Weon Shik Han, Ph.D.

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Education

May 2008	**Ph.D. in Hydrogeology, Earth and Environmental Science**, New Mexico Institute of Mining and Technology, Socorro, NM.
	Dissertation: The evaluation of CO_2 storage mechanisms at SACROC in the Permian basin, site of 35 years of CO_2 injection.
	Coursework: Groundwater Hydrology, Hydrogeochemistry, Flow & Transport in Hydro System, Contaminant Hydrology, Vadose Zone Hydrology, Groundwater Modeling, Hydrogeologic Process, Environmental Tracers in Hydrology, Carbonate Sedimentology & Diagenesis, Time Serise Analysis in Hydrologic Application, Numerical PDEs, Geochemical Modeling, Surface Water Hydrology, Naturally Fractured Reservoirs
February 2003	**M.S., in Hydrogeochemistry, Earth System Science**, Yonsei University, Seoul, Korea.
	Thesis: Surface water and ground water and stable isotope characteristics at Muju, South Korea
February 2000	**B.S., in Geology, Earth System Science**, Yonsei University, Seoul, Korea

Research Interest

- Physical and Chemical hydrogeology
- Geologic CO_2 sequestration processes
- Non-isothermal, Multiphase and Multi-species reactive transport modeling
- Equations of State
- Fluid mechanics in CO_2-driven cold geyser
- Coupled process simulation associated with groundwater flow (heat, reaction, and flow)
- Geothermal resources recovery

Professional Experience

August 2011 – Present	**Assistant Professor**, Department of Geosciences, University of Wisconsin-Milwaukee
October 2010-December 2011	**Advisory Committees**, Korea Institute of Geoscience and Mineral Resources (KIGAM)
January 2008 –July 2011	**Research Assistant Professor**, Department of Civil and Environmental

	Engineering, University of Utah
October 2007 –July 2011	**Research Scientist**, Energy & Geoscience Institute, University of Utah
August 2003 - October 2007	**Research Assistantship**, Petroleum Research Recovery Center, New Mexico Institute of Mining and Technology
August 2003 - October 2007	**Research Assistantship**, Groundwater Hydrology Program in Earth and Environmental Science, New Mexico Institute of Mining and Technology:

Teaching Experience

Spring 2012	Modeling Techniques for Hydrogeology (Geo Sci 730): Department of Geosciences, University of Wisconsin-Milwaukee
Fall 2011	Physical Hydrogeology (Geo Sci 463): Department of Geosciences, University of Wisconsin-Milwaukee
Fall 2010 Co-Teaching	Carbon Capture and Storage (CVEEN 7920): Civil and Environmental Engineering, University of Utah
Spring 2008 Co-Teaching	Hydrology (CVEEN 3420): Civil and Environmental Engineering, University of Utah
Spring 2006 Teaching Assistant	Hydrological Processes (HYD 521): Earth and Environmental Science, New Mexico Institute of Mining and Technology
Fall 2004 Teaching Assistant	Groundwater Hydrology (HYD503 and HYD503L): Earth and Environment Science, New Mexico Institute of Mining and Technology
Spring 2002 Teaching Assistant	Groundwater Hydrology: Earth System Science, Yonsei University, Seoul, Korea
Spring 2000 Teaching Assistant	Rock Mechanics: Earth System Science, Yonsei University

Peer-reviewed Publications

Under Preparation

Lee, S.-Y., **Han, Weon Shik**, Allen, J., Evaluation of supercritical CO_2 migration in the multi-scale heterogeneous cross-bedded formations: outcrops analogues from Jurassic Navajo sandstone.

Lu, C., **Han, Weon Shik**, Lee, S.-Y., and McPherson, B., Effects of wettability of rock-CO_2-water system on the migration and distribution of geologically sequestrated supercritical CO_2.

Kim, K.-Y., Park, E., **Han, Weon Shik**, Numerical investigation of the impact of highly permeable conduit on hydraulic systems in a coastal zone

Ding, G., Park, E., Kim, K.-Y., Chen, H., **Han, Weon Shik**, Kim, Y., Kim, K., Hypothetical study on recovery of head and total dissolved solids (TDS) from long-term pressure depression in coastal aquifers

Han, Weon Shik, Lu, C., Lee, S.-Y., Allen, J., McPherson, B.J., Potential effects of dip and sinusoidal structures in geologic formations on CO_2 plume migration, CO_2 storage, and residual CO_2 trapping

Han, Weon Shik, McPherson, M.J., Lu, M., Keating, E.H., Moore, J., Characteristics of CO_2-driven cold-water geyser, the Crystal Geyser in Utah

Submitted and In Revision

19. Lu, C., **Han, Weon Shik**, Lee, S.-Y., Shu, J., and McPherson, B.J., Capillary pressure and relative permeability model uncertainties in simulations of geological CO_2 sequestration (*Submitted to*

"Advances in Water Resources")

