

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
Advisor: Kate Maher | Expected December 2023 |
| B.A. Geology (Honors), Middlebury College
<i>Summa Cum Laude</i> | 2015 |

PUBLICATIONS

Manuscripts under review

11. **Z. Perzan** and K. Maher. Transport, dispersion and degradation of nonpoint source contaminants during flood managed aquifer recharge. (*under review*)
10. K. Maher and **Z. Perzan**. Reactive transport as a scientific framework. In A. Shahar (Ed.), *Treatise on Geochemistry* (3rd edition). Elsevier: Amsterdam. (*invited; under review*)
9. T. Babey, **Z. Perzan**, S. Pierce, D.B. Rodgers, L. Wang, R. Carroll, J.R. Bargar, K. Boye and K. Maher. Spatiotemporal response of soil-gravel bed connectivity to hydrological transitions in an intermountain floodplain aquifer. (*under review*)

Peer-reviewed publications

8. **Z. Perzan**, G. Osterman and K. Maher. (2023) Controls on flood managed aquifer recharge through a heterogeneous vadose zone: hydrologic modeling at a site characterized with hydrogeophysics. *Hydrology and Earth System Sciences*. [[link](#)]
7. **Z. Perzan** and T. Chapin. (2023) WellSTIC: A cost-effective sensor for performing point dilution tests to measure groundwater velocity in shallow aquifers. *Water Resources Research*. [[link](#)]
6. T. Babey, K. Boye, B. Tolar, M. Engel, V. Noel, **Z. Perzan**, et al. (2022) Simulation of anoxic lenses as exporters of reactivity in alluvial aquifer sediments. *Geochimica et Cosmochimica Acta*. [[link](#)]
5. **Z. Perzan**, T. Babey, J. Caers, J.R. Bargar and K. Maher. (2021) Local and global sensitivity analysis of a reactive transport model simulating floodplain redox cycling. *Water Resources Research*. [[link](#)]
4. Q. Li, L. Wang, **Z. Perzan**, J. Caers, et al. (2021) Global sensitivity analysis of a reactive transport model for mineral scale formation during hydraulic fracturing. *Environmental Engineering Science*. [[link](#)]
3. J. Damerow, C. Varadharajan, K. Boye, et al. (2021) Sample identifiers and metadata to support data management and reuse in multidisciplinary ecosystem sciences. *Data Science Journal*. [[link](#)]

2. J. Munroe, **Z. Perzan** and W. Amidon. (2016) Cave sediments constrain the latest Pleistocene advance of the Laurentide ice sheet in the Champlain Valley, Vermont, USA. *Journal of Quaternary Science*. [[link](#)]
1. A. Schroth, C. Giles, P. Isles, Y. Xu, **Z. Perzan** and G. Druschel. (2015) Dynamic coupling of iron, manganese and phosphorus behavior in water and sediment of shallow ice-covered eutrophic lakes. *Environmental Science & Technology*. [[link](#)]

FELLOWSHIPS & GRANTS

Fellowships

NSF Earth Sciences Postdoctoral Fellowship (<i>awarded but declined</i>)	2023
Preparing Future Professors Fellowship, Stanford University	2022
NSF Graduate Research Fellowship	2017 – 2022
Gerald J. Lieberman Fellowship, Stanford University	2021
- Awarded to a student who shows “broad potential for leadership in academia”	

Grants

Department of Energy Student Travel Grant (\$1,500)	2022
Groundwater Resources Association of California Student Grant (\$500)	2022
Stanford SPICE Grant (\$1,075)	2021
- Funding to develop a new Indigenous Environmental Justice course	
McGee-Levorsen Research Grant (\$3,705)	2021
Shell Foundation Student Grant (\$1,500)	2018
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
U.S. Congress “Posters on the Hill”	2015
- One of 60 students invited to showcase research before Congress	
National GeoCUR Award for Excellence in Student Research	2015
John M. White Award for Outstanding Work in Geology	2015
Outstanding Student Research Paper, Vermont Geological Society	2014

TEACHING EXPERIENCE

Instructor of Record

Indigenous Environmental Justice	2022
Stanford University	
- Designed and taught a new course on Indigenous Environmental Justice	
- Mixture of undergraduates, law students, medical students, earth scientists, and environmental engineering MS students	

Teaching Assistant

Intro. to Environmental Science 2022

University of San Francisco

- Core course of the curriculum designed for first-year undergraduates

Contaminant Hydrogeology 2019 – 2023

Stanford University

- Graduate-level course for 10-15 environmental engineers and earth scientists
- Designed new course material and delivered 1-2 lectures per quarter
- Quality of instruction rated 4.55/5 over four years

Physical Oceanography 2013 – 2014

Middlebury College

- Introductory earth sciences course with 35-40 undergraduates
- Led weekly lab sections aboard a research vessel, the *R/V David Folger*

PEDAGOGICAL TRAINING

Preparing Future Professors Program 2022

- Shadowed a faculty member for 3 months at the University of San Francisco
- Weekly pedagogy workshops with external experts in education

Designing a Learning-centered Syllabus 2022

Accessibility in Action: Designing for Universal Learning 2022

National Environmental Justice Education and Teaching Workshop 2021

Setting the Foundation: Starting with Learning and Working Backwards 2021

MENTORSHIP

Master's degree students:

- Ziyang Wu: Preparing manuscript as part of ongoing research project. Currently PhD student at University of Wisconsin-Madison (2019-2021)

