

Jennifer L. Druhan

Department of Geology, University of Illinois Urbana Champaign
1301 W Green St. Urbana, IL 61801, United States

EDUCATION

2012: Ph.D. Earth and Planetary Science, *University of California, Berkeley, CA*

Dissertation Advisor: Donald J. DePaolo

2006: M.S. Department of Hydrology and Water Resources, *University of Arizona, Tucson, AZ*

2003: B.S. Environmental Sciences, *University of North Carolina, Asheville, NC*

APPOINTMENTS

2021-present: Associate Professor, Dept. of Geology, University of Illinois Urbana Champaign

2019-present: Chercheure Associée (Associate Professor), Institut de Physique du Globe de Paris, Université Paris Cité

2015-2021: Assistant Professor, Dept. of Geology, University of Illinois Urbana Champaign

2017, 2018 & 2019: Invited Professor, Institut de Physique du Globe de Paris, Université Paris Cité

2014 – 2015: Postdoctoral Fellow, Stanford University

2012 – 2014: National Science Foundation Postdoctoral Fellow, Stanford University

HONORS & AWARDS

2021: College of Liberal Arts and Sciences Helen Corley Petit Scholar

2020: National Science Foundation, Division of Earth Sciences Early Career Award

2017, 2019, 2020, 2021: UIUC Teachers Ranked as Excellent by their Students

2017: R&D 100 Award, CrunchFlow Reactive Transport Software

2016: Editors Citation for Excellence in Refereeing, Water Resources Research

2011, 2010, 2007: Outstanding Student Paper Award, American Geophysical Union Fall Meeting

PROFESSIONAL ACTIVITIES

Chair, American Geophysical Union Groundwater Technical Committee

Associate Editor, Water Resources Research

Session Organizer: American Geophysical Union Fall Meeting, Goldschmidt Conference

Short-course Instructor: Reactive transport modeling workshops for CrunchFlow / CrunchTope and The Geochemists Workbench

Editor, Mineralogical Society of America Reviews in Mineralogy and Geochemistry, special volume on “Reactive Transport in Natural and Engineered Systems”

PROFESSIONAL SOCIETY MEMBERSHIPS

Member, American Geophysical Union

Member, Geological Society of American

Member, Geochemical Society

Member, Mineralogical Society of America

Member, American Chemical Society

NARRATIVE OF RESEARCH EXPERIENCE

My interests center around the ability to identify the underlying processes contributing to chemical variability during reactive transport through porous media using measurements and modeling of associated stable isotope fractionations. My recent work has involved integrating stable isotope systems in numerical models of reactive flow and transport for a variety of field and laboratory experiments.

SELECTED EXAMPLES OF PEER-REVIEWED PUBLICATIONS

Fernandez, N. M., Bouchez, J., Derry, L. A., Chorover, J., Gaillardet, J., Giesbrecht, I., Fries, D., & Druhan, J. L. (2022). Resiliency of Silica Export Signatures When Low Order Streams Are Subject to Storm Events. *Journal of Geophysical Research: Biogeosciences*, 127(5), [e2021JG006660]. <https://doi.org/10.1029/2021JG006660>

