

Sheng Peng

Research Associate

Bureau of Economic Geology, University of Texas at Austin

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EDUCATION

University of Arizona, Tucson, Arizona

Ph.D. in Soil, Water, and Environmental Sciences

Dec. 2004

Minor in Hydrogeology

Advisor: Dr. Mark L. Brusseau (AGU Fellow)

Committee members: Dr. Shlomo Neuman, Dr. Art Warrick, Dr. Jim Yeh, Dr. Zhihui Zhang

Dissertation title: Characterization of air-water interfacial area in unsaturated sandy porous materials using tracer techniques

Beijing Normal University, Beijing, China

M.S. in Environmental Science

Jul. 2000

Thesis title: Air-water two-phase flow in vadose zone

Suzhou Institute of Urban Construction & Environmental Protection

(now **Suzhou University of Science and Technology**), Suzhou, China

B.E. in Environmental Planning and Management

Jul. 1997

ACADEMIC EXPERIENCE

Research Associate, Bureau of Economic Geology,

University of Texas at Austin

Nov. 2014 – present

Performing research on petrophysics and multi-scale pore network on Mudrock and carbonate

Research Fellow, Bureau of Economic Geology,

University of Texas at Austin

Feb. 2013 – Oct. 2014

Performing research on pore-scale imaging and upscaling

Assistant Research Professor, University of Texas at Arlington

Jan. 2011 – Jan. 2013

Performing research and teaching as guest lecturer in the areas of hydrogeology and reservoir

characterization

Associate Professor, Beijing Normal University Sep. 2007 – Dec. 2010
Teaching and performing research in the areas of contaminant hydrogeology and environmental engineering

Post-doctoral Researcher, University of Arizona Dec. 2004 – Jun. 2005
Performing research in the area of contaminant hydrology.

Research Assistant, University of Arizona Aug. 2001 – Dec. 2004
Performing research in the area of vadose zone and contaminant hydrology.

INDUSTRY EXPERIENCE

Project Hydrogeologist, GeoSystems Analysis, Inc., Tucson, AZ Jun. 2005 – Aug. 2007
GeoSystems Analysis is a consulting company focusing on mine reclamation, heap leach (unsaturated flow system) optimization, vadoze zone monitoring, and groundwater recharge. My task was on unsaturated flow modeling and laboratory data analysis.

Assistant Environmental Engineer,
Sound Environmental Engineering Group, Beijing Jul. 2000 – Jul. 2001
Sound Group is a leading environmental engineering company in China based in Beijing focusing on waste water treatment and municipal solid waste disposal. I was in charge of feasibility analysis for solid waste disposal project including field, lab, and computer works.

RESEARCH INTERESTS

- Tight formation pore-scale imaging (micro-CT, nano-CT, FIB/SEM, SEM) and upscaling
- Porosity-permeability relationship through image analysis and modeling
- Petrophysical property laboratory measurement and characterization
- Pore and organic matter evolution dynamics for mudstone
- Enhanced oil recovery (EOR), soil and groundwater remediation of organic contaminants (NAPLs) using innovative techniques
- Application of macroscopic continuum based model and pore-scale model for EOR, contaminant remediation, and multi-phase flow

RESEARCH FUNDING

FUNDED IN US

- Jackson School of Geosciences Seed Grant, 2016. “Dynamic imaging of shale evolution using in-situ nano-CT under high pressure and temperature conditions”, Principle Investigator, \$17,600, 2016.

FUNDED IN CHINA (Sum of 530,000 Yuan RMB)

- China’s National Natural Science Foundation (40902072). “Removal of non-aqueous phase liquid (NAPL) with steam-enhanced air injection in layered soil structure: mechanisms and effectiveness”, **Principle Investigator**, 200,000 Yuan RMB. 2010 – 2013.
- China’s Major Science and Technology Program for Water Pollution Control and Treatment – Baiyangdian Lake Project (2008ZX07209-007), “Baiyangdian Lake Non-point Pollution Control”. Co-investigator, 180,000 Yuan RMB. 2008 – 2011.
- Beijing Municipal Science and Technology Commission, Beijing key Science and technology Project: Development of Integrated Ex-situ Soil Remediation Technology (SF2008-02). Co-investigator, 150,000 Yuan RMB, 2009 – 2011.

