

CURRICULUM VITAE OF QUANLIN ZHOU

6/2019

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1. EDUCATION AND DEGREES

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|-------------|--|
| 1996 – 1999 | Ph.D. in Civil & Environmental Engineering
Technion-Israel Institute of Technology, Haifa, Israel |
| 1987 – 1990 | M. Eng. in Hydrology and Water Resources
Hohai University, Nanjing, China. |
| 1983 – 1987 | B. Eng. in Hydrology and Water Resources
Hohai University, Nanjing, China |

2. EMPLOYMENT HISTORY

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|--------------------|---|
| 01/20012 – Present | Geological Staff Scientist (Career), LBNL |
| 11/2008 – 12/2011 | Geological Research Scientist (Career), LBNL |
| 06/2006 – 10/2008 | Geological Research Scientist (Career-Track), LBNL |
| 09/2002 – 06/2005 | |
| 03/2001 – 09/2002 | Geological Postdoctoral Fellow
Energy Geosciences Division
Lawrence Berkeley National Laboratory (LBNL)
1 Cyclotron Road, MS 74-316C, Berkeley, CA 94720 |
| 06/2005 – 06/2006 | Senior Modeler, ETIC Engineering Inc.
1333 Broadway, Suite 1015, Oakland, CA 94612 |
| 10/2000 – 03/2001 | Postdoctoral Fellow
Department of Geology & Geophysics
University of Wisconsin at Madison
1215 W. Dayton Street, Madison, WI53706 |
| 10/1999 – 09/2000 | Postdoctoral Associate
Department of Civil & Environmental Engineering, MIT
15 Vassar Street, Cambridge, MA 02139 |
| 10/1995 – 10/1996 | Senior Engineer |
| 07/1990 – 10/1995 | Engineer
Nanjing Institute of Hydrology and Water Resources
Ministry of Water Resources, Nanjing, China |

3. RESEARCH EXPERIENCE

3.1 Research Interests:

- Analytical and numerical modeling of fluid flow and heat/solute transport in fractured/porous media for geological carbon storage, geothermal energy production, nuclear waste disposal, and contamination remediation
- Multiphase and unsaturated flow in heterogeneous fractured/porous media: preferential flow, lateral spreading, upscaling and effective properties, and fracture-matrix interactions
- Geological carbon storage: fundamental and dynamic processes of CO₂ flow channeling, invasion, spreading, and breakthrough (CISB) at laboratory and field scale; CO₂ plume migration and enhanced storage in heterogeneous and fractured rocks; pressure buildup and brine migration and their impact on groundwater resources at basin scale; early leakage detection by joint inversion of reservoir/overburden pressure and land surface uplift; risk assessment, uncertainty quantification, and wellbore/fault leakage modeling
- Diffusive transport in fractured rock and layered porous media at small and field scales: fundamental diffusive flux equation and memory functions; coupling of hydraulic, solute, or thermal diffusion with advection and dispersion in fractures or high-permeability channels; behavior of field-scale effective diffusion coefficient for heterogeneous media; effective diffusion in unsaturated and multiphase flow conditions
- Field flow and transport processes with enhanced understanding: data integration and analysis, forward modeling, and joint inversion for several field projects of geological carbon storage; analysis of field tracer tests; large-scale contaminant plumes with physical, chemical, microbial (biodegradation) processes
- Density-dependent flow for seawater intrusion and convective dissolved CO₂ transport

3.2 Research Proposals Funded (FY07-FY19, Total Funds as PI and Co-PI: \$10.179 M)

Ongoing Projects in Geological Carbon Storage and Geothermal Systems

1. Offshore Gulf of Mexico Partnership for carbon capture and storage (FY18-FY22, Co-PI with Curt Oldenburg, \$800K funded by USDOE)
2. Toward 100 million tons plus: Basin-scale assessments revisited (FY19-FY21, PI: Jens Birkholzer, \$1,710K funded by TOTAL)
3. An integrated risk management and decision-support system for ensuring the integrity of underground natural gas storage infrastructure in California (FY17-FY20, PI: Yingqi Zhang, \$3,000K funded by CEC)
4. The EGS Collab SIGMA-V Project: Stimulation investigations for geothermal modeling analysis and validation (FY17-FY19, PI: Tim Kneafsey, \$9,000K/year funded by USDOE)
5. Comprehensive physical-chemical modeling to reduce risks and costs of flexible geothermal energy production (FY17-FY20, Co-PI with Jonny Rutqvist, \$1,000K funded by CEC)
6. NRAP Project: Thermal fracturing at two CO₂ storage sites (FY18-FY21, PI, \$120K funded by DOE)

Completed Projects in Geological Carbon Storage (FY2007 – FY2018)

7. NRAP Project: Fault leakage at the Kimberlina site (FY15-FY18, **PI, \$320K** funded by DOE)
8. Multiscale modeling of CO₂ migration and trapping in fractured reservoirs with validation by model comparison and real-site applications (DE-FE-0023323, FY15-FY17, **PI**, LBNL share of **\$200K**, total project \$1,000K led by Prof. Mike Celia at Princeton University, funded by USDOE)
9. Modeling and monitoring support of the Big Sky Partnership’s Phase III project at Kevin Dome (FY2011 – FY2018, **Co-PI** with Curtis Oldenburg and Task Lead for modeling, **\$2,671K** funded by USDOE)
10. An Advanced Joint Inversion System for CO₂ Storage Modeling with Large Data Sets for Characterization and Real-Time Monitoring — Enhancing Storage Performance and Reducing Failure Risks under Uncertainties (DE-FE-0009260, FY13-FY15, **PI**, LBNL share of **\$200K**, total project \$1,000K led by Prof. Peter Kitanidis at Stanford University, funded by USDOE)
11. Stochastic Joint Inversion for CO₂ Storage Modeling and Monitoring (FY13-FY15, **PI, \$345K** funded by USDOE)
12. Large-scale hydrologic impacts of CO₂ geological storage (FY10 – FY13, **Co-PI** with Jens Birkholzer, **\$1,391K** funded by USDOE) (\$375K in FY10 + \$386K in FY11 + \$380K in FY12 + \$250K in FY13)
13. Joint inversion of monitoring data for early leakage detection (FY10 – FY13, **PI, \$2,000K** funded by USDOE)
14. Validation of models simulating capillary and dissolution trapping during injection and post-injection of CO₂ in heterogeneous geological formations using data from intermediate scale test systems (DE-FE-0004630, FY2011 – FY2013, \$600K funded by USDOE, LBNL share of \$150K)
15. Potential impacts of future geological storage of CO₂ on the groundwater resources in California’s Central Valley (September 2010 – May 2013, **PI, \$490K** funded by California Energy Commission)
16. Collaboration with China on geologic carbon sequestration: Novel field tests to characterize heterogeneity for China’s first pilot test (FY2011 – FY2012, **PI, \$315K**, LDRD, funded by Lawrence Berkeley National Laboratory)
17. Analytical and numerical modeling in support of EPA Area-of-Review estimates and geologic sequestration modeling framework (2008-2012, **PI, \$447.5K** funded by USEPA)
18. Large-scale hydrological evaluation and modeling of the impact of CO₂ geological sequestration on groundwater systems (FY2007-FY2009, **PI: Jens Birkholzer, \$900K** funded by USDOE)

4. AWARDS AND PROFESSIONAL SOCIETIES

- “Director’s Award for Exceptional Achievement,” Lawrence Berkeley National Laboratory, 2012
- “Outstanding Performance Award,” Lawrence Berkeley National Laboratory, 2007
- “The Miriam and Aaron Gutwirth Award,” the Gutwirth Foundation, Israel, 1999
- “The Irmay Prize,” Dept. of Civil Engineering, Technion-Israel Institute of Technology, Israel, 1998
- Supervisor of two postdoctoral fellows, two project scientist, and five visiting PhD students/scholars