18. Chen, H., Ding, G., **Han, Weon Shik**, Park E., Multiscale solute transport in a multi-domain porous media (*Submitted to "Water Resources Research"*)

17. **Han, Weon Shik**, Kim, K.-Y., Park E., Conditional stochastic predictions of geologic heterogeneities and leakage potentials for hypothetical CO_2 sequestration sites. (*Submitted to "Water Resources Research"*)

16. **Han, Weon Shik**, Kim, K.-Y., Park, E., McPherson, B.J., S.-Y. Lee, Modeling of spatiotemporal thermal response on CO_2 injection activity: Interpretation for Monitoring Application (*In Revision for "Transport in Porous Media"*)

Year 2012

15. Kim, K.-Y., **Han, Weon Shik**, Oh, J., Kim, T., Kim, J.-C., (2012) Characteristics of salt precipitation and the associated pressure build-up during CO_2 storage in saline aquifers, *Transport in Porous Media*, doi:10.1007/s11242-011-9909-4.

Year 2011

14. **Han, Weon Shik**, Kim K.-Y., Esser, R.P., McPherson B.J., Park, E. 2011, Sensitivity study of simulation parameters controlling CO_2 trapping in saline formation *Transport in Porous Media*, 90(3), 807-829.

13. Park, E., Kim, K.-Y., Ding, G., Kim, K., **Han, Weon Shik**, Kim, Y., Kim, N., 2011. A delineation of regional hydraulic conductivity based on water table fluctuation. *Journal of Hydrology*, 399(34), 235-245.

Year 2010

12. **Han, Weon Shik**, McPherson, B.J., P.C. Lichtner, Wang, F.P., 2010, Evaluation of CO_2 trapping mechanisms at the SACROC northern platform, Permian basin, Texas, site of 35 years of CO_2 injection. *American Journal of Science*, 310, 282-324.

11. **Han, Weon Shik**, Greg, A.S., Lu, M., Lu, C., McPherson, B., Park, E., 2010, Evaluation of potential non-isothermal effect and heat transport during CO_2 sequestration. *Journal of Geophysical Research-Solid Earth* doi:10.1029/2009jb006745.

10. **Han, Weon Shik**, Lee, S.-Y., Lu, C. McPherson B.J., 2010, Effect of permeability on CO_2 trapping mechanisms and buoyancy-driven CO_2 migration in saline formations. *Water Resources Research* doi:10.1029/2009wr007850.

Year 2009

9. Kim K.-Y., Kim T., Kim J.-C., **Han, Weon Shik**, 2009, Numerical study on pressure variation due to subsurface CO_2 injection. *Journal of Geologic Society of Korea*, 45(5), 435-448.

8. Lu, C., **Han, Weon Shik**, Lee, S.-Y., McPherson, B. J. Lichtner, P.C. 2009, Effects of density and mutual solubility of CO_2-brine system on CO_2 storage in geologic formations: "Warm" vs. "Cold" Formations. *Advances in Water Resources*, 32(12), 1685-1702.

7. **Han, Weon Shik**, McPherson, B.J., 2009, Optimizing geologic CO_2 sequestration by injection in deep saline formations below oil reservoirs. *Energy Conversion and Management*, 50(10) 2570-2582.

6. Lu, C., Lee, S.-Y., **Han, Weon Shik**, McPherson, B.J., Lichtner, P.C., 2009, Comments on "Abrupt-interface solution for carbon dioxide injection into porous media" by M. Dentz and D. Tartakovsky. *Transport in Porous Media*, 79(1), 29-37.

Year 2008

5. **Han, Weon Shik**, McPherson, B.J., 2008. Comparison of Two Different Equations of State for

Application of Carbon Dioxide Sequestration. *Advances in Water Resources*, 31(6), 877-890.

4. McPherson, B.J., **Han, Weon Shik**, Cole, B., 2008. Two Equations-of-State assembled for basic analysis of multiphase CO_2 flow in deep sedimentary basin conditions. *Computers & Geosciences,* 34(5), 427-444.

Before Year 2007

3. **Han, Weon Shik**, Nam-Chil Woo, Kwang-Sik Lee, Ki-Chul Lee, 2003, Temporal and Spatial Variation of Stable Isotopic Compositions of Surface water and Ground Water in a Small Catchment, Muju, *Korea Society of Economic and Environmental Geology*, 36(5), 329-338.

2. **Han, Weon Shik**, Nam-Chil Woo, Ki-Chul Lee, Kwang-Sik Lee, 2002, Watershed Classification using Statistical Analysis of Water Quality Data in MuJu area, *Korean Society of Soil and Groundwater Environment*, 7(3), p.3-17.

1. **Han, Weon Shik**, Byung-Sun Lee, Youn-Tae Kim, Sang-Ki Moon, 2002, NGWA Conference: Fractured-Rock Aquifer 2002 Report, Korean. *Society of Soil and Groundwater Environment* 7(2), p.83-85

Peer-reviewed Book Chapter

Year 2009

1. **Han, Weon Shik**, McPherson, B.J., 2009, On using numerical simulation to evaluate CO_2 flow and transport in the subsurface: Uncertainty due to choice of Equations of State algorithms, in *Carbon Sequestration and Its Role in the Global Carbon Cycle*. B. McPherson, and E. Sundquist, Eds., Geophysical Monograph Series 183, American Geophysical Union, Washington, D.C., 261-278, doi:10.1029/2008gm000696.

