

Jiamin Wan

Researcher ID: H-6656-2014. ORCID 0000-0003-4847-5577

Energy Geosciences Division (MS 74-316C)
E.O. Lawrence Berkeley National Laboratory, 1 Cyclotron Road, Berkeley, CA 94720
510-486-6004, jwan@lbl.gov

Education:

Ph.D., Hydrology, 1989-1993, New Mexico Institute of Mining and Technology, NM, USA
Ph.D., Geochemistry(candidate), 1986-1989, New Mexico Institute of Mining and Technology, NM, USA
M.S., Geochemistry, 1981-84, Institute of Geochemistry, Chinese Academy of Science, China
B.S., Chemistry, 1977-1981, Beijing University of Iron and Steel Technology, China

Biographical Summary:

Jiamin Wan completed graduate education in hydrology and geochemistry. Since graduation, she has been employed in the Earth Sciences Division (now the Energy Geosciences Division) of Lawrence Berkeley National Laboratory, and is currently a Staff Scientist. Her research is focused on interfacial, wetting, and capillary phenomena in geologic materials, and on biogeochemical reactions and subsurface transport of contaminants, colloids and nano-particulates. Her studies under high-pressure and high-temperature reservoir conditions combine pore-scale microscopy of fluid interfacial dynamics with surface spectroscopy and macroscopic interfacial measurements to understand mechanisms controlling CO₂, water, and oil interactions. She currently has 90 publications (1/3 as the first author, H-Index 34) in peer-reviewed journals. She was the lead principal investigator for many projects over two decades when funding was available through competitive peer-reviewed processes.

Research Interests:

- Interfacial phenomenon in hydrogeological media: Dynamic wetting and fluid-fluid interfacial tensions under atmosphere and elevated (deep subsurface) pressures and temperatures; colloid stability, partitioning, and transport.
- CO₂ enhanced oil recovery (CO₂-EOR): altering CO₂ apparent viscosity (using foams) and varying wettability to control fluids mobility; to test these in high-pressure micromodels and cores.
- Hydraulic fracturing: developing new fracturing fluids as the alternative to water-based fracturing fluids; understanding fluid-rock interactions and manipulating interfacial properties.
- Geological CO₂ sequestration: studies of mechanisms controlling CO₂ mobility and trapping, and caprock integrity through pore-scale microscopy, surface spectroscopy, and macroscopic interfacial measurements under elevated P-T conditions.
- Contaminant biogeochemistry and plume remediation: studies of reactions, transport, and remediation of contaminants including U and Cr.
- Soil C and N transport and transformations and their impacts on C and N cycling: from the unsaturated zone to groundwater.

Professional Experience:

- 1997- present: Staff Geological Scientist, Earth Sciences Division, LBNL
- 1995 -1997: Scientist, Earth Sciences Division, LBNL
- 1993 -1995: Postdoctoral Research Fellow, Earth Sciences Division, LBNL
- 1989 -1993: Graduate Research Associate in Hydrology, New Mexico Tech, NM
- 1984 -1986: Research Associate, Institute of Geochemistry, Chinese Academy of Sciences

Publications in refereed journals:

1. Wan, J., T.K. Tokunaga, W. Brown, W. Dong, M. Bill, C.A. Buetler, A.N. Henderson, N. Harvey-Costello, M.E. Conrad, N.J. Bouskill, S.S. Hubbard, and K.H. Williams. Bedrock weathering contributions to subsurface reactive nitrogen and nitrous oxide emissions. *Nature Geosciences*, 14, 217-224. 10.1038/s41561-021-00717-0, 2021.
2. Chang, C., T. Kneafsey, J. Wan, T.K. Tokunaga, S. Nakagawa. Impacts of mixed-wettability on brine drainage and supercritical CO₂ storage efficiency in a 2.5=D heterogeneous micromodel. *Water Resources Research*, 56(7), <https://doi.org/10.1029/2019WR026789>, 2020.
3. Zhu, C., J. Wan, and T.K. Tokunaga. Impact of CO₂ injection on wettability of coal at elevated pressure and temperature. *Int. Journal of Greenhouse Gas Control*, 91, 102840, <https://doi.org/10.1016/j.jggc.2019.102840>, 2019.
4. Wan, J., T.K. Tokunaga, K.H. Williams, W. Dong, W. Brown, A.N. Henderson, A.W. Newman, S.S. Hubbard. Predicting sedimentary bedrock subsurface weathering fronts and weathering rates. *Scientific Rep.* 9:17198, <https://doi.org/10.1038/s41598-019-53205-2>, 2019.
5. Tokunaga, T.K., J. Wan, K.H. Williams, W. Brown, A. Henderson, Y. Kim, A.P. Tran, M.E. Conrad, M. Bill, R.W.H. Carroll, W. Dong, Z. Xu, A. Lavi, B. Gilbert, S. Romero, J.N. Christensen, B. Faybishenko, B. Arora, E.R. Siirila-Woodburn, R. Versteeg, J.H. Raberg, J.E. Peterson, S.S. Hubbard. Depth- and time-resolved distributions of snowmelt-driven hillslope subsurface flow and transport and their contributions to surface waters. *Water Resources Research*, 55, <https://doi.org/10.1029/2019WR025093>, 2019.
6. Lavy, A., D.G. Geller, P.B. Matheus Carnevali, J. Wan, W. Dong, T.K. Tokunaga, B.C. Thomas, K.H. Williams, S.S. Hubbard, J.F. Banfield. Microbial communities across a

- hillslope-riparian transect shaped by proximity to the stream, groundwater table, and weathered bedrock. *Ecology and Evolution*. DOI: 10.1002/ece3.5254, 2019.
7. Wan, J., T.K. Tokunaga, W. Dong, K.H. Williams, Y. Kim, M.E. Conrad, M. Bill, W.J. Riley, S.S. Hubbard. Deep unsaturated zone contributions to carbon cycling in semiarid environments. *J Geophys Res-Biogeosci* 123, 3045-3054, doi:10.1029/2018jg004669, 2018.
 8. Tokunaga, T.K., Y. Kim, J. Wan, M. Bill, M.E. Conrad, W. Dong. Method for controlling temperature profiles and water table depths in laboratory sediment columns. *Vadose Zone J.* 17, doi: 10.2136/vzj2018.04.0085, 2018.
 9. Wang, L. J. Wan, T.K. Tokunaga, Y. Kim, Q. Yu, Experimental and modeling study of methane adsorption onto partially saturated shales. *Water Resources Research*, 54, 5017-5029, DOI: 10.1029/2017WR020826, 2018.
 10. Wan, J., T.K. Tokunaga, P.D. Ashby, Y. Kim, M. Voltolini, B. Gilbert, and D.J. DePaolo. Supercritical CO₂ uptake by nonswelling phyllosilicates. *PNAS*, DOI: 10.1073/pnas.1710853114. 2018.i
 11. Christensen, J.N., B. Dafflon, A.E. Shiel, T.K. Tokunaga, J. Wan, B. Faybishenko, W. Dong, K.H. Williams, C. Hobson, S.T. Brown, S.S. Hubbard. Using strontium isotopes to evaluate the spatial variation of groundwater recharge. *Sci. Total. Environ.* doi: 10.16/j.scitotenv.2018.05.019, 2018.
 12. Shen, W.J., L.G. Zheng, C.M. Oldenburg, A. Cihan, J. Wan, T.K. Tokunaga. Methane diffusion and adsorption in shale rocks: A numerical study using the dusty gas model in TOUGH2/EOS7C-ECBM. *Transport in Porous Media* 123, 3, 521-531, DOI: 10/1007/s11242-017-0985-y, 2018.
 13. Wan, J., Y. Kim, M.J. Mulvihill, and T. K. Tokunaga. Dilution destabilizes engineered ligand-coated nanoparticles in aqueous suspensions. *Environmental Toxicology and Chemistry*. doi: 10.1002/etc.4103. 2018.
 14. Hu, R. J. Wan, Z. Yang, Y.F. Chen, and T.K. Tokunaga, Wettability and flow rate impacts on immiscible displacement: A theoretical model. *Geophysical Research Letters*, doi: 10.1002/2017GL076600, 2018.

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16. Hu, R. J. Wan, Y. Kim, and T.K. Tokunaga. Wettability impact on supercritical CO₂ capillary trapping: Pore-scale visualization and quantification. *Water Resources Research*, DOI: 10.1002/2017WR02072, 2017.
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