RESEARCH SUPERVISION IN BEIJING NORMAL UNIVERSITY

Wu, Wei, Environmental Engineering, M. S. student,

Advised since Fall 2009

Graduation with Outstanding Graduate Award: Fall 2011

Thesis title: Surfactant-enhanced soil washing to remove PAHs in a contaminated soil from a coal chemical plant. (Co-supervised by Prof. Jiajun Chen)

Zhang, Jianming, Environmental Engineering, M. S. student

Advised since Fall 2009

Graduation: Fall 2012

Thesis title: Sorption of heavy metals on soils: evaluation of influences of mixing mode and liquid/soil ratio.

Wang, Ning, Environmental Engineering, M. S. student

Advised since Fall 2010

Graduation: Fall 2013

Thesis title: Steam-enhanced injection to remove volatile organic contaminant in 2D flow cell with layered sand structure.

TEACHING EXPERIENCE

University of Texas at Arlington

Spring 2012

Reservoir Characterization (graduate class): solute transport and imaging techniques. [Guest

lecturer, 6 hours in total]

Subsurface Contaminant Transport and Remediation Spring 2010
Basic water flow and solute transport concepts, theories, and equations; remediation techniques for soil and groundwater. Graduate level class.

Selected Topics in Environmental Science and Engineering Spring 2010
Hot topics in recent research frontiers in the broad areas of ESE, including: global climate change, new technologies in wastewater treatment, soil remediation, air pollution, etc. Graduate level class, Taught in English, Section 1 of Technical English.

Site Cleanup Techniques and Applications Fall 2007, 2008
Soil and groundwater remediation techniques: established and innovative chemical, biological, and hydraulic techniques and real-world projects. Graduate level class. [Short course]

Hydrogeology and Its Applications Fall 2009
Introduction of hydrogeology: history, basic theories, and applications. Undergraduate level class [Short course]

Cochise County Groundwater Recharge Model June 2007
A spreadsheet model developed in GeoSystems Analysis for the estimation of groundwater recharge from surface runoff due to urbanization with land use change. [Short training course for county engineers]

JOURNAL REVIEW & PROFESSIONAL AFFILIATION

AAPG Bulletin (3); Transport in Porous Media (9); Special topics and Reviews in Porous Media (1); Journal of Contaminant Hydrology (5); Environmental Earth Sciences (7); Environmental Pollution (3); Chemosphere (2); Soil and Sediment Contamination An International Journal (3); Journal of Environmental Radioactivity (1); Chinese Journal of Environmental Engineering (4).

American Geophysical Union	2003-2005, 2011-Present
AAPG	2013-Present

AWARDS AND PATENT

- Invention Patent (application #: 201110144101.2) Submitted Jan. 2011
A new design of circulating soil washing system. Submitted to State Intellectual Property Office of China. Major contributor, third author.

- Research Assistant Fellowship, University of Arizona 2001-2004
 - Outstanding Academic Research Award, Beijing Normal University 2002
 - President's Award for Outstanding Graduate 1997
- Five out of over 400 graduates awarded, Suzhou University of Science and Technology

TALKS

- Mudrock Systems Research Laboratory Annual Meeting 2015, March, 2016, "Pore and organic matter evolution from dynamic nano-CT imaging"
- Mudrock Systems Research Laboratory Annual Meeting 2015, March, 2016, "Mudrock porosity: different results from different methods"
- Mudrock Systems Research Laboratory Annual Meeting 2015, March, 2016, "Matrix permeability in shale: particle/plug size effect and implications"
- Reservoir Characterization Research Laboratory Annual Meeting 2015, October, 2015, "Application of imaging analysis and pore modeling on carbonates: from 3D to 2D"
- Mudrock Systems Research Laboratory Annual Meeting 2014, April 16, 2015, "Laboratory permeability measurement of Mudrocks: what are we measuring?"
- Mudrock Systems Research Laboratory Annual Meeting 2014, April 15, 2015, "Permeability measurement for Mudrocks with a modified GRI method under in-situ confining stress"
- AAPG Annual Convention April 7, 2014, "Upscaling of Pore Network and Permeability from Micron to Millimeter Scale in Organic-Pore Dominated Mudstones"
- Mudrock Systems Research Laboratory Annual Meeting 2013, March 6, 2014, "An Integrated Method for Up-scaling of Pore Network Characterization and Permeability Estimation for Barnett Shale".
- University of Texas at Arlington, Sep. 29, 2011, Department seminar, "Pore structure characterization of Berea sandstone using synchrotron X-ray microtomography: resolution effect and comparison with MIP".
- College of Engineering, Peking University, Beijing, China, Nov. 12, 2009, Invited seminar, Host: Dr. Chunmiao Zheng, "Air-water interfacial area measurement using different tracer techniques and X-ray microtomography".
- Regional Water Symposium, Tucson, AZ, Aug. 2007, "Cochise County Flood Control and Urban Runoff Recharge Plan: 2/2".
- University of Arizona, Tucson, AZ, Oct. 2004, Department seminar, "Air-water interfacial area in unsaturated soils: Measurement and modeling".