Non Peer-reviewed Publications

Year 2010

5. Kim, K.-Y., **Han, Weon Shik**, Kim, T., 2010. Numerical study of pressure evolution from CO_2 injection in saline aquifer. Energy Procedia 10th *International Conference on Greenhouse Gas Technology*, 19-23 September 2010, RAI, Amsterdam, Netherlands.

4. **Han, Weon Shik**, Kim K.-Y., Lu M., McPherson, B.J., 2010. Injectivity changes and associated temperature disequilibrium study: numerical study. Energy Procedia 10th *International Conference on Greenhouse Gas Technology*, 19-23 September 2010, RAI, Amsterdam, Netherlands.

Year 2009

3. **Han, Weon Shik**, Esser, R.P., Thorne, D.A., McPherson, B.J., 2009, Southwest Partnership Phase II Project Site: Principal Reservoir Description Associated with Geology and Oil Production History in SACROC, Site of 35 Years of CO_2 injection. DOE Topical Report, DOE Award Number: DE-FC26-05NT42591**.**

Year 2008

2. Han, Weon Shik, Lee, S.-Y. Lu, C., McPherson, B.J., Esser, R.P., 2008. Role of correlation structure of permeability field on residual trapping mechanisms and buoyancy-driven CO_2 migration. Energy Procedia 1(1), 3494-3498, *9th International Conference on Greenhouse Gas Technology*, 16-20 November 2008, The Omni Shoreham Hotel, Washington D.C.

1. McPherson, B.J., **Han, Weon Shik**, Lee, S.-Y. Lu, C., Esser, R.P., 2008. Mitigation planning for large-scale storage project: Multiple injection zones and reservoir pressure reduction engineering design. Energy Procedia 1(1), 2595-2597, *9th International Conference on Greenhouse Gas Technology*,

16-20 November 2008, The Omni Shoreham Hotel, Washington D.C.

Conference Proceedings Papers and Abstracts

Year 2011

44. Karra, S., Ayling, B., **Weon Shik Han**, Lichtner, P.C., Lu, C., McPherson, B.J., Mclin, K.S., Moore, J., Pan, F., Rose, P.E., Xu, T., 2011. Simulation studies on Enhanced Geothermal Systems with CO_2 as a working fluid, Abstract H21C-1126 presented at 2011 Fall Meeting, AGU, San Francisco, California, 5-9 December.

43. Park, E., **Weon Shik Han**, 2011. A delineation of regional hydraulic properties based on water table fluctuation, Abstract H33G-1395 presented at 2011 Fall Meeting, AGU, San Francisco, California, 5-9 December.

42. Jeong, J., **Weon Shik Han**, Park, E., 2011. Stochastic predictions on CO_2 leakage potentials based on geostatistical simulations on hypothetical heterogeneous fields, Abstract H21C-1123 presented at 2011 Fall Meeting, AGU, San Francisco, California, 5-9 December.

41. Lee, S.-Y., Allen, J., **Weon Shik Han**, Lu, C., McPherson B.J., 2011. Supercritical CO_2 migration under cross-bedded structures: outcrop analog from the Jurassic Navajo Sandstone, Abstract H24B-07 presented at 2011 Fall Meeting, AGU, San Francisco, California, 5-9 December (Oral Presentation).

40. **Weon Shik Han**, McPherson, B.J., Kim, K.-Y., Chae, G.-T., Yum, B.-W., 2011. Lessons from natural CO_2 leakage analogue site studies and their application to secure CO_2 storage and monitoring, Abstract H32B-05 presented at 2011 Fall Meeting, AGU, San Francisco, California, 5-9 December (Oral Presentation).

39. Keating, G.N., Viswanathan, H.S., Letellier, B.C., **Han Weon Shik**, Wriedt, J.A., Lee, S.-Y., Deo, M., Lepinski, J., 2011. CO_2 leakage risk: assigning metrics, *Proceedings of the 10th Annual Conference on Carbon Capture & Sequestration*, Pittsburgh, Pennsylvania.

38. Lee, S.-Y., **Han Weon Shik,** Allen, J., McPherson, B.J., 2011. Understanding supercritical CO_2 migration and trapping mechanisms in a multi-scale heterogeneous cross-bedded formation: outcrop analog from the Jurassic Navajo sandstone, *Proceedings of the 10th Annual Conference on Carbon Capture & Sequestration*, Pittsburgh, Pennsylvania.