- An international member of the Steering Committee of the CO2CARE (CO2 Site Closure Assessment Research) Consortium of multiple institutions in EU; A member representing LBNL, a partner of the board of associated parties (BAP) of the PANACEA consortium and MUSTANG consortium in EU.
- Keynote Speech on “Multiple Flow Paths of CO₂ Migration Revealed from Field Monitoring of Frio I Pilot Test and Cranfield Large-Scale Demonstration Project: Potential Applications of Stochastic Joint Inversion”, at the EU-FP7 Funded PANACEA Consortium Meeting, March 31st -- April 1st, 2014, Trondheim, Norway
- Chaired sessions in the Stanford Geothermal Workshops in 2017 and 2018
- Member, American Geophysical Union, Geological Society of America
- Reviewers for top journals in hydrogeology, one book chapter, and one book

Water Resources Research	Hydrogeology Journal
Advances in Water Resources	Environmental Science & Technology
Transport in Porous Media	International Journal of Greenhouse Gas Control
Journal of Contaminant Hydrology	Journal of Geotechnical and Geoenvironmental Engineering
Ground Water	Computers and Geosciences
Journal of Hydrology	AGU Monograph book chapter
Book: “Geological Storage of CO ₂ : Modeling Approaches for Large-Scale Simulation” by Jan M. Nordbotten and Michael A. Celia	

5. REFERENCES

Prof. Jacob Bear

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6. SCIENTIFIC AND PROFESSIONAL PUBLICATIONS

6.1. Peer-Reviewed Journal Publications [Total SCI Citations: 1781, h-Index = 23]

- J68. **Zhou, Q.** (2019). A hybrid discrete-continuum model for modeling supercritical CO₂ storage in fractured reservoirs. *Water Resources Research* (to be submitted in October 2019).
- J67. **Zhou, Q.** (2019). Multirate invasion of supercritical CO₂ in fractured reservoirs: Effects of buoyancy and matrix capillary continuity. *Water Resources Research* (to be submitted in October 2019).
- J66. **Zhou, Q.**, Bissel, R., Ringrose, P. S., Vasco, D. W., & Foxall, W. (2019). Dynamic processes of CO₂ storage in the field: 3. Thermal breakdown, caprock fracturing, and CO₂ flow channeling and storage in the fractured reservoir at In Salah, Algeria. *Water Resources Research* (to be submitted in July 2019)
- J65. Chang, C., Kneafsey, T. J., & **Zhou, Q.** (2019). Core-flooding experiments on three-dimensional fracture-matrix interactions with application to CO₂ geological sequestration.
- J64. Appriou, D., Bonneville, A., **Zhou, Q.**, & Gasperikova, E. (2019). Assessment of time-lapse gravity monitoring for detecting CO₂ leakage from a faulted subsurface storage complex. *International Journal of Greenhouse Gas Control* (submitted)
- J63. **Zhou, Q.**, Li, C., Li, Y., Zhang, K., & Wang, Y. (2019). Dynamic processes of CO₂ storage in the field: 2. Thermal fracturing and self-propping induced by liquid CO₂ injection into the multilayered reservoirs at Ordos, China. *Water Resources Research* (submitted)
- J62. **Zhou, Q.**, Yang, X., Zhang, R., Hosseini, S. A., Ajo-Franklin, J. B., Freifeld, B. M., Daley, T. M., & Hovorka, S. D. (2019). Dynamic processes of CO₂ storage in the field: 1. Multiscale and multipath channeling of CO₂ flow in the hierarchical fluvial reservoir at Cranfield, Mississippi. *Water Resources Research* (submitted)
- J61. **Zhou, Q.** (2019). Comment on "Effects of convection and fracture boundary conditions on heat transfer shape factor in fractured geothermal reservoirs" by Abbasi, Madani, Moraveji, and Sharifi. *Transport in Porous Media* (submitted)
- J60. Chang, C., Kneafsey, T. J., **Zhou, Q.**, Oostrom, M., & Ju, Y. (2019). Scaling the impacts of pore-scale characteristics on unstable supercritical CO₂-water drainage using a complete capillary number. *International Journal of Greenhouse Gas Control*, 86, 11-21. <https://doi.org/10.1016/j.ijggc.2019.04.010>. [SCI Citations: 0]. [PDF](#)
- J59. González-Nicolás, A., Cihan, A., Petrusak, R., **Zhou, Q.**, Trautz, R., Riestenberg, D., Godec, M., & Birkholzer, J. T. (2019). Pressure management via brine extraction in geological CO₂ storage: adaptive optimization strategies under poorly characterized reservoir conditions. *International Journal of Greenhouse Gas Control*, 83, 176-185. <https://doi.org/10.1016/j.ijggc.2019.02.009>. [SCI Citations: 0]. [PDF](#)
- J58. Oldenburg, C. M., Pan, L., **Zhou, Q.**, Dobeck, L., & Spangler, L. (2019). On producing CO₂ from subsurface reservoirs: Simulations of decompression cooling and phase change. *Greenhouse Gases: Science and Technology*, 9, 194–208. <https://doi.org/10.1002/ghg.1852>. [SCI Citations: 0]. [PDF](#)
- J57. **Zhou, Q.**, Oldenburg, C. M., & Rutqvist, J. (2019). Revisiting the analytical solutions of heat transport in fractured reservoirs using a generalized multirate memory function. *Water Resources Research*, 55, 1405–1428. <https://doi.org/10.1029/2018WR024150>. [SCI Citations: 0]. [PDF](#)