PUBLICATIONS

IN PREPARATION (DENOTES CORRESPONDING AUTHOR)*

1. Peng, S.* , B. Loucks, T. Zhang, J. Shultz, L. Ko, S. C. Ruppel, Porosity Analysis for Eagle

Ford Shales with Different Methods (Submitted)

2. **Peng, S.***, A. Hassan, B. Loucks, F.J. Lucia. Permeability prediction from thin section 2D image analysis and modeling in Carbonates (Under revision)

PUBLISHED (DENOTES CORRESPONDING AUTHOR)*

1. **Peng, S.***, B. Loucks, 2016. Permeability Measurements in Mudrocks Using Gas-Expansion Methods on Plug and Crushed-Rock Samples. *Marine and Petroleum Geology* 73, 299-310.
2. **Peng, S.***, J Yang, X Xiao, B Loucks, SC Ruppel, T Zhang, 2015. An Integrated Method for Upscaling Pore-Network Characterization and Permeability Estimation: Example from the Mississippian Barnett Shale. *Transport in Porous Media*, 109, 359-376.
3. **Peng, S.***, F. Marone, S. Dultz, 2014. Resolution effect in X-ray microcomputed tomography imaging and small pore's contribution to permeability for a Berea sandstone. *Journal of Hydrology*, 510, 403-411.
4. **Peng, S.***, N. Wang, J. Chen, 2013. Steam and air co-injection in removing residual TCE in unsaturated layered sandy porous media. *Journal of Contaminant Hydrology*, 153, 24-36.
5. **Peng, S.***, S. Dultz, M. Zhang, Q. Hu, 2012. Pore structure characterization of Berea sandstone using synchrotron X-ray computed tomography: resolution effect and comparison with mercury intrusion porosimetry. *Journal of Hydrology*, 472, 254-261.
6. **Peng, S.**, Q. Hu, R. P. Ewing, C. Liu, and J. M. Zachara, 2012. Quantitative 3-D elemental mapping by LA-ICP-MS of basalt from the Hanford 300 area. *Environmental Science & Technology*, 46, 2035-2042.
7. **Peng, S.**, Q. Hu, S. Hamamoto, 2012. Gas diffusivity in rocks: measurement and its correlation to porosity, pore-size distribution, and permeability. *Water Resources Research*, 48, W02507, 9 PP., doi:10.1029/2011WR011098
8. **Peng, S** and Q. Hu, 2012. LA-ICP-MS Calibrations for intact rock samples with internal standard and modified constant-sum methods. *American J. of Analytical Chem.*, 3, 168-174.
9. **Peng, S.**, M. L. Brusseau, 2011. Air-water interfacial area and capillary pressure: porous-medium texture effects and empirical function. *Journal of Hydraulic Engineering*, 17(7), 829–832.
10. **Peng, S**, Wu, W., Chen, J., 2011. Removal of PAHs with surfactant enhanced soil washing: Influencing factors and removal effectiveness. *Chemosphere*, 82, 1173-1177.
11. **Peng, S***, H. Jiang, 2009. A review on soil cover in waste and contaminant containment: design, monitoring, and modeling. *Frontiers of Earth Science in China*, 3.3, 303-311.
12. **Peng, S***, 2009. Characterization of solute transport parameters in leach ore: inverse modeling based on column experiments. *Frontiers of Earth Science in China*, 3.2, 208-213.
13. Brusseau, M. L., **S. Peng**, G. Schanaar, and A., 2007. Measured Air-Water Interfacial Areas for a Sandy Porous Medium: Comparing X-Ray Microtomography and Partitioning Tracer Test Methods, *Environmental Science & Technology*, 41, 1956-1961.

