Zach Perzan

PhD Candidate, Dept. of Earth System Science, Stanford University
zperzan@stanford.edu | (617) 851-3045 | zperzan.github.io

EDUCATION

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

RESEARCH EXPERIENCE

On-farm recharge in California's Central Valley, Doctoral Researcher   2020 –
With R. Knight and K. Maher (Stanford)
- 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

Floodplain groundwater quality modeling, Doctoral Researcher   2018 –
SLAC Floodplain Hydro-Biogeochemistry SFA
- 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

Financial burden of the Flint Crisis, Doctoral Researcher   2019 –
With N. Ajami (NSF-ReNUWIt) and K. Maher (Stanford)
- 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

Redox cycling in a uranium-contaminated floodplain, Doctoral Researcher   2017 –
With K. Maher (Stanford) and J. Bargar (SLAC)
- Field project studying bieogeochemical cycling of contaminants in the unsaturated zone of an arid floodplain, funded by Dept. of Energy
- Oversaw a multi-year sampling campaign with 8-10 research assistants
- Designed a series of groundwater tracer tests in a high-elevation floodplain

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

Updated: July 2021

- 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
U.S. Congress "Posters on the Hill" Presenter	2015

- One of 60 students invited to showcase research before Congress

National GeoCUR Award for Excellence in Student Research	2015

- National award recognizing research impact as an undergraduate

John M. White Award for Outstanding Work in Geology ($800)	2015
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
- 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
- Ziyan Wu: Preparing manuscript as part of ongoing research project. Recently graduated with MS degree and applying to PhD programs (since 2019)

Undergraduate (4 yr)
- Marc Berghouse: Now pursuing MS and PhD 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 PhD student at U. Michigan (2019)

Community College
- 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

Faculty Search Committee Student Representative   2021
School of Earth, Stanford University
- Faculty search focused on candidates with strong DEI proposals

Northern Arapaho Environmental Meeting   2018
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

Small Business Innovation and Research Advisor   2019 –
Quantitative BioSciences, Inc
- Helped biotech startup secure three DOE small business research grants
- Provided expertise in making new sensor tech field-deployable

Data Manager and Archivist   2019 –
SLAC-SFA, SLAC National Accelerator Lab
- Developed GitHub data management and archiving platform for large research program across multiple institutions

Lab Safety Coordinator   2019 –
School of Earth, Stanford University
- Manage lab safety training and assessments on behalf of other students

Graduate Student Mentor   2018 – 2020
Earth System Science, Stanford University
- Mentor incoming Earth Science graduate students over their first year

Data Archiving Standard Development   2018 – 2019
ESS-DIVE, Lawrence Berkeley National Lab
- Helped test and create data archiving and sample naming standards used by all DOE Biological and Environmental Research (BER) research programs

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 (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

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.

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

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