- J56. Onishi, T., Nguyen, M. C., Carey, J. W., Will, R., Zaluski, W., Bowen, D. W., Devault, C., Duguid, A., **Zhou, Q.**, Fairweather, S. H., Spangler, L. H., & Stauffer, P. H. (2019). Potential CO₂ and brine leakage through wellbore pathways for geologic CO₂ sequestration using the National Risk Assessment Partnership tools: Application to the Big Sky Regional Partnership. *International Journal of Greenhouse Gas Control*, 81, 44-65. <https://doi.org/10.1016/j.ijggc.2018.12.002>. [SCI Citations: 1]. [PDF](#)
- J55. Chang, C., **Zhou, Q.**, Kneafsey, T. J., Oostrom, M., & Ju, Y. (2019). Coupled supercritical CO₂ dissolution and water flow in pore-scale micromodels. *Advances in Water Resources*, 123, 54–69. <https://doi.org/10.1016/j.advwatres.2018.11.004>. [SCI Citations: 0]. [PDF](#)
- J54. **Zhou, Q.**, Oldenburg, C. M., Rutqvist, J., & Birkholzer, J. T. (2017). Revisiting the fundamental analytical solutions of heat and mass transfer: The kernel of multirate and multidimensional diffusion. *Water Resources Research*, 53, 9960–9979, <https://doi.org/10.1002/2017WR021040>. [SCI Citations: 2]. [PDF](#)
- J53. Jeanne, P., Rutqvist, J., Wainwright, H. M., Rinaldi, A. P., Foxall, W., **Zhou, Q.**, Birkholzer, J. T., & Layland-Bachmann, C. (2017). Effects of the distribution and evolution of the coefficient of friction along a fault on the assessment of the seismic activity associated with a hypothetical industrial-scale geologic CO₂ sequestration operation. *International Journal of Greenhouse Gas Control* 66, 254-263, <https://doi.org/10.1016/j.ijggc.2017.09.018>. [SCI Citations: 0]. [PDF](#)
- J52. Chang, C., Ju, Y., Xie, H., **Zhou, Q.**, & Gao, F. (2017). Non-Darcy interfacial dynamics of air-water two-phase flow in rough fractures under drainage conditions. *Scientific Report*, 7: 4570 | <https://doi.org/10.1038/s41598-017-04819-x>. [SCI Citations: 1]. [PDF](#)
- J51. Agartan, E., Cihan, A., Illangasekare, T. H., **Zhou, Q.**, & Birkholzer, J. T. (2017). Mixing and trapping of dissolved CO₂ in deep geologic formations with shale layers. *Advances in Water Resources*, 105, 67–81, <https://doi.org/10.1016/j.advwatres.2017.04.014>. [SCI Citations: 2]. [PDF](#)
- J50. Chang, C., **Zhou, Q.**, Oostrom, M., Kneafsey, T. J., & Mehta, H. (2017). Pore-scale supercritical CO₂ dissolution and mass transfer under drainage conditions. *Advances in Water Resources*, 100, 14–25, <https://doi.org/10.1016/j.advwatres.2016.12.003>. [SCI Citations: 6]. [PDF](#)
- J49. **Zhou, Q.**, Oldenburg, C. M., Spangler, L.H., & Birkholzer, J. T. (2017). Approximate solutions for diffusive fracture-matrix transfer: Application to storage of dissolved CO₂ in fractured rocks. *Water Resources Research*, 53(2), 1746–1762, <https://doi.org/10.1002/2016WR019868>. [SCI Citations: 6]. [PDF](#)
- J48. Trevisan, L., Pini, R., Cihan, A., Birkholzer, J. T., **Zhou, Q.**, Gonzalez-Nicolas, A., & Illangasekare, T. H. (2017). Imaging and quantification of spreading and trapping of carbon dioxide in saline aquifers using meter-scale laboratory experiments. *Water Resources Research*, 53(1), 485–502, <https://doi.org/10.1002/2016WR019749>. [SCI Citations: 9]. [PDF](#)
- J47. Jeanne, P., Rutqvist, J., Wainwright, H. M., Foxall, W., Bachmann, C., **Zhou, Q.**, Rinaldi, A. P., & Birkholzer, J. T. (2016). Effects of in situ stress measurement uncertainties on assessment of predicted seismic activity and risk associated with a hypothetical industrial-scale geologic CO₂ sequestration operation. *Journal of Rock Mechanics and Geotechnical Engineering*, 8(6), 873–885, <https://doi.org/10.1016/j.jrmge.2016.06.008>. [SCI Citations: 2]. [PDF](#)
- J46. Oldenburg, C. M., Cihan, A., **Zhou, Q.**, Fairweather, S., & Spangler, L. H. (2016). Geologic carbon sequestration injection wells in over-pressured storage reservoirs: Estimating area of review.

- Greenhouse Gases: Science and Technology*, 6(6): 775–786, [https://doi.org/ 10.1002/ghg.1607](https://doi.org/10.1002/ghg.1607). [SCI Citations: 0]. [PDF](#)
- J45. Tian, L., Yang, Z., Jung, B., Joodaki, S., Erlström, M., **Zhou, Q.**, & Niemi, A. (2016). Integrated simulations of CO₂ spreading and pressure response of Southwest Scania Site, Sweden. *Greenhouse Gases: Science and Technology*, 6(4): 531–545, [https://doi.org/ 10.1002/ghg.1583](https://doi.org/10.1002/ghg.1583). [SCI Citations: 1]. [PDF](#)
- J44. Chang, C., **Zhou, Q.**, Kneafsey, T. J., Oostroom, M., Wietsma, T. W., & Yu, Q. (2016). Pore-scale supercritical CO₂ dissolution and mass transfer under imbibition conditions. *Advances in Water Resources* 92, 142–158, <https://doi.org/10.1016/j.advwatres.2016.03.015>. [SCI Citations: 13]. [PDF](#)
- J43. Wang, Y., Hu, M., **Zhou, Q.**, & Rutqvist, J. (2016). A new second-order numerical manifold method model with an efficient scheme for analyzing free surface flow with inner drains. *Applied Mathematical Modeling*, 40, 1427–1445, <https://doi.org/10.1016/j.apm.2015.08.002>. [SCI Citations: 8]. [PDF](#)
- J42. Trevisan, L., Pini, R., Cihan, A., Birkholzer, J. T., **Zhou, Q.**, & Illangasekare, T. H. (2015). Experimental analysis of spatial correlation effects on capillary trapping of supercritical CO₂ at the intermediate laboratory scale in heterogeneous porous media. *Water Resources Research*, 51, 8791–8805, <https://doi.org/10.1002/2015WR017440>. [SCI Citations: 20]. [PDF](#)
- J41. Jung, Y., **Zhou, Q.**, & Birkholzer, J. T. (2015). On the detection of leakage pathways in geological CO₂ storage systems using pressure monitoring data: Impact of model parameter uncertainties. *Advances in Water Resources*, 84, 112–124, [https://doi.org/ 10.1016/j.advwatres.2015.08.005](https://doi.org/10.1016/j.advwatres.2015.08.005). [SCI Citations: 6]. [PDF](#)
- J40. Birkholzer, J. T., Oldenburg, C. M., & **Zhou, Q.** (2015). CO₂ migration and pressure evolution in deep saline aquifers. *International Journal of Greenhouse Gas Control*, 40, 203–220, <https://doi.org/10.1016/j.ijggc.2015.03.022>. [SCI Citations: 38]. [PDF](#)
- J39. Agartan, E., Trevisan, L., Cihan, A., Birkholzer, J., **Zhou, Q.**, & Illangasekare, T. H. (2015). Experimental study on effects of geologic heterogeneity in enhancing dissolution trapping of supercritical CO₂. *Water Resources Research*, 51, 1635–1648. <https://doi.org/10.1002/2014WR015778>. [SCI Citations: 30]. [PDF](#)
- J38. Wang, Y., Hu, M., **Zhou, Q.**, & Rutqvist, J. (2014). Energy-work-based numerical manifold seepage analysis with an efficient scheme to locate the phreatic surface. *International Journal for Numerical and Analytical Methods in Geomechanics*, 38, 1633–1650. [https://doi.org/ 10.1002/nag.2280](https://doi.org/10.1002/nag.2280). [SCI Citations: 15]. [PDF](#)
- J37. Trevisan, L., Cihan, A., Agartan, E., Mori, H., Fagerlund, F., Birkholzer, J. T., **Zhou, Q.**, & Illangasekare, T. H. (2014). Investigation of mechanisms of supercritical CO₂ trapping in deep saline reservoirs using surrogate fluids at ambient laboratory conditions. *International Journal of Greenhouse Gas Control* 29, 35-49. [https://doi.org/ 10.1016/j.ijggc.2014.07.012](https://doi.org/10.1016/j.ijggc.2014.07.012). [SCI Citations: 17]. [PDF](#)
- J36. Chang, C., **Zhou, Q.**, Guo, J., & Yu, Q. (2014). Supercritical CO₂ dissolution and mass transfer in low-permeability sandstone: Effect of concentration difference in water-flood experiments. *International Journal of Greenhouse Gas Control* 28, 328-342. [https://doi.org/ 10.1016/j.ijggc.2014.07.006](https://doi.org/10.1016/j.ijggc.2014.07.006). [SCI Citations: 13]. [PDF](#)

