Curriculum Vitae

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RESEARCH INTERESTS:

- **Environmental Geochemistry**
- **Hydrogeology**
- **Energy Geosciences**
- **Computational Fluid Dynamics**
- **Reactive Transport Modeling**
- **Integrated Assessment Modeling**

EDUCATION:

- Postdoctoral Fellow, Energy Geosciences Division, Lawrence Berkeley National Laboratory **Present**
- PhD Civil and Environmental Engineering, Princeton University **2015**
- Graduate certificate in Science, Technology, and Environmental Policy (STEP), Woodrow Wilson School of Public and International Affairs, Princeton University **2015**
- M.A. Civil and Environmental Engineering, Princeton University **2012**
- B.A. China Center for Economic Research, Peking University **2009**
- B.S. School of Environmental Sciences, Peking University **2009**

TEACHING EXPERIENCE:

- **Introduction to Environmental Engineering** by Professor Catherine A. Peters, 2011
- **Environmental Implications of Energy Technologies** by Professor Daniel E. Giammar, 2012

PUBLICATIONS:

- **H. Deng**, J.M. Bielicki, M. Oppenheimer, J.P. Fitts, C.A. Peters. Leakage risks of geologic CO_2 sequestration and the impacts on the global energy system and climate mitigation. *In prep.*
- **H. Deng,** S. Molins, C.I. Steefel, D.J. DePaolo, M. Voltolini, L. Yang, J. Ajo-Franklin. A 2.5D Reactive Transport Model for Fracture Alteration Simulation. *Environmental Science & Technology*, 2016, 50 (14), 7564-7571.
- **H. Deng,** J.P. Fitts, C.A. Peters. Quantifying fracture geometry with X-ray tomography: Technique of Iterative Local Thresholding (TILT) for 3D image segmentation. *Computational Geosciences*, 2016, 20(1), 231-244.
- J.M. Bielicki, M.F. Pollak, **H. Deng,** E.J. Wilson, J.P. Fitts, C.A. Peters. The Leakage Risk Monetization Model for Geologic CO_2 Storage. *Environmental Science & Technology*, 2016, 50(10), 4923-4931.
- **H. Deng,** J.P. Fitts, D. Crandall, D. McIntyre, C.A. Peters. Alterations of fractures in carbonate rocks by CO_2-acidified brines. *Environmental Science & Technology*, 2015, 49(16), 10226-10234.
- **H. Deng**, J.M. Bielicki, M. Oppenheimer, J.P. Fitts, C.A. Peters. Policy Implications of Monetized Leakage Risk from Geologic CO_2 Storage Reservoirs. *Energy Procedia*, Volume 63, 2014, Pages 6852-6863.

- **H. Deng**, J.P. Fitts, C.A. Peters, L. Li, D. Crandall, G.S. Bromhal. Experimental study of reactive flow in an Eau Claire fracture exposed to CO_2-rich brine. 2013: American Rock Mechanics Association, paper 13-592.
- **H. Deng**, B.R. Ellis, C.A. Peters, J.P. Fitts, D. Crandall, G.S. Bromhal, (2013), Modifications of carbonate fracture hydrodynamic properties by CO_2-acidified brine flow. *Energy & Fuels*, 27(8), 4221-4231.
- J.P. Fitts, B.R. Ellis, **H. Deng**, C.A. Peters. Invited "Geochemical controls on fracture evolution in carbon sequestration". 2012: American Rock Mechanics Association, paper 12-549.
- **H. Deng**, F. Zhao, X. Zhao, (2012), Changes of extreme temperature events in Three Gorges area, China. *Environmental Earth Science*. 66:7, 1783-1790.
- H.Y. Dou, **H. Deng**, X.M. Sun, X.Y. Zhao, (2010), Short-term temperature and precipitation forecast over Tibetan Plateau using mean generating function-optimal subset regression. *Acta Scientiarum Naturalium Universitatis Pekinensis*, 46: 643-648.
- F. Zhao, **H. Deng**, X. Zhao, (2010), Rainfall regime in Three Gorges area in China and the control factors. *International Journal of Climatology*, 30: 1396–1406.

CONFERENCE PRESENTATIONS:

- **H. Deng,** S. Molins, C.I. Steefel, D.J. DePaolo, "Simulating Fracture Alteration Caused by CO_2-water-Rock Interactions", Goldschmidt Conference, Yokohama, Japan, 2016.
- **H. Deng,** S. Molins, C.I. Steefel, D.J. DePaolo, M. Voltolini, J. Ajo-Franklin. "Simulating the evolution of fracture surface alteration exposed to CO_2-acidified brine", AGU Fall Meeting, San Francisco, CA, 2015.
- **H. Deng**, Jeffrey Fitts, Catherine Peters, "Geochemical alterations of carbonate fractures", 250th ACS National Meeting, Boston, MA, 2015.
- **H. Deng**, J.P. Fitts, C.A. Peters, "Geochemical Alterations of Carbonate Fractures and the Environmental Implications", 2015 AEESP Research and Education Conference, New Haven, CT, 2015.
- **H. Deng**, J.M. Bielicki, M. Oppenheimer, J.P. Fitts, C.A. Peters, "How leakage risk in geologic CO_2 storage might impact climate change mitigation and policy choices", 2015 AEESP Research and Education Conference, New Haven, CT, 2015.
- **H. Deng**, J.M. Bielicki, M. Oppenheimer, J.P. Fitts, C.A. Peters, "Accounting for the Leakage Risk of Geologic CO_2 Storage and Its Impacts on Climate Mitigation and the Global Energy System" Oral, The 14th Annual Carbon Capture, Utilization and Storage Conference, Pittsburgh, PA, 2015.
- **H. Deng**, J.P. Fitts, D. Crandall, D. McIntyre, C.A. Peters, "Permeability evolution of fractured limestone due to reactive flow: Observation and prediction of wormhole formation", AGU Fall Meeting, San Francisco, CA, 2014.
- C.A. Peters, **H. Deng**, J.M. Bielicki, J.P. Fitts, M. Oppenheimer, "How CO_2 Leakage May Impact the Role of Geologic Carbon Storage in Climate Mitigation", AGU Fall Meeting, San Francisco, CA, 2014.
- J.P. Fitts, **H. Deng**, C.A. Peters, "How Reactive Fluids Alter Fracture Walls and Affect Shale-Matrix Accessibility", AGU Fall Meeting, San Francisco, CA, 2014.
- C.A. Peters, **H. Deng**, B. Guo, J.P. Fitts, "Challenges in Reactive Transport Modeling for Prediction of Geometry Evolution in Fractured Carbonate Rocks", **INVITED**, AGU Fall Meeting, San Francisco, CA, 2014.
- **H. Deng**, J.M. Bielicki, M. Oppenheimer, J.P. Fitts, C.A. Peters, "Policy Implications of Monetized Leakage Risk from Geologic CO_2 Storage Reservoirs" Oral, International Conference on Greenhouse Gas Technologies (GHGT), Austin, TX, Oct 2014.
- C.A. Peters, **H. Deng**, J.P. Fitts "New Reactive Transport Challenges for Acidified Flows in Fractured Carbonate Rocks" **INVITED** Abstract H35C-1425 presented at 2013 Fall Meeting, AGU, San Francisco, CA Dec 2013.

- J.P. Fitts, **H. Deng**, R. Tappero, C.A. Peters "Spatial Variation of Dissolution at Fracture Boundaries" Goldschmidt 2013. Mineralogical Magazine, **77(5)** 1092.
- J.P. Fitts, **H. Deng**, R. Tappero, C.A. Peters "Exploring Geochemically Driven Evolution of Vertical Fractures in Tight Sedimentary Rocks". 2013 AEESP 50th Anniversary Conference, Environmental Engineers and Scientists of 2050: Education, Research, and Practice. Colorado School of Mines, July 2013.
- **H. Deng**, C.A. Peters, J.P. Fitts, D. Crandall, G. Bromhal, L. Li "Impacts of Reactive Fluids on Fracture Flows in the Context of Subsurface Energy Technologies". 2013 AEESP 50th Anniversary Conference, Environmental Engineers and Scientists of 2050: Education, Research, and Practice. Colorado School of Mines, July 2013.
- A.F. Clarens, J.P. Fitts, S. Wang, Z. Tao, C.A. Peters, **H. Deng**, "Geochemically Driven Evolution of Mineral Surfaces: Impacts on Leakage Processes from Geologic Carbon Sequestration Sites" 2013 AEESP 50th Anniversary Conference, Environmental Engineers and Scientists of 2050: Education, Research, and Practice. Colorado School of Mines, July 2013.
- **H. Deng**, J.P. Fitts, R. Tappero, C.A. Peters, S. Wirick, W. Rao. "X-ray imaging studies of water-rock interactions at fracture surfaces during fluid flow", 2013 National Synchrotron Light Source/Center for Functional Nanomaterials (NSLS/CFN) Joint Users' Meeting, Brookhaven National Lab, Upton, NY, May 20-22, 2013.
- A.F. Clarens, S. Wang, B. Liang, C.A. Peters, J.P. Fitts, **H. Deng**, B.R., Ellis, "An Integrated Experimental Program to Understanding Leakage from Geologic Carbon Sequestration Sites across Scales", Abstract H14D-05 presented at 2012 Fall Meeting, AGU, San Francisco, CA, 3-7, Dec.
- **H. Deng**, B.R. Ellis, C.A. Peters, J.P. Fitts, D. Crandall, G. Bromhal "Modification of fracture hydrodynamic properties by CO_2-acidified brine flow". 2012 AIChE Annual Meeting, Nov 2012.
- J.P. Fitts, B.R. Ellis, **H. Deng**, R. Tappero, C.A. Peters, "Calcite Dissolution and Caprock Fracture Surface Deterioration at High P/T: Dependence on Reactive Fluid Velocity and Mineral Spatial Heterogeneity", NSF CMMI Engineering Research and Innovative Conference, Program Area: Geomechanics and Geomaterials, C133, Boston, MA July 2012.
- **H. Deng**, D. Crandall, S. King, B.R. Ellis, G. Bromhal, J.P. Fitts, C.A. Peters, "Change in Fracture Permeability after the Flow-through of CO_2-acidified brine", AGU Fall Meeting, San Francisco, CA, Dec, 2011.
- **H. Deng**, C.A. Peters, J.P. Fitts, M. Pollak, E. Wilson, "Hydrogeological characterization of a potential CO_2 injection site in Ottawa County, Michigan", AGU Fall Meeting, San Francisco, CA, 2010.

PROFESSIONAL ACTIVITIES:

- **Co-convener**: session "Geochemical and Transport Processes Associated with CO_2 Geological Storage", Goldschmidt Conference, Yokohama, Japan, 2016.
- **Reviewer**: Journals *Computational Geosciences, Computer Methods and Programs in Biomedicine, Environmental Science & Technology, Environmental Engineering Science, Geochimica et Cosmochimica Acta, Geophysical Research Letters, Greenhouse Gases: Science and Technology, Hydrology and Earth System Sciences*