37. Wriedt, J., Deo, M., **Han Weon Shik**, Lee, S.-Y., McPherson, B.J., Lepinsky, J., 2011. A methodology for determining risk and likelihood of failure for carbon dioxide injection into saline aquifers, *Proceedings of the 10th Annual Conference on Carbon Capture & Sequestration*, Pittsburgh, Pennsylvania (Oral Presentation).

36. Allen, J., S.-Y. Lee, **Han Weon Shik**, 2011, Construction of a geologic model of the Aeolian Jurassic Navajo sandstone in central Utah for the evaluation of CO_2 sequestration, *AAPG Annual Convention and Exhibition*, 10-13 April, Houston, Texas.

Year 2010

35. Potter, S.L., **Han Weon Shik**, McPherson, B.J., Chan, M., 2010, Diagenetic iron oxide precipitation: A proxy for supercritical CO_2 spatiotempotal flow, *Geological Society of America Annual Meeting*, 31 October-3 November, Denver, Colorado (Oral Presentation).

34. Lu C., **Han, Weon Shik**, McPherson B.J., Lichtner, P., 2010, Effect of wetability of rock-CO_2-water system on the migration and distribution of geological sequestered supercritical CO_2, *Proceedings of the AIChe Annual Meeting*. Salt Lake City, Utah.

33. Kim K.-Y., Park E., **Han, Weon Shik**, 2010, Effect of high permeable layer on hydraulic system in a coastal aquifer, 21st Salt Water Intrusion Meeting, 21-25 June 2010, Azores, Portugal.

32. Kim K.-Y., **Han, Weon Shik**, Kim, T. 2010, Numerical study of pressure evolution from CO_2 injection in saline aquifers, 10*th International Conference on Greenhouse Gas Technology*, 19-23 September

2010, RAI, Amsterdam, Netherlands.

31. Han, Weon Shik, Stillman, G., Lu M., Lu C., McPherson B.J., Kim K.-Y., Lee S.-Y., 2010, Injectivity changes and associated temperature disequilibrium study in pilot test site: Numerical study, 10th *International Conference on Greenhouse Gas Technology*, 19-23 September 2010, RAI, Amsterdam, Netherlands (Oral Presentation).

30. Han, Weon Shik, Lee, S.-Y., Lu, C., Dubois, M., McPherson B.J., 2010. CO_2 injection evaluation in the Arbuckle formation under Thrall-Aagard reservoir, Kansas, *ARMA 44th U.S. Rock Mechanics Symposium*, 27-30 June 2010, Salt Lake City, Utah.

Year 2009

29. Kim K.-Y., **Han, Weon Shik**, Kim, T., Kim, J.-C., 2009. Spatial distribution of pressure built-up from CO_2 injection in saline aquifers. *EOS Trans. AGU, 90 (52), Fall Meet. Suppl., Abstract H13C-1029, 2008.*

28. McPherson, B., McColpin, G., Rutledge, J., Pawar, R., Deo, M., Rose, P., Lee, S.-Y., **Han. Weon Shik**, Lu, C., Grigg, R., Lee, R., 2009. Lesson learned from ongoing field tests of geologic CO_2 sequestration, *Proceedings of the 8th Annual Conference on Carbon Capture & Sequestration*, Pittsburgh, Pennsylvania (Oral Presentation).

27. Han. Weon Shik, Stillman, G.A., Lu, C., Lu, M., McPherson, B.J., Lee, S.-Y., Connell, L. D., 2009. Evaluation of potential non-isothermal effect and heat transport in CO_2 sequestration process, *Proceedings of the 8th Annual Conference on Carbon Capture & Sequestration*, Pittsburgh, Pennsylvania (Oral Presentation).

Year 2008

26. Stauffer, P.H., Pawar, R.J., **Han, Weon Shik**, R., McPherson, B. J., 2008. Assessing the leakage potential of CO_2 into ground water resources at SACROC, west Texas. *EOS Trans. AGU, 89 (53), Fall Meet. Suppl., Abstract H14C-05, 2008.*

25. Han, Weon Shik, Lee, S.-Y., Lu, C., Thorne, D., Esser, R., McPherson, B. J., 2008. Analysis of heterogeneity length-scales on residual gas trapping and buoyancy-driven CO_2 migration. *EOS Trans. AGU, 89 (53), Fall Meet. Suppl., Abstract H12C-04, 2008* (Oral Presentation).

24. Lu, C., **Han, Weon Shik**, Lee, S.-Y., Thorne, D., Esser, R., McPherson, B. J., 2008. Effects of density and mutual solubility of CO_2-brine system on CO_2 storage in geologic formations. *EOS Trans. AGU, 89 (53), Fall Meet. Suppl., Abstract H23D-0998, 2008.*

23. Lee, S.-Y., **Han, Weon Shik**, Morgan, C., Lu, C., Esser, R., Thorne, D., McPherson, B. J., 2008. An overview of CO_2 sequestration at Farnham Dome site, Utah, USA. *EOS Trans. AGU, 89 (53), Fall Meet. Suppl., Abstract H23D-0992, 2008.*

22. McPherson, B.J., McColpin, G., Rutledge, J., Pawar, R., Deo, M., Rose, P., Lee, S.-Y., **Han, Weon Shik**, Lu, C., 2008. Lessons learned from ongoing field tests of geologic CO_2 sequestration. *EOS Trans. AGU, 89 (53), Fall Meet. Suppl., Abstract H13K-07, 2008* (Oral Presentation).