- J35. Wainwright, H. M., Finsterle, S., Jung, Y., **Zhou, Q.**, & Birkholzer, J. T. (2014). Making sense of global sensitivity analysis. *Computers & Geoscience*, 65, 84-94. <https://doi.org/10.1016/j.cageo.2013.06.006>. [SCI Citations: 76]. [PDF](#)
- J34. Cihan, A., **Zhou, Q.**, Birkholzer, J. T., Kraemer, S.R. (2014). Flow in horizontally anisotropic multilayered aquifer systems with leaky wells and aquitards. *Water Resources Research*, 50, 741-747. <https://doi.org/10.1002/2013WR013867>. [SCI Citations: 8]. [PDF](#)
- J33. Cihan, A., Birkholzer, J. T., Illangasekare, T. H., & **Zhou, Q.** (2014). A modeling approach to represent hysteresis in capillary pressure-saturation relationship based on fluid connectivity in void space. *Water Resources Research*, 50, 119-131. <https://doi.org/10.1002/2013WR014280>. [SCI Citations: 9]. [PDF](#)
- J32. Liu, X., **Zhou, Q.**, Kitanidis, P. K., Birkholzer, J. T. (2014). Fast iterative implementation of large-scale nonlinear geostatistical inverse modeling. *Water Resources Research*, 50, 198-207. <https://doi.org/10.1002/2012WR013241>. [SCI Citations: 9]. [PDF](#)
- J31. Chen, F., Wiese, B., **Zhou, Q.**, Kowalsky, M. B., Norden, B., Kempka, T., & Birkholzer, J. T. (2014). Numerical modeling of the pumping tests at the CO₂ pilot site in Ketzin, Germany: Model calibration and heterogeneity effects. *International Journal of Greenhouse Gas Control*, 22, 200-212. <https://doi.org/10.1016/j.ijggc.2014.01.003>. [SCI Citations: 10]. [PDF](#)
- J30. Jung, Y., **Zhou, Q.**, & Birkholzer, J. T. (2013). Early detection of brine and CO₂ leakage through abandoned wells using pressure and surface-deformation monitoring data: Concept and demonstration. *Advances in Water Resources*, 62, 555-569. <https://doi.org/10.1016/j.advwatres.2013.06.008>. [SCI Citations: 35]. [PDF](#)
- J29. Liu, X., **Zhou, Q.**, Birkholzer, J. T. & Illman, W. A. (2013). Geostatistical reduced-order models in under-determined inverse problems. *Water Resources Research*, 49(10), 6587–6600. <https://doi.org/10.1002/wrcr.20489>. [SCI Citations: 11]. [PDF](#)
- J28. Birkholzer, J. T., Nicot, J.-P., Oldenburg, C. M., **Zhou, Q.**, Kraemer, S., & Bandilla, K. (2013). Reply to comments by Schnaar et al. on “Brine flow up a well caused by pressure perturbation from geologic carbon sequestration: static and dynamic Evaluations” by Birkholzer et al. (2011). *International Journal of Greenhouse Gas Control*, 17, 544–545. <https://doi.org/10.1016/j.ijggc.2013.06.001>.
- J27. Wainwright, H., Finsterle, S., **Zhou, Q.**, & Birkholzer, J.T. (2013). Modeling the performance of large-scale CO₂ storage systems: A comparison of different sensitivity analysis methods. *International Journal of Greenhouse Gas Control*, 17, 189–205. <https://doi.org/10.1016/j.ijggc.2013.05.007>. [SCI Citations: 40]. [PDF](#)
- J26. Chang, C., **Zhou, Q.**, Xia, L., Li, X., & Yu, Q. (2013). Dynamic displacement and non-equilibrium dissolution of supercritical CO₂ in low-permeability sandstone: An experimental study. *International Journal of Greenhouse Gas Control*, 14, 1-14. <https://doi.org/10.1016/j.ijggc.2012.12.025>. [SCI Citations: 44]. [PDF](#)
- J25. Cihan, A., Birkholzer, J. T., & **Zhou, Q.** (2013). Pressure buildup and brine migration in CO₂ storage systems with multiple leakage pathways: Application of a new analytical solution. *Ground Water*, 51(2), 252–267. <https://doi.org/10.1111/j.1745-6584.2012.00972.x>. [SCI Citations: 42]. [PDF](#)
- J24. Birkholzer, J. T., Cihan, A., & **Zhou, Q.** (2012). Impact-driven pressure management via targeted brine extraction – Conceptual studies of CO₂ storage in saline formations. *International Journal of*

- Greenhouse Gas Control*, 7, 168-180. <https://doi.org/10.1016/j.ijggc.2012.01.001>. [SCI Citations: 66]. [PDF](#)
- J23. Cihan, A., **Zhou, Q.**, & Birkholzer, J. T. (2011). Analytical solutions for pressure perturbation and fluid leakage through aquitards and wells in a multilayered system. *Water Resources Research*, 47, W10504. <https://doi.org/10.1029/2011WR010721>. [SCI Citations: 43]. [PDF](#)
- J22. Birkholzer, J. T., Nicot, J.-P., Oldenburg, C. M., **Zhou, Q.**, Kraemer, S., & Bandilla, K. (2011). Brine flow up a well caused by pressure perturbation from geologic carbon sequestration: Static and dynamic evaluations. *International Journal of Greenhouse Gas Control*, 5(4), 850-861. <https://doi.org/10.1016/j.ijggc.2011.01.003>. [SCI Citations: 54]. [PDF](#)
- J21. **Zhou, Q.**, & Birkholzer, J. T. (2011). On scale and magnitude of pressure build-up induced by large-scale geologic storage of CO₂. *Greenhouse Gases: Science and Technology*, 1, 11-20. <https://doi.org/10.1002/ghg3.001>. [SCI Citations: 46]. [PDF](#)
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- J19. **Zhou, Q.**, Birkholzer, J. T., Mehnert, E., Lin, Y.-F., & Zhang, K. (2010). Modeling basin- and plume-scale processes of CO₂ storage for full-scale deployment. *Ground Water*, 48(4), 494-514. <https://doi.org/10.1111/j.1745-6584.2009.00657.x>. [SCI Citations: 114]. [PDF](#)
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6.2. Book Chapters

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6.3. Conference Papers

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- C71. **Zhou, Q.**, C.M. Oldenburg, J. Rutqvist, T.J. Kneafsey, and The EGS Collab Team, 2018. Analytical and numerical modeling of heat transport in fractured reservoirs. PROCEEDINGS, 43rd Workshop on Geothermal Reservoir Engineering Stanford University, Stanford, California, February 12-14, 2018 SGP-TR-213
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- C67. **Zhou, Q.**, C.M. Oldenburg, and J.T. Birkholzer. Modeling CO₂ storage in fractured reservoirs: Fracture-matrix interactions of free-phase and dissolved CO₂, H41B-1439, AGU Fall 2017 Meeting, New Orleans, December, 11-15, 2017.
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- C65. Jeanne, P., J. Rutqvist, H.M. Wainwright, W. Foxall, C.E. Layland-Bachmann, **Q. Zhou**, A.P. Rinaldi, J.T. Birkholzer, Assessment of the predicted seismic activity associated with a hypothetical industrial-scale geologic CO₂ sequestration operation: effect of in-situ stress measurement

