

Zach Perzan

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EDUCATION

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| Ph.D. Earth System Science, Stanford University
Gerald J. Lieberman Fellow
NSF Graduate Research Fellow
<i>Advisor: Kate Maher</i> | Expected 2022 |
| B.A. Geology (Honors), Middlebury College
<i>Summa Cum Laude</i> | 2015 |

RESEARCH EXPERIENCE

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|---|--------|
| On-farm recharge in California's Central Valley , Doctoral Researcher
<i>With R. Knight and K. Maher (Stanford)</i> <ul style="list-style-type: none">- Collaborative project with Stanford geophysicists and a local water district to optimize managed aquifer recharge projects without degrading water quality- Assimilated novel geophysical data into a massively parallel hydrologic model- Developed a workflow for evaluating potential recharge sites | 2020 – |
| Floodplain groundwater quality modeling , Doctoral Researcher
<i>SLAC Floodplain Hydro-Biogeochemistry SFA</i> <ul style="list-style-type: none">- Field-based project with a large research team to understand floodplain response to hydrologic perturbations, funded by Dept. of Energy- Designed and built a network of water quality sensors at remote field sites, including a data assimilation and modeling workflow- Created a central data management platform for distributing data among the research team spread across 9 different institutions | 2018 – |
| Financial burden of the Flint Crisis , Doctoral Researcher
<i>With N. Ajami (NSF-ReNUWIt) and K. Maher (Stanford)</i> <ul style="list-style-type: none">- Project examining consumer spending data to analyze Americans' distrust of tap water following the Flint water crisis- Used modern data science tools to map increases in bottled water spending following Flint and quantify the associated financial cost | 2019 – |
| Redox cycling in a uranium-contaminated floodplain , Doctoral Researcher
<i>With K. Maher (Stanford) and J. Bargar (SLAC)</i> <ul style="list-style-type: none">- Field project studying biogeochemical cycling of contaminants in the unsaturated zone of an arid floodplain, funded by Dept. of Energy- Designed a series of groundwater tracer tests in a high-elevation floodplain | 2017 – |

- Oversaw a multi-year sampling campaign with 8-10 research assistants

Lake circulation and water quality, Research Technician 2013 – 2015
With T. Manley and P. Manley (Middlebury College)

- NSF EPSCoR project deploying sensor networks around Lake Champlain to identify the triggers of harmful algal blooms
- Assimilated 9M sensor observations into a lake circulation model

Paleoclimate records in New England cave sediments, Student Researcher 2013 – 2015
With J. Munroe and W. Amidon (Middlebury College)

- Discovered some of the oldest sediment in the northeastern U.S.
- Developed new luminescence geochronology lab

PUBLICATIONS

Peer-Reviewed Journals

Perzan, Z., Babey, T., Caers, J., Bargar, J.R., and Maher, K., Local and global sensitivity analysis of a reactive transport model simulating floodplain redox cycling. (in review, [Water Resources Research](#))

Li, Q., Wang, L., **Perzan, Z.**, Caers, J., Brown, G.E., Bargar, J.R., and Maher, K., 2021, Global Sensitivity Analysis of a Reactive Transport Model for Mineral Scale Formation During Hydraulic Fracturing. [Environmental Engineering Science](#), 38 (3).

Damerow, J., Varadharajan, C., Boye, K., et al., 2021, Sample Identifiers and Metadata to Support Data Management and Reuse in Multidisciplinary Ecosystem Sciences. [Data Science Journal](#), 20 (11), pp. 1-19.

Manley, T., **Perzan, Z.**, Manley, P., and Wei, E., 2020. Unexpected vertical shear in a shallow, eutrophic bay, Lake Champlain, Vermont. (submitted to [Limnology and Oceanography](#))

Munroe, J., **Perzan, Z.**, and Amidon, W., 2016. Cave sediments constrain the latest Pleistocene advance of the Laurentide ice sheet in the Champlain Valley, Vermont, USA. [Journal of Quaternary Science](#), 31 (8), pp. 893-904.

Schroth, A., Giles, C., Isles, P., Xu, Y., **Perzan, Z.**, and Druschel, G., 2015. Dynamic coupling of iron, manganese, and phosphorous behavior in water and sediment of shallow ice-covered eutrophic lakes. [Environmental Science and Technology](#), 49 (16), pp. 9758-9767.