21. Lee, S.-Y., **Han, Weon Shik**, Lu, C., McPherson, B.J., Esser, R.P., 2008. Effects of permeability heterogeneity on CO_2 sequestration in brine formation. *Proceedings of the AIChE Annual Meeting*. Philadelphia, PA. November 16-21.

20. Han. Weon Shik, Lee, S.-Y. Lu, C., VanZanten, A., 2008. Southwest Regional Partnership – Phase III @ Price Utah. *The Future of Coal in a Carbon-Constrained World*. Salt Lake City, Utah. May, 2008.

19. Han. Weon Shik, Lee, S.-Y. Lu, C., VanZanten, A., 2008. Southwest Regional Partnership – Phase II Demonstratoins. *The Future of Coal in a Carbon-Constrained World*. Salt Lake City, Utah. May, 2008.

18. Pawar, R., Carey, W., **Han. Weon Shik**, McPhersin, B.J., Fessenden, J., Kazuba, J., Keathing, E., 2008. A performance assessment of geologic sequestration of carbon dioxide at SACROC, west Texas, *Proceedings of the 7th Annual Conference on Carbon Capture & Sequestration*, Pittsburgh,

Pennsylvania.

17. Han. Weon Shik, B.J., McPherson, Lee, S.-Y., Esser, R.P., Lu, C., 2008. Quantitative comparison of thermophysical behavior of injected CO_2 in oil reservoir and brine formations, *Proceedings of the 7th Annual Conference on Carbon Capture & Sequestration*, Pittsburgh, Pennsylvania.

16. **Han. Weon Shik**, Lee, S.-Y., Lu, C., 2008. Southwest Regional Partnership – Phase III at Price, Utah. *Utah Energy Discovery Conference* 2008, Salt Lake City, UT, March. 14. 2008.

15. McPherson, B.J. **Han. Weon Shik**, M.D., Deo, S.-Y., Lee., 2008. Evaluations of potential impacts of geologic carbon sequestration using numerical simulation. *Proceedings of the AIChE Spring National Meeting*. New Orleans, LA.

Year 2007

14. Han. Weon Shik, B.J., McPherson, 2007. Evaluation of CO_2 injection into brine formation below oil reservoir. *EOS Trans. AGU, 88 (52), Fall Meet. Suppl., Abstract H12D-04, 2007* (Oral Presentation).

13. Han. Weon Shik, B.J., McPherson, 2007. Advanced model analysis of CO_2 storage mechanisms at SACROC, site of 35 years of CO_2 injection. *Proceedings of the AIChE Annual Meeting*. Salt Lake City, Utah (Oral Presentation).

12. McPherson, B.J., Li, L., Deo, M., **Han. Weon Shik**, Liu, N., 2007. Coupled hydrogeomechanical impacts of carbon sequestration. *Proceedings of the AIChe Annual Meeting*. Salt Lake City, Utah (Oral Presentation).

11. Han. Weon Shik, B.J., McPherson, 2007. Evaluation of CO_2 storage mechanisms at SACROC, site of 35 years of CO_2 injection, *Proceedings of the 6th Annual Conference on Carbon Capture & Sequestration*, Pittsburgh, Pennsylvania.

Year 2006

10. McPherson, B.J., Haerer, D. **Han, Weon Shik**, Heath, J., Morse, J., 2006. Potential hydrogeomechanical impacts of geological CO_2 sequestration. *EOS Trans. AGU, 87 (52), Fall Meet. Suppl., Abstract H14A-04, 2006* (Oral Presentation).

9. Han. Weon Shik, B.J. McPherson, Wang, P.F. 2006. CO_2 sequestration in the Permian basin SACROC northern Platform, site of 35 years of CO_2 injection. *EOS Trans. AGU, 87 (52), Fall Meet. Suppl., Abstract H21A-1356, 2006.*

8. Han. Weon Shik, B.J. McPherson, 2006. Comparison of two CO_2 equations of state algorithms. *Western Pacific Geophysical Meeting*, 24-27 July, Beijing, China (Oral Presentation).

7. McPherson, B.J., T. Chidsey, M.H., Holtz, J. Heath, **Han, Weon Shik,** Allis, R., Benson, R., 2006. Initial and ongoing results of CO_2 sequestration field demonstrations in the southwestern U.S.A. Paper presented at the 8th *International Conference on Greenhouse Gas Control Technologies*, Trondheim, Norway, June 19-22

6. Han, Weon Shik, B.J. McPherson, M. Raines, A.I. Sulaiman, 2006. Comparison of Two CO_2 EOS Algorithms: Minor Contrasts in State Properties May Translate to Significant Contrasts in Predicted Migration Histories, *Proceedings of the 5th annual conference on carbon capture & sequestration*, Alexandria, Virginia (Oral Presentation).