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- C63. **Zhou, Q.**, C.M. Oldenburg, J. Ajo-Franklin, S. Fairweather and L.H. Spangler, 2015 (Talk). Thermal perturbations induced by CO₂ production from the Kevin Dome reservoir, TOUGH Symposium 2015, September 28-30, 2015, Berkeley, CA.
- C62. Zhang, Y., L. Blanco-Martín, C. Doughty, S. Finsterle, **Q. Zhou**, and C. M. Oldenburg, 2015. Determining optimal monitoring strategies for managing risks of cyclic steam injection using data-worth analysis, TOUGH Symposium 2015, September 28-30, 2015, Berkeley, CA.
- C61. **Zhou, Q.**, C.M. Oldenburg, J. Ajo-Franklin, S. Fairweather, L. Tollefson, and L.H. Spangler, 2015. Modeling CO₂ injection into fractured Duperow Formation at Kevin Dome using a multi-continuum approach, Carbon Storage R&D Project Review Meeting, August 18-20, 2015, Pittsburgh, Pennsylvania.
- C60. **Zhou, Q.**, J.T. Birkholzer¹, S. Bachu, W.D. Peck, and J. Braunberger, 2014 (Talk). Assessing the Regional-Scale Dynamic Storage Capacity of the Northern Plains – Prairie Basal Aquifer, *the 12th International Conference on Greenhouse Gases Technologies (GHGT-12)*, October 4-9, Austin, TX.
- C59. Oldenburg, C.M., A. Cihan **Q. Zhou**, S. Fairweather, L.H. Spangler, 2014. Delineating area of review in a system with pre-injection relative overpressure, *the 12th International Conference on Greenhouse Gases Technologies (GHGT-12)*, October 4-9, Austin, TX.
- C58. Thibeau, S., S. Bachu, J.T. Birkholzer, S. Holloway, F. Neele, **Q. Zhou**, 2014 (Talk). Using Pressure and Volumetric Approaches to Estimate CO₂ Storage Capacity in Deep Saline Aquifers, *the 12th International Conference on Greenhouse Gases Technologies (GHGT-12)*, October 4-9, Austin, TX.
- C57. Cihan, A., J.T. Birkholzer, M. Binachi, L. Trevisan, **Q. Zhou**, T. Illangasekare, 2014. A Connectivity-Based Upscaling Approach for Modeling Two-Phase Flow in Heterogeneous Geological Formations, *the 12th International Conference on Greenhouse Gases Technologies (GHGT-12)*, October 4-9, Austin, TX.
- C56. Trevisan, L., R. Pini, A. Cihan, J.T. Birkholzer, Q. Zhou, T.H. Illangasekare, 2014. Experimental investigation of supercritical CO trapping mechanisms at the intermediate laboratory scale in well-defined heterogeneous porous media, *the 12th International Conference on Greenhouse Gases Technologies (GHGT-12)*, October 4-9, Austin, TX.
- C55. Agartan, E., A. Cihan, J.T. Birkholzer, **Q. Zhou**, and T. Illangasekare, 2014. Effects of Lithology of Deep Layered Geologic Formations on Trapping of Dissolved Supercritical CO₂, *Gordon Research Seminar & Gordon Research Conference: Flow & Transport in Permeable Media*, July 5-6, 2014, Bates College, Lewiston, ME.
- C54. Liu, X., **Q. Zhou**, J.T. Birkholzer, W. Illaman, 2014 (Poster). Geostatistical Reduced-Order Models in Highly-Parameterized Inverse Problems, *XX International Conference on Computational Methods in Water Resources*, Stuttgart, Germany, June 10-13, 2014.
- C53. Illangasekare, T.H., M. Plampin, L. Trevisan, E. Agartan, J. Vargas-Johnson¹, H. Mori, T. Sakaki, R. Pawar, A. Cihan, J.T. Birkholzer, and **Q. Zhou**, 2014 (Invited Talk). Intermediate Scale Experimental

- Investigation of CO₂ Trapping and Leakage Mechanisms in Deep Geologic Formations for Model Improvement, *6th International Conference on Porous Media & Annual Meeting of the International Society for Porous Media*, May 27 - 30, 2014 Milwaukee, Wisconsin USA.
- C52. **Zhou, Q.**, J.T. Birkholzer, C. M. Oldenburg, 2014 (Poster). Analysis of Injectivity at Four Representative Geological CO₂ Injection Sites, *The thirteenth Annual Carbon Capture, Utilization, and Storage Conference*, April 28 - May 1, Pittsburgh, PA.
- C51. **Zhou, Q.**, 2014 (Keynote talk). Multiple flow paths of CO₂ migration revealed from field monitoring of Frio I Pilot test and Cranfield large-scale demonstration project: Potential applications of stochastic joint inversion, presented at *the EU-FP7 Funded PANACEA Consortium Meeting*, March 31st -- April 1st, 2014, Trondheim, Norway.
- C50. Liu, X., **Q. Zhou**, J. T. Birkholzer, and J. Lee, 2014 (Talk). Geostatistical Reduced-Order Models in Inverse Problems, *2014 SIAM Conference on Uncertainty Quantification*, Savannah, GA, March 31 to April 3, 2014.
- C49. **Zhou, Q.**, F. Chen, Y. Jung, X. Liu, J.T. Birkholzer, B. Wiese, B. Norden, T. Kempka, 2013 (Talk). Inversion Applications to Modeling Pumping Tests and Early Leakage Detection at the Ketzin Site, Extended Abstract, CO₂CARE Final Scientific Conference 2013 and Joint Meeting of CO₂CARE Steering Committee and General Assembly, GFZ Helmholtz Center, Potsdam, Germany, November 4-6, 2013.
- C48. Wainwright, H.M., S. Finsterle, **Q. Zhou** and J.T. Birkholzer, 2013. Improved understanding of global sensitivity analysis: Applications to CO₂ storage systems, *MODFLOW and More 2013: Translating Science into Practice*, June 2-5, Colorado School of Mines, Golden, CO.
- C47. Cihan, A., J.T. Birkholzer, L. Trevisan, **Q. Zhou**, T. Illangasekare, 2013. A Theoretical Approach Based on Description of Void Space Connectivity for Representing Hysteretic Capillary Pressure-Saturation Relationship, Abstract submitted to *MODFLOW and More Conference: Translating Science into Practice 2013*, Golden, CO, June 2-5, 2013.
- C46. ARTAGAN, E., ILLANGASEKARE, T., CIHAN, A., BIRKHOLZER, J.T., ZHOU, Q., TREVISAN, L. (2013): Investigation of Multi-Phase Modeling Approaches for Behavior of Supercritical CO₂ in Deep Formations Using Analog Fluids in the Laboratory, Abstract submitted to Modflow and More Conference 2013, Golden, CO, June 2013.
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- C43. Liu X., **Q. Zhou**, J.T. Birkholzer, 2013. Aquifer characterization with hydraulic tomography and geostatistical inversion, *12th Annual Conference on Carbon Capture Utilization & Sequestration*, May 13 - 16, 2013, Pittsburgh, Pennsylvania.