- Roque-Malo, S., Druhan, J., & Kumar, P. (2022). REWTCrunch: A Modeling Framework for Vegetation Induced Reactive Zone Processes in the Critical Zone. *Journal of Geophysical Research: Biogeosciences*, 127(2), [e2021JG006562]. <https://doi.org/10.1029/2021JG006562>
- Druhan, J. L., & Turchyn, A. V. (2022). A reactive transport framework describing covariation in the isotopic ratios of multiple elements in natural systems. *Isotopic Constraints on Earth System Processes*, 285-300.
- Esteves, B. F., Spielman-Sun, E., Li, Q., Jew, A. D., Bargar, J. R., & Druhan, J. L. (2022). Geochemical Modeling of Celestite (SrSO₄) Precipitation and Reactive Transport in Shales. *Environmental Science & Technology*, 56(7), 4336-4344.
- Khan, H. J., Ross, C. M., & Druhan, J. L. (2022). Impact of Concurrent Solubilization and Fines Migration on Fracture Aperture Growth in Shales during Acidized Brine Injection. *Energy & Fuels*, 36(11), 5681-5694.
- Jew, A. D., Druhan, J. L., Ihme, M., Kovscek, A. R., Battiato, I., Kaszuba, J. P., ... & Brown Jr, G. E. (2022). Chemical and Reactive Transport Processes Associated with Hydraulic Fracturing of Unconventional Oil/Gas Shales. *Chemical reviews*, 122(9), 9198-9263.
- Golla, J. K., Kuessner, M. L., Henehan, M. J., Bouchez, J., Rempe, D. M., & Druhan, J. L. (2021). The evolution of lithium isotope signatures in fluids draining actively weathering hillslopes. *Earth and Planetary Science Letters*, 567, 116988.
- Fernandez, N. M., Perez-Fodich, A., Derry, L. A., & Druhan, J. L. (2021). A first look at Ge/Si partitioning during amorphous silica precipitation: Implications for Ge/Si as a tracer of fluid-silicate interactions. *Geochimica et Cosmochimica Acta*, 297, 158-178.
- Guinoiseau, D., Fekiacova, Z., Allard, T., Druhan, J. L., Balan, E., & Bouchez, J. (2021). Tropical weathering history recorded in the silicon isotopes of lateritic weathering profiles. *Geophysical Research Letters*, 48(19), e2021GL092957.
- Druhan, J. L., & Lawrence, C. R. (2021). Development of soil radiocarbon profiles in a reactive transport framework. *Geochimica et Cosmochimica Acta*, 306, 63-83.
- Druhan, J. L., Lawrence, C. R., Covey, A. K., Giannetta, M. G., & Oster, J. L. (2021). A reactive transport approach to modeling cave seepage water chemistry I: Carbon isotope transformations. *Geochimica et Cosmochimica Acta*, 311, 374-400.
- Oster, J. L., Covey, A. K., Lawrence, C. R., Giannetta, M. G., & Druhan, J. L. (2021). A reactive transport approach to modeling cave seepage water chemistry II: Elemental signatures. *Geochimica et Cosmochimica Acta*, 311, 353-373.
- Khan, H. J., Spielman-Sun, E., Jew, A. D., Bargar, J., Kovscek, A., & Druhan, J. L. (2021). A Critical Review of the Physicochemical Impacts of Water Chemistry on Shale in Hydraulic Fracturing Systems. *Environmental science & technology*, 55(3), 1377-1394.
- Tune, A. K., Druhan, J. L., Wang, J., Bennett, P. C., & Rempe, D. M. (2020). Carbon Dioxide Production in Bedrock Beneath Soils Substantially Contributes to Forest Carbon Cycling. *Journal of Geophysical Research: Biogeosciences*, 125(12), e2020JG005795.
- Dávila, G.; Dalton, L.; Crandall, D.M.; Garing, C.; Werth, C.J.; Druhan, J.L. (2020) Reactive alteration of a Mt. Simon sandstone due to CO₂-rich brine displacement. *Geochimica et Cosmochimica Acta*.
- Winnick, M.; Lawrence, C.; McCormick, M.; Druhan, J.L.; Maher, K. (2020) Soil respiration response to rainfall modulated by plant phenology in a montane meadow, East River, Colorado, USA. *Journal of Geophysical Research: Biogeosciences*, 125(10), e2020JG005924.
- Druhan, J.L.; Maher, K. (2017) The influence of mixing on stable isotope ratios in porous media: A revised Rayleigh model. *Water Resources Research*, 53, 1101-1124.
- Druhan, J.L.; Steefel, C.I.; Williams, K.H.; DePaolo, D.J. (2013) Calcium isotope fractionation in groundwater: Molecular scale processes influencing field scale variability. *Geochimica et Cosmochimica Acta*, 119, 93 - 116.