5. Holtz, M. H., R.C. Smyth, B.J. McPherson, **Weon Shik Han**, 2006. Subsurface characterization of CO_2 sequestration sites, example from a carbonate reef setting. *Proceedings of International Symposium on Site Characterization for CO_2 Geological Storages (CO2SC)*, Lawrence Berkeley National Laboratory, Berkeley, California (Oral Presentation).

Before Year 2005

4. Han, Weon Shik, B.J. McPherson, R. Pawar, J. Heath, 2005. Numerical analysis of pilot test plume evolution patterns using two different equations of state, *Proceedings of the 4th Annual Conference*

on Carbon Capture & Sequestration, Alexandria, Virginia.

3. McPherson, B.J., J. Heath, **Weon Shik Han**, 2005. 2-D numerical modeling of a fault zone leaking carbon dioxide in east central Utah: Implications for MMV Protocols, *Proceedings of the 4th Annual Conference on Carbon Capture & Sequestration*, Alexandria, Virginia.

2. Han, Weon Shik, B.J. McPherson, 2004, Assembly and comparison of different equations of state for multiphase carbon dioxide in the subsurface, *EOS Trans. AGU, 85 (47), Fall Meet. Suppl., Abstract H21E-1071, 2004.*

1. McPherson, B.J., J. Heath, **Weon Shik Han**, J. Koonce, 2004, Coupled fluid-heat flow model analysis to explain the origin and accumulation of subsurface carbon dioxide: McElmo dome case study. *EOS Trans. AGU, 89 (53), Fall Meet. Suppl., Abstract H33F-0531, 2004.*

Awarded proosals as PI and co-PI

October 2011 (Subcontracting Award)	**PI**	Department of Energy **(**DOE) proposal for research on "Southwest Regional Partnership on Carbon Sequestration-Phase II and III" (DE-FC-05NT42593), a total of $19,496 over one-month period: Subcontracted from University of Utah
October 2011 (Subcontracting Award)	**PI**	Department of Energy **(**DOE) proposal for research on "Comprehensive, quantitative risk assessment of CO_2 geologic storage" (DE-FE0001112), a total of $46,740 over two-month period: Subcontracted from University of Utah
August 2011 (Awarded)	**PI**	Korea National Oil Corporation (KNOC) proposal "Technology development for geologic CO_2 storage demonstration through participating in the Canadian project", a total of $416,107 over the three-year period: U.S. Korea National Oil Corporation
October 2009 (Awarded)	**Co-PI**	**With co-PIs Lu, C., McPherson, B.J., Moore, J., University of Utah, Kaszuba, J.P., University of Wyoming, Lichtner, P.C., Los Alamos National Laboratory,** Department of Energy **(**DOE) proposal for research on "Development of Chemical Model to Predict the Interaction between Supercritical Carbon Dioxide and Reservoir Rock in EGS reservoirs" (DE-PS36-09GO99018), a total of $900,000 over the three-year period (submitted July): U.S. Department of Energy

Pending Proposals as PI and co-PI

November 2011 (Pending)	**PI**	American Chemical Society's Petroleum Research Fund "Application of ^4He isotope to quantify supercritical CO_2 distribution in geostatistically predicted heterogeneous media", a total of $100,000 over two-year period: American Chemical Society's Petroleum Research Fund
October 2011 (Pending)	**PI**	**With co-PI Lee, S.-Y., University of Utah and Allen, J., Chevron**, Research Growth Initiative in University of Wisconsin-Milwaukee "Multi-scale geologic structures dependent capillary entrapment and migration processes of supercritical CO_2", a total of $60,486 over one-year period: University of Wisconsin-Milwaukee
June 2011 (Pending)	**PI**	**With co-PI McPherson, B.J., University of Utah**, National Science Foundation **(**NSF) proposal for hydrologic sciences on "Collaborative Research: CO_2 leakages as cold-geysers and diffusive CO_2 transport:

Continuous monitoring of *in-situ* P, T, chemistry, and CO_2 flux with numerical verification" (09-538), a total of $200,572 over the two-year period: U.S. National Science Foundation