Bachelor's degree students:

- Timothy Dai: Computer science student working on ML emulators (since 2022)
- Marc Berghouse: Now pursuing MS and PhD at the University of Nevada, Reno. Co-author on multiple conference presentations (2018-2021)
- Diana Velazquez: Summer Undergraduate Research in Geoscience and Engineering (SURGE; now an REU). Currently PhD student at U. Michigan (2019)

Associate degree students:

- Bailey Lewis: 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

AGU Session Chair 2022

American Geophysical Union Fall Meeting

- Chair for long-running "Groundwater-Surface Water Interactions" session

Mail-in Proposal Reviewer	2022
Biological and Environmental Research, Dept. of Energy	
- Reviewer for Environmental System Science SBIR and STTR proposals	
Graduate Teaching Mentor	2021 – 2022
School of Earth, Stanford University	
- Facilitated pedagogy workshops for Stanford faculty, instructors and teaching assistants	
Faculty Search Committee Student Representative	2021
School of Earth, Stanford University	
- Faculty search focused on candidates with strong DEI proposals	
Small Business Innovation and Research Advisor	2019 –
Quantitative BioSciences, Inc	
- Helped biotech startup secure three DOE small business research grants	
Lab Safety Coordinator	2019 –
School of Earth, Stanford University	
- Manage lab safety training and assessments on behalf of other students	
Northern Arapaho Environmental Meeting	2019
Northern Arapaho Tribe, Wind River Reservation	
- Outreach event on the Wind River Indian Reservation designed to introduce Middle and High School students to research in Environmental Science	
Invited Speaker	2019
Stanford Earth Young Investigators, Stanford University	
- Discuss graduate school and career path with high school summer interns interested in Earth Science research	
Reviewer for:	Journal of Hydrology (12), Water Resources Research (2), Environmental Science & Technology, Hydrological Processes, AGU Books, Petroleum Research

SELECTED CONFERENCE PRESENTATIONS

- Z. Perzan**, T. Babey, S. Pierce, L. Wang, D.B. Rogers, K. Boye and K. Maher. (2023) Observations of hot moments of beaver-driven biogeochemical activity in a mountainous floodplain using in situ sensors. Dept. of Energy, Environmental System Science Program 2023 Principal Investigators' Meeting.
- Z. Perzan** and K. Maher. (2022) Contaminant flushing and groundwater mixing during managed aquifer recharge: a particle tracking approach. American Geophysical Union Annual Meeting.
- K. Fang, **Z. Perzan** and K. Maher. (2022) WaterNet: A process-based and explainable deep learning framework modeling stream discharge. American Geophysical Union Annual Meeting.
- Z. Perzan**, G. Osterman, R. Knight and K. Maher. (2022) A geostatistical workflow for evaluating flood-MAR sites using geophysical data. ISMAR11: the 11th International Symposium on Managed Aquifer Recharge.
- Z. Perzan**. (2022) Groundwater modeling in the face of uncertainty. ISMARx, Long Beach, CA.

- L. Wang, **Z. Perzan**, T. Babey, et al. (2021) Uncertainty quantification of water exchanges due to beaver-induced inundation. American Geophysical Union Annual Meeting.
- T. Babey, **Z. Perzan**, D.B. Rogers, L. Wang, S. Pierce, J.R. Bargar and K. Maher. (2021) Hydro-biogeochemical response of oxic-anoxic interfaces to beaver dam construction in a simulated floodplain aquifer. American Geophysical Union Annual Meeting.
- Z. Perzan**, T. Babey and K. Maher. (2020) Interpreting parameter interactions using global sensitivity analysis on a hillslope-scale reactive transport model. American Geophysical Union Annual Meeting.
- Z. Perzan**, T. Babey and K. Maher. (2020) Short-term water quality forecasting with continuous-time recurrent neural networks. Computational Methods in Water Resources XXIII.
- T. Babey, K. Boye, **Z. Perzan**, Bargar, J.R. and K. Maher. (2020) Simulation of biogeochemical cycling in a synthetic alluvial aquifer. Computational Methods in Water Resources XXIII.
- Z. Perzan**, K. Boye, M. Berghouse, S. Fendorf, J.R. Bargar and K. Maher. (2019) Seasonal nutrient cycling between the saturated and unsaturated zones in a contaminated floodplain. American Geophysical Union Annual Meeting.
- Z. Perzan**. (2019) Forecasting groundwater quality using continuous-time recurrent neural networks. Stanford Deep Learning Symposium.
- T. Babey, **Z. Perzan**, K. Boye, C. Bobb, J.R. Bargar and K. Maher. (2019) Modeling of biogeochemical responses to hydrologic transitions in floodplain aquifers. American Geophysical Union Annual Meeting.
- S. Roycroft, K. Boye, **Z. Perzan**, R. Johnson, W. Dam, V. Noel, S. Fendorf and J.R. Bargar. (2019) Uranium mobilization across saturated-unsaturated interfaces. Goldschmidt2019.
- Z. Perzan**, P.L. Manley, T.O. Manley, T. Manary, M. Kraft, J.P. Juteau and J. Singer. (2016) Sediment transport dynamics of a shallow bay: Missisquoi Bay, Lake Champlain, VT. Association for the Sciences of Limnology and Oceanography Meeting.
- Z. Perzan**, W. Amidon and J. Munroe. (2014) Investigation of last interglacial sediment in Weybridge Cave, Vermont. Geological Society of America Annual Meeting.