multicomponent reactive transport in single and double porosity media, En: *Computer Methods in Water Resources*, pp. 805-816, 2004.
57. L. Zheng, J. Samper, Inverse problem of non-isothermal multiphase flow and reactive transport in porous media, EGU, Vienna, Austria, 24 – 29 April 2004.
58. J. Samper, A. M. Fernández, L. Zheng, L. Montenegro, P. Rivas y Z. Dai. Modelización directa e inversa del transporte reactivo multicomponente en medios de doble porosidad, En: *VI Jornadas de Zona No Saturada, Valladolid. Temas de Investigación en Zona no Saturada, Valladolid*, pp.261-268, 2003.
59. Samper, J., A. M. Fernández, L. Zheng, L. Montenegro, P. Rivas y Z. Dai. Calibration and inverse modelling of multicomponent reactive transport in single and dual porosity media, En: *Eos Trans. AGU, Fall Meeting, San Francisco. Diciembre 2003*,. Abstract, 2003.
60. Liansheng He, Yousheng Zhao, Liange Zheng, The study on natural materials of the liner for MSW landfill, Environmental Engineering (in Chinese), vol 4, 2002.
61. Zheng L. and Zhao Yongsheng (2000). "Landfill barrier-overview and prospect". Journal of Geoscience Research in Northeast China. No.1, Vol.3, 87-98 pp.