Unfunded Proposal Efforts as PI and co-PI

May 2011 (Unfunded)	**PI**	Utah Geological Survey proposal for research on "Modeling of CO_2-driven cold-water geyser eruption mechanisms, the Crystal Geyser, Utah", a total of $24,866 over the one-year period (Submitted May 2011: Utah Geological Survey
April 2011 (Unfunded)	**Co-PI**	**With co-PI Lee, S.-Y., McPherson, B.J., University of Utah, Matthews, V., Colorado Geological Survey, Rowe, W., Schulumberger Carbon Services, Yum, B.-W., Korea Institute of Geoscience and Mineral Resources,** Department of Energy **(**DOE) proposal for research on "Small-scale field test of geologic CO_2 storage in Craig, Colorado" (DE-FOA-0000441), a total of $16,384,554 over the four-year period (submitted April, 2011): U.S. Department of Energy
September 2010 (Unfunded)	**Co-PI**	**With co-PI Lee, S.-Y., University of Utah,** Department of Energy **(**DOE) proposal for research on "Evaluation of supercritical CO_2 migration and trapping mechanisms in a multi-scale heterogeneous cross-bedded formation: outcrop analog from the Jurassic Navajo sandstone" (DE-FOA-0000178), a total of $180,000 over the two-year period (submitted September): U.S. Department of Energy
April 2010 (Unfunded)	**PI**	**With PI Tsau, J.-S., University of Kansas**, Department of Energy **(**DOE) proposal for research on "Feasibility testing of new concept optimizing geologic CO_2 sequestration by injection in deep saline formations below oil reservoir: A case study in SACROC Unit, western Texas" (DE-FE0000250), a total of $4,870,000 over the two-year period (submitted April): U.S. Department of Energy.
February 2010 (Unfunded)	**PI**	**With co-PI Lu, C., University of Utah**, Funding incentive seed grand program, University of Utah "Development of thermal-hydrologic-mechanical-chemical simulator for the application of CO_2 sequestration", a total 25,000 over one-year period.
December 2009 (Unfunded)	**Co-PI**	**With PI Lee, S.-Y., University of Utah**, National Science Foundation **(**NSF) proposal for hydrologic sciences on "Evaluation of supercritical CO_2 migration and trapping in the multi-scale heterogeneous cross-bedded formations: outcrop analogues from Jurassic Navajo sandstone" (09-538), a total of $243,130 over the two-year period: U.S. National Science Foundation
May 2009 (Unfunded)	**PI**	**With PIs Lu, C. Deo, M., University of Utah, Min, K-B., Seoul National University,** Department of Energy **(**DOE) proposal for research on "Development of Advanced Simulation Capabilities for Underground Storage of Carbon Dioxide" (DE-FOA0000023-02), a total of $2,000,000 over the four-year period (submitted May): U.S. Department of Energy
October 2008 (Unfunded)	**Co-PI**	**With PIs Deo, M., Jones, G., Berzins, M., University of Utah,** Energy Frontier Research Center (EFRC) proposal for research on *the fundamental chemistry and physics of geologic sequestration of carbon*

dioxide (DE-PS02-08ER15944), $5,000,000 per year for a total of $25,000,000 over the five-year period (submitted 10/01/2008): Basic Energy Science, U.S. Department of Energy

Competitive Proposal efforts as Collaborator

August 2009 (Awarded)	**Key Personnel**	**With PIs, McPherson, B.J., University of Utah, D'Acosta, C., Cap CO2, Barkley, N., Coffeyville Resources, Chisam, M., Kansas Ethanol, Dubois, M., Cap CO2, Duguid, A., Schlumberger, Erickson, J., Black&Veatch, Hattenbach, R., Blue Source, Roskam, J., Cap CO2, Vick, K., CVR Energy&Coffeville Resources,** Department of Energy (DOE) proposal for research on "Integrated Mid-Continent Carbon Capture, Sequestration and Enhanced Oil Recovery" (DE-FOA-0000019), a total of $3,435,718 over the seven month period (submitted August): U.S. Department of Energy
August 2009 (Awarded)	**Key Personnel**	**With PIs, McPherson, B.J., University of Utah, Matthews, V., Colorado Geological Survey,** Department of Energy (DOE) proposal for research on "Characterization of most promising sequestration formations in the Rocky Mountain Region" (DE-FOA-0000033), a total of $4,832,138 over the three-year period (submitted August): U.S. Department of Energy
July 2009 (Awarded)	**Key Personnel**	**With PI Lee, R. Petroleum Research Recovery Center, New Mexico Tech,** Department of Energy (DOE) proposal for the development on "*Southwestern United States Carbon Sequestration Training Center*" (DOE-FOA-000080), a total of $1,077,171 over the three-year period (submitted July): U.S. Department of Energy
January 2009 (Awarded)	**Key Personnel**	**With PIs McPherson, B.J., Solomon, D.K., Deo, M., Geol, R., University of Utah,** Energy Protection Environment (EPA) proposal for research on *the Integrated design, modeling, and monitoring of geologic sequestration of anthropogenic carbon dioxide to safeguard sources of drinking water* (EPA-G2008-STAR-H1), a total of $899,567 over the three-year period (submitted 01/06/09): U.S. Environmental Protection Agency

Student Advising

Blayde McIntire (University of Utah)	Undergraduate: Risk related processes in CO_2 sequestration project
Greg Stillman (University of Utah)	Undergraduate: Graduated Summer 2009 in Department of Chemistry, University of Utah, Primary Research Advisor for Undergraduate Thesis, Research topic: Evaluation of non-isothermal processes associated with CO_2 sequestration. Currently working in the Geothermal Technologies Program at Department of Energy (DOE)