14. Brusseau, M. L., **S. Peng**, G. Schanaar, and M. S. Costanza-Robinson, 2006. Relationships among Air-Water Interfacial Area, Capillary Pressure, and Water Saturation for a Sandy Porous Medium. *Water Resources Research*, Vol. 42, No. 3, W03501, 10.1029/2005WR004058.
15. **Peng, S.** and M. L. Brusseau, 2005. The impact of soil texture on air-water interfacial area in unsaturated sandy porous media, *Water Resources Research*, Vol. 41, No. 3, W0302110.1029/2004WR003233.
16. **Peng, S.** and M. L. Brusseau, 2005. Gas-Phase Partitioning Tracer Test Method for Water Content Measurement: Evaluating Efficacy for a Range of Porous-Medium Textures, *Vadose Zone Journal*, 4: 881-884.
17. **Peng, S.**, J. Chen, Shuton Li, 2002. Two-phase flow in vadose zone: experimental study, *ACTA PEDOLOGICA SINICA*, 39(4), 505-511, (in Chinese with English abstract)
18. **Peng, S.**, J. Chen, H. Wang, 2001. The mechanisms and models of transport of volatile organic contaminants in unsaturated soils, *ACTA PEDOLOGICA SINICA*, 38(3): 315-323 (in Chinese with English abstract).
19. **Peng, S.**, J. Chen, 2000. Review of studies on two-phase flow in vadose zone, *Advances in Water Science*, 13(11), 333-338 (in Chinese with English abstract).
20. Chen, J., **S. Peng**, 2000. Experimental study on parameter identification for two-phase (water and air) flow in vadose zone, *Advances in Water Science*, 12(4): 467-474 (in Chinese with English abstract).

CONFERENCE PUBLICATIONS

1. **Peng, S.**, J. Yang, X. Xiao, B. Loucks, S. Ruppel, T. Zhang. Upscaling of Pore Network and Permeability from Micron to Millimeter Scale in Organic-Pore Dominated Mudstones. AAPG Annual Conference, 2014, 6-9 April, Houston.
2. **Peng, S.**, T. Zhang, S. Ruppel. CH₄ Adsorption on Moisturized Oil-Bearing and Oil-Free Shales and Its Implication to Oil and Gas Storage in Organic-rich Shales. AAPG Annual Conference, 2014, 6-9 April, Houston.
3. McGlue, M., G. Ellis, J. Reid, **S. Peng**, T. Zhang. Unconventional Reservoir Potential of Rift-Lake Mudrocks: Preliminary Results from the Newark, Deep River, and Central Lake Malawi Basins. AAPG Annual Conference, 2014, 6-9 April, Houston.
4. Ellis, G., T. Zhang, M. Lewan, **S. Peng**, H. Hu. Experimental Study of Methane Adsorption on Organic Matter in Mudstones: Implications for Natural Gas Storage in Unconventional Reservoirs, AAPG Annual Conference, 2014, 6-9 April, Houston.
5. **Peng, S.**, Q. Hu, S. Hamamoto. Gas diffusivity in rocks: measurement and its correlation to porosity, pore-size distribution, and permeability. *National Geophysical Union meeting*. 2011, 2-8 December, San Francisco.
6. Hu, Q., Z. Gao, **S. Peng**, R. Ewing. Pore structure and chemical diffusion in the Barnett Shale. *National Geophysical Union meeting*. 2011, 2-8 December, San Francisco.
7. Keller J., M.A. Milczarek, **Peng S.**, A. Graham, T-M. Yao, D. van Zyl. 2009. Characterization and Modeling of Macro-pore Flow in Heap Leach and Waste Rock Material. *8th International*

Conference on Acid Rock Drainage, June 22-26, 2009, Skelleftea, Sweden.

8. **Peng, S.**, Milczarek, M. A., and L. Lacher, 2007. Cochise County Flood Control and Urban Runoff Recharge Plan: 2/2, *2007 Regional Water Symposium*, Tucson, Arizona, Aug. 29 – Sep. 1.
9. Milczarek, M. A., D. van Zyl, **S. Peng**, R. C. Rice. 2006. Saturated and unsaturated hydraulic properties characterization at mine facilities: are we doing it right? *7th ICARD*, 2006, 26-30 March, St. Louis,
10. **Peng, S.** and M. L. Brusseau, Characterizing air-water interfacial area in unsaturated sandy porous media, *National Geophysical Union meeting*. 2004, 13-17 December, San Francisco.