GRANTS & FELLOWSHIPS

Gerald J. Lieberman Fellowship (\$95,549) 2021

- Highly competitive fellowship awarded for service to the University

Shell Foundation Student Grant (\$1,500) 2018

NSF Graduate Research Fellowship (GRFP) (\$138,000)	2017
Vermont Geological Society Research Grant (\$400)	2013
Middlebury Undergraduate Research Grant (\$1,000)	2013

HONORS & AWARDS

Outstanding Poster, Computational Methods in Water Resources XXIII	2020
Outstanding Poster, Stanford Deep Learning Symposium	2019
National GeoCUR Award for Excellence in Student Research - National award recognizing research impact as an undergraduate	2015
John M. White Award for Outstanding Work in Geology (\$800)	2015
Provided expertise in making new sensor tech field-deployable- F	
Outstanding Student Research Paper, Vermont Geological Society	2014

TEACHING

Contaminant Hydrogeology	2019 – 2021
Teaching Assistant, Stanford University	
- Graduate-level course for 15-20 MS and PhD students	
- Designed new course material, including both problem sets and lectures	
- Planned and led twice weekly discussion and review sessions	
- Delivered 1-2 lectures each quarter	
Intro. to Cave Science	2015
Co-instructor, Craters of the Moon National Monument	
- Co-designed lecture- and field-based short course on lava tube caves	
- Led field excursions to local caves to explore their geologic significance	
Physical Oceanography	2013 – 2014
Teaching Assistant, Middlebury College	
- Intro-level course for 40 freshman students with weekly field component	
- Led weekly labs aboard a research vessel on Lake Champlain	

MENTORSHIP

Community College, Undergraduate and Graduate Student Mentees

Graduate	
- Ziyang Wu: Preparing manuscript as part of ongoing research project. Recently graduated with MS degree and applying to Ph.D. programs (since 2019)	
Undergraduate (4 yr)	
- Marc Berghouse: Now pursuing MS and Ph.D. at the University of Nevada, Reno. Co-author on multiple conference presentations (since 2018)	

- Diana Velazquez: Summer Undergraduate Research in Geoscience and Engineering (SURGE; now an REU). Currently Ph.D. student at U. Michigan. (2019)

Community College

- Bailey Lewis: Presented research results at the Wyoming Undergraduate Research Day 2019. Now pursuing BS in Earth Science at UC Berkeley (2019-2020)
- Cassie Weed: Field intern in Wyoming. Now at Bureau of Land Management (2019)
- George Sims: Presented work at the Wyoming Undergraduate Research Day (2018)
- Dustin Proctor: Field intern in Wyoming, co-advised with Callum Bobb. (2018)

SERVICE AND OUTREACH

Faculty Search Committee Student Representative School of Earth, Stanford University	2021
- Faculty search focused on candidates with strong DEI proposals	
Northern Arapaho Environmental Meeting Northern Arapaho Tribe, Wind River Reservation	2018
- Outreach event on the Wind River Indian Reservation designed to introduce Middle and High School students to research in Environmental Science	
Small Business Innovation and Research Advisor Quantitative BioSciences, Inc	2019 –
- Helped biotech startup secure three DOE small business research grants	
- Provided expertise in making new sensor tech field-deployable	
Data Manager and Archivist SLAC-SFA, SLAC National Accelerator Lab	2019 –
- Developed GitHub data management and archiving platform for large research program across multiple institutions	
Lab Safety Coordinator School of Earth, Stanford University	2019 –
- Manage lab safety training and assessments on behalf of other students	
Graduate Student Mentor Earth System Science, Stanford University	2018 – 2020
- Mentor incoming Earth Science graduate students over their first year	
Data Archiving Standard Development ESS-DIVE, Lawrence Berkeley National Lab	2018 – 2019
- Helped test and create data archiving and sample naming standards used by all DOE Biological and Environmental Research (BER) research programs	
Invited Speaker Stanford Earth Young Investigators, Stanford University	2019

- Discuss graduate school and career path with high school summer interns interested in Earth Science research

Reviewer for: Journal of Hydrology (5), Water Resources Research (2), Environmental Science & Technology, Hydrological Processes, American Geophysical Union Books, Petroleum Research