- C42. Chen, F., **Q. Zhou**, J.T. Birkholzer, 2013. Modeling pumping and CO₂ injection tests at Ketzin site: Heterogeneity effects and model calibration, *12th Annual Conference on Carbon Capture Utilization & Sequestration*, May 13 - 16, 2013, Pittsburgh, Pennsylvania.
- C41. Wainwright, H.M., S. Finsterle, Y. Jung, **Q. Zhou**, J.T. Birkholzer, 2012. iTOUGH2 global sensitivity analysis module: Application to CO₂ storage systems, *Proceedings of TOUGH Symposium 2012*, September 17-19, 2012, Berkeley, CA.
- C40. Jung, Y., **Q. Zhou**, and J. T. Birkholzer, 2012. Impact of data uncertainty on identifying leakage pathways in CO₂ geologic storage and estimating hydrogeological properties by inverse modeling, *Proceedings of TOUGH Symposium 2012*, September 17-19, 2012, Berkeley, CA.
- C39. Chen, F., **Q. Zhou**, and J. T. Birkholzer, 2012. TOUGH2 Simulation of the pumping tests at Ketzin site: Heterogeneity effects and model calibration, *Proceedings of TOUGH Symposium 2012*, September 17-19, 2012, Berkeley, CA.
- C38. Rebscher, D., **Q. Zhou**, and J. T. Birkholzer, 2012. Simulation of CO₂ storage in the Basal aquifer in the Northern Plains – Prairie region of North America, *Proceedings of TOUGH Symposium 2012*, September 17-19, 2012, Berkeley CA.
- C37. Wainwright, H.M., S. Finsterle, **Q. Zhou**, J.T. Birkholzer, 2012 (Talk). Uncertainty quantification of the CO₂ storage system for a hypothetical GCS project in the southern San Joaquin Basin in California, *Computational Methods in Water Resources XIX International Conference*, June 17-21, 2012 in Urbana, Illinois, USA.
- C36. Birkholzer, J.T., A. Cihan, **Q. Zhou**, 2012 (Talk). Impact-driven pressure management via targeted brine extraction – Conceptual studies of CO₂ storage in saline formations, *the 11th Annual Conference on Carbon Capture Utilization & Sequestration*, April 30 - May 3, 2012, Pittsburgh, Pennsylvania.
- C35. Jung, Y., **Q. Zhou**, and J.T. Birkholzer, 2012. Early detection of brine or CO₂ leakage through high-permeability pathways using pressure-based observation data, *the 11th Annual Conference on Carbon Capture Utilization & Sequestration*, April 30 - May 3, 2012, Pittsburgh, Pennsylvania.
- C34. Illangasekare, T.H., Plampin, M., Trevisan, L., Agartan, E, H.Mori, Sakaki, T., Cihan, A., Birkholzer, J., **Zhou, Q.**, R. Pawar and G. Zyvoloski, 2012 (Talk). Multiple scale physical and numerical modeling for improved understanding of mechanisms of trapping and leakage of CO₂ in deep geologic formations, *the EGU General Assembly 2012*, Vienna, Austria.
- C33. Trevisan, L., Illangasekare, T.H., Rodriguez, D., Sakaki, T., Cihan, A., Birkholzer, J.T., and **Zhou, Q.**, 2011. Improved understanding of migration and entrapment of supercritical CO₂ in deep geologic formations: Intermediate-scale testing and modeling, *The MODFLOW and More 2011: Integrated Hydrologic Modeling*, Golden, CO, June 5-8, 2011.
- C32. Murakami, H., S. Finsterle, **Q. Zhou**, J.T. Birkholzer, 2011. Uncertainty quantification and global sensitivity analysis of CO₂ migration and pressure buildup for a hypothetical GCS project in the Southern San Joaquin Basin in California, *The Tenth Annual Carbon Capture & Sequestration*, May 2-5, Pittsburgh, PA.
- C31. Cihan, A., **Q. Zhou**, J.T. Birkholzer, 2011, Analytical solutions for leakage through aquitards and abandoned wells in multilayered aquifer-aquitard systems, *The Tenth Annual Carbon Capture & Sequestration*, May 2-5, Pittsburgh, PA.

- C30. Birkholzer, J.T., J.P. Nicot, C.M. Oldenburg, **Q. Zhou**, S. Kraemer, K. Bandilla, 2011. Brine leakage up a well caused by pressure perturbation from CO₂ injection: A discussion of threshold pressures, flow rates, and environmental impact, *The Tenth Annual Carbon Capture & Sequestration*, May 2-5, 2011, Pittsburgh, PA.
- C29. Illangasekare, T.H., Trevisan, L., Rodriguez, D., Sakaki, T., Cihan, A., Birkholzer, J.T., and **Zhou, Q.**, 2011. A fundamental study of migration and entrapment of supercritical CO₂ in heterogeneous deep geologic formations: Intermediate-scale testing and modeling, *the EGU 2011 Meeting*, Vienna, Austria, April 10-14, 2011.
- C28. Birkholzer, J.T., **Q. Zhou**, L. Zheng, and N. Spycher, 2011. CO₂ geological storage and groundwater resources: Model applications, *the 2011 SIAM Conference on Mathematical and Computational Issues in Geosciences*, Long Beach, CA, March 21-24, 2011.
- C27. Birkholzer, J.T., **Q. Zhou**, A. Cortis, and S. Finsterle, 2010 (Talk). A sensitivity study on regional pressure buildup from large-scale CO₂ storage projects, *the 10th International Conference on Greenhouse Gas Control Technologies (GHGT-10)*, Sept 19-23, 2010, Amsterdam, the Netherland.
- C26. **Quanlin Zhou**, Jens T. Birkholzer, and Jeffrey L. Wagoner, 2010 (Talk). Modeling the potential impact of geologic carbon sequestration in the southern San Joaquin basin, California, *The Ninth Annual Carbon Capture & Sequestration*, May 10-13, Pittsburgh, PA
- C25. **Quanlin Zhou** and Jens T. Birkholzer, 2010. The secondary seal effect on CO₂ plume development and migration in a sedimentary basin, *Caprocks and Seals for Geologic Carbon Sequestration*, January 12 to 15, 2010, Pacific Grove, CA.
- C24. Jens T. Birkholzer and **Quanlin Zhou**, 2010. Large-scale impact of CO₂ storage in deep saline aquifers: The importance of caprock permeability, *Caprocks and Seals for Geologic Carbon Sequestration*, January 12 to 15, 2010, Pacific Grove, CA.
- C23. Jens T. Birkholzer and **Quanlin Zhou**, 2009. An Integrated Model for Basin- and Plume-scale Processes Related to Full-Scale Employment of CO₂ Storage – The Illinois Basin as an Example, Extended Abstract, *AAPG/SEG/SPE Hedberg Conference on Geological Carbon Sequestration: Prediction and Verification*, Vancouver, BC, Canada, August 16-19, 2009.
- C22. **Quanlin Zhou**, Jens T. Birkholzer, Hannes Leetaru, Edward Mehnert, Yu-Feng Lin, 2009 (Talk). Integrated modeling of basin-scale impacts on groundwater resources and plume-scale transport behavior of geologic carbon sequestration in the Illinois sedimentary basin, *the 7th International Conference on Calibration and Reliability in Groundwater Modeling, Managing Groundwater and the Environment*, September 20-23, 2009, Wuhan, China.
- C21. **Quanlin Zhou**, Jens T. Birkholzer, Edward Mehnert, and Yu-Feng Lin, 2009 (Talk). Basin-scale hydrological impact of geologic carbon sequestration in the Illinois Basin: A full-scale deployment scenario, *Water/Energy Sustainability Symposium at the 2009 Groundwater Protection Council Annual Forum*, September 13 to 16, Salt Lake City, Utah.
- C20. **Quanlin Zhou**, Lehua Pan, James Hylen, Byron G. Lundberg, Robert K. Plunkett, Stephen H. Pordes, and Stefan A. Finsterle, 2009. Modeling of multiphase diffusive processes of tritium in an underground accelerator facility, *TOUGH Symposium 2009*, Berkeley, CA, September 14-16, 2009.
- C19. Jens T. Birkholzer, and **Quanlin Zhou**, 2009. Integrated modeling of basin- and plume-scale processes related to geologic carbon sequestration in the Illinois Basin, *TOUGH Symposium 2009*, Berkeley, CA, September 14-16, 2009.