Professional Activities

Invited Presentation

2011

- Department of Geosciences, University of Wisconsin-Milwaukee (2011.11)
- Korea Ocean Research & Development Institute (2011.7)

- National Institute of Environmental Research, Korea (2011.7)
- Korea University, Seoul, South Korea (2011.7)
- Korea Institute of Geoscience & Mineral Resources, Daejeon (2011.7)

2010

- Department of Geosciences, University of Wisconsin-Milwaukee (2010.12)
- Korea Basic Science Institute (2010.12)
- Energy & Geosciences Institute, University of Utah, Salt Lake City (2010.1)

2009

- Korea Institute of Geoscience & Mineral Resources, Daejeon (2009.5)
- Korea University, Seoul, South Korea (2009.5)
- Yonsei University, Seoul, South Korea (2009.5)

2007

- Society of Petroleum Engineers Permian Basin Section, Midland, Texas (2007.9)
- Texas Bureau of Economic Geology, The University of Texas, Austin (2007.5)

Session Developer and Chair of International Conference

- Session Developer: 44th U.S. Rock Mechanics Symposium, Salt Lake City, Utah, June 27-30, 2010
- Chair: Session Title as "Modeling Tools (I)", International Conference on Greenhouse Gas Technologies (GHGT) 2010, Amsterdam, Netherland, September 19-23, 2010.

Project Group Leader

- Simulation working group of "Integrated Mid-Continent Carbon Capture, Sequestration and Enhanced Oil Recovery" project funded by Department of Energy

Proposal, Journal Review Activity, and Session Chair

Journal

2011:Applied Geochemistry; Greenhouse Gases: Science and Technology; International Journal of Greenhouse Gas Control; Transport in Porous Media; Environmental Engineering and Management Journal
2010: Transport in Porous Media (2)
2009: Transport in Porous Media
2008: Water Resources Research

Proposal

2010: American Chemical Society's Petroleum Research Fund
2008:National Science Foundation EPSCoR

Session Chair

2011: Session Title as "Heterogeneity and Geologic Storage of CO_2", American Geophysical Union Conference, San Francisco, December 5-9, 2011.
2010: Session Title as "Modeling Tools (I)", International Conference on Greenhouse Gas Technologies (GHGT) 2010, Amsterdam, Netherland, September 19-23, 2010.
2010: Session Developer: 44th U.S. Rock Mechanics Symposium, Salt Lake City, Utah, June 27-30, 2010

News and Media

Carbon sequestration newsletter by National Energy Technology Laboratory in the November 2007: Odessa American Online, "More on FutureGen"

Carbon sequestration newsletter by National Energy Technology Laboratory in the August 2009: Science highlights "Optimizing geologic CO_2 sequestration by injection in deep saline formations below oil reservoir"

Science for Environment Policy by the European Union's DG (department of Environment) Issue 171, 29 October, 2009: The article highlights "Brian formations under oil reservoirs ideal for CO_2

storage"

Frontiers in Ecology and the Environment, published by the Ecological Society of America (December, 2009, Page 512): "Oily solution to global warm". The article highlights "Brian formations under oil reservoirs ideal for CO_2 storage"

Awards/Fellowships/Grants

2009	Nominated to the Candidate for "the Eni Award" in 2010 (http://www.eni.it/eni-award/eng/home.shtml): The candidature article is "**Han, Weon Shik**, McPherson, B.J., 2009, Optimizing geologic CO_2 sequestration by injection in deep saline formations below oil reservoirs. *Energy Conversion and Management*, Vol.50, No.10, 2570-2582, doi:10.1016/j.enconman.2009.06.008."
2007	Travel Grants from New Mexico Institute of Mining and Technology: $1,000
2003	Graduate study abroad scholarship by the Korea Science and Engineering Foundation (KOSEF): $60,000
Fall 2001	Brain Korea 21, Yonsei University
Fall 1999	Academic Scholarship, Yonsei University
Spring 1999	Academic Scholarship, Yonsei University
Fall, 1994	Academic Scholarship, Yonsei University

Collaborators & Affiliations

Allen, J., University of Utah
Esser, R., University of Utah
Holtz, M., Former Texas Bureau of Economic Geology
Keating, E., Los Alamos National Laboratory
Keating, G., Los Alamos National Laboratory
Kim, K.-Y., Korea Institute of Geoscience and Mineral Resources (KIGAM), South Korea
Lee, S.-Y., University of Utah
Lichtner, P.C., Los Alamos National Laboratory
Lu, C., Idaho National Laboratory
Lu, M., Commonwealth Scientific and Research Organization (CSIRO), Australia
Milind, D., University of Utah
McPherson, B.J., Univesrity of Utah
Park, E., Kyungpook National University, South Korea
Raines, M., Former Kinder Morgan LLC.
Stauffer, P.H., Los Alamos National Laboratory
Solomon, D. University of Utah
Viswanathan, H., Los Alamos National Laboratory
Wang, F.P., Texas Bureau of Economic Geology