CONFERENCE PRESENTATIONS

- Perzan, Z.,** Babey, T., and Maher, K., 2020, Interpreting Parameter Interactions using Global Sensitivity Analysis on a Hillslope-scale Reactive Transport Model. [American Geophysical Union Annual Meeting](#).
- Perzan, Z.,** Babey, T., and Maher, K., 2020, Short-term water quality forecasting with continuous-time recurrent neural networks. [Computational Methods in Water Resources XXIII](#).
- Babey, T., Boye, K., **Perzan, Z.,** Bargar, J.R., and Maher, K., 2020, Simulation of biogeochemical cycling in a synthetic alluvial aquifer. [Computational Methods in Water Resources XXIII](#).
- Perzan, Z.,** Boye, K., Berghouse, M., Fendorf, S., Bargar, J.R., and Maher, K., 2019, Seasonal nutrient cycling between the saturated and unsaturated zones in a contaminated floodplain. [American Geophysical Union Annual Meeting](#), San Francisco, CA.
- Perzan, Z.,** 2019, Forecasting groundwater quality using continuous-time recurrent neural networks. [Stanford Deep Learning Symposium](#), Stanford, CA.
- Babey, T., **Perzan, Z.,** Boye, K., Bobb., C., Bargar, J.R., and Maher, K., 2019, Modeling of biogeochemical responses to hydrologic transitions in floodplain aquifers. [American Geophysical Union Annual Meeting](#), San Francisco, CA.
- Roycroft, S., Boye, K., **Perzan, Z.,** Johnson, R., Dam, W., Noel, V., Fendorf., S., Bargar, J.R., 2019, Uranium mobilization across saturated-unsaturated interfaces. [Goldschmidt2019](#), Barscelona, Spain.
- Bargar, J.R., Noel, V., **Perzan, Z.,** Boye, K., Janot, N., Williams, K.H., 2019, Hydrological-Biogeochemical controls over uranium redox rates. [SSSA International Soils Meeting](#), San Diego, CA.
- Manley, T.O., **Perzan, Z.,** Herdman, L., and Chen, T., 2018, Circulation dynamics of Missisquoi Bay: A new look at the question of water quality and causeways. [Geological Society of America – Northeastern Section Meeting](#), Burlington, VT
- Perzan, Z.,** Manley, P.L., Manley, T.O., Manary, T., Kraft, M., Juteau, J-P., and Singer, J., 2016, Sediment transport dynamics of a shallow bay: Missisquoi Bay, Lake Champlain, VT. [Association for the Sciences of Limnology and Oceanography \(ASLO\) Meeting](#), Santa Fe, NM

- Manley, T., **Perzan, Z.**, Manley, P., and Wei, E., 2016, Unexpected vertical shear in a very shallow bay of Lake Champlain, Vermont: implications for management and modeling. [International Society of Limnology \(SIL\) Meeting](#), Torino, Italy
- Perzan, Z.**, Munroe, J., and Amidon, W., 2015, A potential long-term climate record from Weybridge Cave, Vermont, USA. [U.S. Congress: “Posters on the Hill”](#), Washington, D.C.
*One of 60 students invited to showcase research before members of congress
- Perzan, Z.** and Amidon, W., 2015, A pre-Wisconsinan sedimentary record from a cave in central Vermont. [New World Luminescence Dating Workshop](#), Manhattan, KS
- Perzan, Z.**, Manley, T., and Manley, P., 2015, Hydrodynamics and sediment dynamics of Missisquoi Bay, Lake Champlain. [Vermont EPSCoR Research Symposium](#), Burlington, VT
- Perzan, Z.**, Amidon, W., and Munroe, J., 2014, Investigation of last interglacial sediment in Weybridge Cave, Vermont. [Geological Society of America \(GSA\) Annual Meeting](#), Vancouver, Canada
- Perzan, Z.**, Amidon, W., and Munroe, J., 2014, A potential pre-Wisconsinan paleoenvironmental record from Weybridge Cave, VT. [Vermont Geological Society Meeting](#), Middlebury, VT
- Perzan, Z.**, Munroe, J., and Amidon, W., 2014, Origin and significance of clastic sediments within Weybridge Cave, VT. [Geological Society of America – Southeastern Section Meeting](#), Blacksburg, VA