- C18. **Quanlin Zhou**, Jens T. Birkholzer, Hannes Leetaru, Edward Mehnert, Yu-Feng Lin, 2009 (Invited Talk). Basin-scale environmental impact of geologic carbon sequestration: evaluation of a hypothetical scenario for full-scale deployment in the Illinois Basin, *The American Water Works Association (AWWA) Annual Meeting* in San Diego, CA, June 14-18, 2009.
- C17. Jens T. Birkholzer and **Quanlin Zhou**, 2009 (Talk). Basin-scale hydrological impacts of multiple-site CO₂ storage in the Illinois Basin: Regulatory and capacity implications, *The Eighth Annual Conference on Carbon Capture & Sequestration*, Pittsburgh, PA, May 4-7, 2009.
- C16. **Quanlin Zhou**, Jens T. Birkholzer, Hannes Leetaru, Edward Mehnert, Yu-Feng Lin, Chin-Fu Tsang, Preston Jordan, Scott Frailey, and Robert Finley, 2009 (Talk). Integrated modeling of basin-scale and plume-scale processes related to geologic carbon sequestration in the Illinois Basin, *The Eighth Annual Conference on Carbon Capture & Sequestration*, Pittsburgh, PA, May 4-7, 2009.
- C15. **Quanlin Zhou**, Jens T. Birkholzer, Hannes Leetaru, Edward Mehnert, Chin-Fu Tsang, Scott Frailey, and Robert Finley, 2009 (Invited Talk). Basin-scale environmental impact of geologic carbon sequestration in the Illinois Basin, *the Symposium of Carbon Sequestration— Moving Carbon from the Atmosphere to the Lithosphere, in the 42nd Annual Meeting of the North-Central Section of the Geological Society of America*, April 2-3, 2009, Rockford, Illinois, USA.
- C14. **Quanlin Zhou**, Jens T. Birkholzer, Chin-Fu Tsang, Hannes Leetaru, Edward Mehnert, Keni Zhang, Preston Jordan, Scott Frailey, and Robert Finley, 2008. Modeling of basin-scale pressure perturbations induced by geological carbon sequestration in a sedimentary basin, *the Virtual Conference on Climate Change and CO₂ Storage*, December 3rd, 2008, Imperial College, London.
- C13. Monica Gasca, Theodore Johnson, Sally McCraven, **Quanlin Zhou**, Julio Garcia, 2008. Natural photolysis and biodegradation of NDMA at groundwater recharge facilities that use recycled water, Los Angeles County, California, *The 21st Symposium of Groundwater Resources Association of California on Emerging Contaminants 2008*, San Jose, CA, November 19-20, 2008.
- C12. Hannes Leetaru, Scott Frailey, James Damico, Edward Mehnert, Jens Birkholzer, **Quanlin Zhou**, and Preston Jordan, 2008. Understanding CO₂ plume behavior during sequestration projects through the use of reservoir fluid modeling, *9th International Conference on Greenhouse Gas Technologies*, Washington DC, November 16-20, 2008.
- C11. **Quanlin Zhou**, Jens T. Birkholzer, Chin-Fu Tsang, 2008. Environmental impact of large-scale CO₂ injection and storage in a multi-sequence aquifer-seal system: pressure propagation and brine displacement, *The Seventh Annual Conference on Carbon Capture & Sequestration*, Pittsburgh, PA, May 5-8, 2008.
- C10. Sally McCraven, Phyllis Stanin, **Quanlin Zhou**, 2008 (Talk). Occurrence, fate, and transport of N-Nitrosodimethylamine (NDMA) in California Groundwater, *Sixth International Conference on Remediation of Chlorinated and Recalcitrant Compounds*, Monterey, CA, May 19-22, 2008.
- C09. Sally McCraven, **Quanlin Zhou**, Julio Garcia, Monica Gasca, and Ted Johnson, 2008 (Talk). Characterizing field biodegradation of N-Nitrosodimethylamine (NDMA) in groundwater near reclaimed water recharge areas, *Annual California Water Reuse Conference*, Newport Beach, CA, March 24-26, 2008.
- C08. **Quanlin Zhou**, Jens Birkholzer, Jonny Rutqvist, and Chin-Fu Tsang, 2007 (Talk). Sensitivity study of CO₂ storage capacity in brine aquifers with closed boundaries: Dependence on hydrogeologic

- properties, *Sixth Annual Conference on Carbon Capture & Sequestration*, Pittsburgh, PA, May 7-10, 2007.
- C07. Jacob Bensabat, Jacob Bear, and **Quanlin Zhou**, 2006. Large scale modeling of seawater intrusion in a coastal aquifer: Application to the North Sharon and Heffer Valley areas, Israel, *CMWR XVI - Computational Methods in Water Resources, XVI International Conference*, Copenhagen, Denmark, June 19-22, 2006.
- C06. **Quanlin Zhou**, 2006. Validation of the active fracture model for unsaturated fracture flow using numerical experiments, in *Proceedings of TOUGH Symposium 2006*, Berkeley, CA, May 15-17, 2006.
- C05. **Quanlin Zhou**, Jens T. Birkholzer, Iraj Javandel, and Preston D. Jordan, 2003. Simulation of groundwater flow at the LBNL site using TOUGH2, in *Proceedings of TOUGH Symposium 2003*, Berkeley, California, May 12-14, 2003.
- C04. **Quanlin Zhou**, Gudmundur S. Bodvarsson, Hui-Hai Liu, and Curtis M. Oldenburg, 2002 (Talk). Characterization of spatial variability of hydrogeologic properties for the unsaturated flow in the fractured rocks at Yucca Mountain, Nevada, in *Proceedings of the International Groundwater Symposium on Bridging the Gap between Measurements and Modeling in Heterogeneous Media*, Berkeley, California, March 25-29, 2002.
- C03. **Quanlin Zhou**, Lynn W. Gelhar, and Bruce Jacobs, 2002 (Talk). Comparison of the field-scale effective properties of two-phase flow in heterogeneous porous media obtained by stochastic analysis and numerical experiments, in *Proceedings of the International Groundwater Symposium on Bridging the Gap between Measurements and Modeling in Heterogeneous Media*, Berkeley, California, March 25-29, 2002.
- C02. Jacob Bear, **Quanlin Zhou**, and Jacob Bensabat, 2001 (Talk). Three-dimensional simulation of seawater intrusion in heterogeneous aquifers: Application to the coastal aquifer of Israel, in *Proceedings of the First International Conference on Saltwater Intrusion and Coastal Aquifers-Monitoring, Modeling, and Management*, Essaouira, Morocco, April 23-25, 2001.
- C01. **Quanlin Zhou**, and Yuansheng Zhu, 1993 (Talk). Composite risk analysis for levee of flood plains, in *Proceedings of South and East Asia Regional Symposium on Tropic Storms and Related Flood*, 139-146, Guangzhou, China, November 22-25, 1993.

6.4. Presentations with Abstracts in Conferences and Professional Meetings

1. Zhou, Q., J.T. Birkholzer, and C.M. Oldenburg, 2015. A Hybrid Continuum-Discrete Scheme for Simulating CO₂ Migration and Trapping in Fractured Sandstone Reservoirs, H54F-07, 2015 AGU Fall Meeting, December 14-18, 2015, San Francisco, CA.
2. Chang, C., Q. Zhou, T.J. Kneafsey, M. Oostrom, T. W. Wietsma, Q. Yu, 2015. Supercritical CO₂ Dissolution and Mass Transfer in a Heterogeneous Pore Network under Drainage and Imbibition Conditions, H41C-1311, 2015 AGU Fall Meeting, December 14-18, 2015, San Francisco, CA.
3. LIU, X., ZHOU, Q., BIRKHOLZER, J.T., ILLMAN, W. (2013): Geostatistical Reduced-Order Models in Under-Determined Inverse Problems, AGU Fall Meeting 2013, San Francisco, CA, December, 2013.

4. CHEN, F., WIESE, B., ZHOU, Q., BIRKHOZLER, J.T., KOWALSKY, M.B. (2013): Numerical Modeling of the Pumping Tests at the Ketzin Pilot Site for CO₂ Injection: Model Calibration and Heterogeneity Effects, AGU Fall Meeting 2013, San Francisco, CA, December, 2013.
5. TREVISAN, L., ILLANGASEKARE, T., ARTAGAN, E., MORI, H., CIHAN, A., BIRKHOZLER, J.T., ZHOU, Q. (2013): Investigation of Multiphase Modeling Approaches for Behavior of Supercritical CO₂ in deep Formations Using Analog Fluids In the Laboratory, AGU Fall Meeting 2013, San Francisco, CA, December, 2013.
6. CIHAN, A., BIRKHOZLER, J.T., ILLANGASEKARE, T., ZHOU, Q. (2013): A Theoretical Approach Representing Hysteresis in Capillary Pressure-Saturation Relationship Based on Connectivity in Void Space, AGU Fall Meeting 2013, San Francisco, CA, December, 2013.
7. HUANG, X., BANDILLA, K.W., CELIA, M.A., BACHU, S., REBSCHER, D., ZHOU, Q., BIRKHOZLER, J.T. (2012): Modeling Carbon Dioxide Storage in the Basal Aquifer of Canada, Abstract submitted to AGU Fall Meeting 2012, San Francisco, CA, December, 2012.
8. Liu, X., **Q. Zhou**, P.K. Kitanidis, and Jens T. Birkholzer 2012 (Talk). Fast iterative implementation of nonlinear geostatistical inverse modeling, Abstract in Proceedings AGU Fall Meeting 2012, San Francisco, CA, December, 2012.
9. Jung, Y., **Q. Zhou**, and J.T. Birkholzer, 2012 (Talk). Early detection of brine and CO₂ leakage through abandoned wells using pressure and surface deformation monitoring data, Abstract in Proceedings AGU Fall Meeting 2012, San Francisco, CA, December, 2012.
10. Birkholzer J.T., and **Zhou Q.**, 2010 (Invited Talk). On Regional Pressure Buildup and Fluid Migration in Response to Large CO₂ Injection Operations, Abstract in Proceedings to 2010 GSA Annual Meeting, Denver, Colorado, October 31 to November 3, 2010.
11. Cihan A., Illangasekare T.H., **Zhou Q.**, Birkholzer J.T., and Rodriguez D., 2010. Intermediate-scale investigation of capillary and dissolution trapping during CO₂ injection and post-injection in heterogeneous geologic formations, Abstract in Proceedings AGU Fall Meeting 2010, San Francisco, CA, December, 2010.
12. **Zhou Q.**, and Birkholzer J.T., 2010 (Talk). The Role of Fault Zones in Capillary and Dissolution Trapping of CO₂ in the Southern San Joaquin Basin, California, Abstract in Proceedings to AGU Fall Meeting 2010, San Francisco, CA, December, 2010.
13. **Quanlin Zhou**, Fred J. Molz, Hui-Hai Liu, and Yingqi Zhang, 2008 (Talk). Scaling behavior of field-scale diffusive transport in fractured rock and porous media: A contradiction? *EOS Trans. AGU* 89(53), Fall Meet. Suppl. Abstract H31K-04, December 15-19, San Francisco, CA.
14. Jens T. Birkholzer, **Quanlin Zhou**, Preston Jordan, Chin-Fu Tsang, Hannes Leetaru, Edward Mehnert, Scott Frailey, and Robert Finley, 2008 (Talk). A hypothetical scenario for full-scale deployment of geological carbon sequestration: Investigating the interaction between multiple CO₂ storage sites in a sedimentary basin, *EOS Trans. AGU* 89(53), Fall Meet. Suppl. Abstract H12C-02, December 15-19, San Francisco, CA.
15. **Quanlin Zhou**, Jens Birkholzer, Chin-Fu Tsang, Jonny Rutqvist, 2007. Quick assessment of CO₂ storage capacity in pressure-constrained saline aquifers with different hydrogeologic properties. H13F-1662, AGU Fall Meeting, December 10-14, San Francisco, CA

16. Chin-Fu Tsang, Jens Birkholzer, **Quanlin Zhou**, 2007. Pressure propagation and brine displacement in CO₂ storage formations: The role of sealing units. H13F-1661, AGU Fall Meeting, December 10-14, San Francisco, CA.
17. Sally McCraven, **Quanlin Zhou**, Julio Garcia, Monica Gasca, and Ted Johnson, 2007. Characterizing field biodegradation of N-nitrosodimethylamine (NDMA) in groundwater with active recycled water recharge. H33E-1696, AGU Fall Meeting, December 10-14, 2007, San Francisco, CA.
18. Yingqi Zhang, Hui-Hai Liu, Stefan Finsterle, and **Quanlin Zhou**, 2005. How dual-scale diffusive property heterogeneity affects the effective matrix diffusion coefficient in fractured rock. AGU Fall Meeting, December 5-9, 2005, San Francisco, CA
19. **Quanlin Zhou**, Jens T. Birkholzer, Iraj Javandel, and Preston D. Jordan, 2004. Refining a three-dimensional groundwater flow model at a heterogeneous site in support of remediation. H11C-0316, AGU Fall Meeting, December 13–17, 2004, San Francisco, CA.
20. **Quanlin Zhou**, Gudmundur S. Bodvarsson, Hui-Hai Liu, and Curtis M. Oldenburg, 2001. Calibration of spatial variability of hydrogeologic properties in the unsaturated fractured rock at Yucca Mountain, Nevada. H31C-0259, AGU Fall Meeting, December 10–14, 2001, San Francisco, CA.

6.5. Seminars by Quanlin Zhou

1. Four Unresolved Questions in Monitoring Data from CO₂ Injection-Storage Sites: Some Modeling Studies and Discussions, Presented at Uppsala University, Uppsala, Sweden, April 3, 2014,
2. Basin-Scale Modeling of CO₂ Injection and Storage in Brine Formations: Analytical and Numerical Modeling with Applications, Presented at Uppsala University, Sweden, April 2, 2014
3. Science and Technology Challenges in Geologic Carbon Sequestration (GCS): Storage Capacity, Heterogeneity Effects, and Monitoring and Leakage Detection, at Beijing Normal University, Beijing, January 10, 2011.
4. Overview of Geologic Carbon Sequestration in the United States: Update and Challenges, at the Institute of Geology and Geophysics, China Academy of Sciences, Beijing, January 5, 2011
5. TOUGH2 Modeling for Geologic Carbon Sequestration: Fundamentals and Application to the Southern San Joaquin Basin, California, at the Institute of Geology and Geophysics, China Academy of Sciences, Beijing, January 5, 2011.
6. Data Analysis of the Frio Brine Pilot Tests: Characterizing Multiscale Heterogeneity and Evaluating its Effects on CO₂ Storage, at the Institute of Geology and Geophysics, China Academy of Sciences, Beijing, January 5, 2011.
7. Science and Technology Challenges in Geologic Carbon Sequestration (GCS): Storage Capacity, Heterogeneity Effects, and Monitoring and Leakage Detection, at China University of Geosciences, Beijing, January 4, 2011.
8. Modeling Geologic Carbon Sequestration (GCS) and Some Thoughts on Pressure-Driven Geomechanical Processes, at the Geotechnical Institute, Hohai University, Nanjing, China, October 15, 2009.
9. Climate Change and U.S. Energy Research: The Role of Carbon Capture and Sequestration, at the Research Center for Climate Change, the Ministry of Water Resources, Nanjing Hydraulic Research Institute, Nanjing, China, October 14, 2009.

10. Climate Change and U.S. Energy Research: The Role of Carbon Capture and Sequestration, at the Key State Laboratory of Water Resources and Hydraulic Engineering, Hohai University, Nanjing, China, October 13, 2009.
11. Geologic Carbon Sequestration (GCS) in the Illinois Basin: From Site Characterization to Full-Scale Deployment, at the Institute of Geology and Geophysics, China Academy of Sciences, Beijing, China, September 29, 2009.
12. Geologic Carbon Sequestration (GCS) in the Illinois Basin: From Site Characterization to Full-Scale Deployment, at the Institute of Rock and Soil Mechanics, China Academy of Sciences, Wuhan, China, September 22, 2009.
13. Numerical investigation of multiphase flow and transport in heterogeneous porous and fractured media, at Lawrence Livermore National Laboratory, April 2002.
14. Numerical investigation of field-scale effective properties of two-phase flow in heterogeneous porous media, at Lawrence Berkeley National Laboratory, September 2001.
15. Numerical investigation of effective properties of multiphase flow in heterogeneous porous media, at Massachusetts Institute of Technology, September 2000.
16. Modeling of strongly density-dependent flow and transport problems, at Massachusetts Institute of Technology, April 2000.
17. Modeling of strongly density-dependent flow and transport problems, at the University of Texas at Austin, March 2000.
18. Modeling seawater intrusion in coastal aquifers, at the Technion-Israel Institute of Technology, Haifa, Israel, June 1999.