

# Galen Gorski

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U.S. Geological Survey  
509.869.2314 ggorski@usgs.gov  
galengorski.github.io

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## RESEARCH INTERESTS

Aquatic biogeochemical cycling, field hydrology; water resources/water quality management; groundwater-surface water interactions; watershed hydrology; machine learning; high-frequency water quality measurements; data science; science communication

## POSITIONS HELD

**Machine learning specialist (GS-12)** *2021- Present*  
United States Geological Survey *Reston, Virginia*  
Analysis and Prediction Branch  
Water Mission Area

**Postdoctoral Scholar** *Jan.-Jul. 2021*  
Department of Geography, University of California, Berkeley  
*Advisor: Laurel Larsen*

**Postdoctoral Researcher** *Oct.-Dec. 2020*  
Department of Earth and Planetary Science, University of California, Santa Cruz  
*Advisors: Andrew Fisher and Margaret Zimmer*

**NSF Graduate Research Intern** *2018 - 2020*  
USGS New Jersey Water Science Center  
*Advisor: Dan Goode*

**NSF Graduate Fellow** *2016 - 2020*  
Department of Earth and Planetary Science, University of California, Santa Cruz  
*Advisors: Andrew Fisher (Primary Advisor), Adina Paytan (Co-Advisor)*

**Biological Science Technician** *2014 - 2015*  
Department of Soil, Water, and Climate, University of Minnesota/USDA  
*Advisors: John Baker and Tim Griffis*

**Laboratory Technician** *2013 - 2014*  
Department of Geology and Geophysics, University of Utah  
*Advisor: Gabe Bowen*

## EDUCATION

University of California, Santa Cruz, Santa Cruz, CA *2020*  
PhD Hydrogeology; Department of Earth and Planetary Science  
*Advisors: Andrew Fisher (Primary Advisor), Adina Paytan (Co-Advisor)*

Carleton College, Northfield, MN *2013*  
BA; Department of Chemistry

**PUBLICATIONS** *In Review:*

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**Gorski G.**, Larsen L., Wingenroth J., Zhang L., Bellugi D., and Appling A.P. (In Review) Stream nitrate dynamics driven primarily by discharge and watershed physical and soil characteristics at intensively monitored sites: Insights from deep learning. *Water Resources Research*.

Sadler J., Koenig-Snyder L.E., **Gorski G.**, Carter A., and Hall Jr. R.O. (In Review) Evaluating a process-guided deep learning approach for predicting dissolved oxygen in streams. *Hydrologic Processes*.

Zhang L, Bellugi D., **Gorski G.**, Moges E., Wani O., and Larsen L. (In Review) A physics-informed machine learning model for streamflow prediction. *Water Resources Research*.

*In Press*

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**Gorski G.**, Stets E.G., Scholl M., Degnan J., Mullaney J., Galanter A., Martinez A., Padilla J., LaFontaine J.H., Corson-Dosch H., and Shapiro A., (In Press) Chapter B: National Water Supply in National Integrated Water Availability Assessment Report 1a Current Status 2010-2020. *U.S. Geological Survey Professional Paper*.

*Published:*

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**Gorski G.**, Cook S., Snyder A., Appling A., Thompson T., Smith J., Warner J. C., and Topp S.N. (2024) Deep learning of estuary salinity dynamics is physically accurate at a fraction of hydrodynamic model computational cost. *Limnology and Oceanography*. 68, 5, 1070 - 1085.  
doi.org/10.1002/lno.12549

Pensky J., Fisher A.T., **Gorski G.**, Schrad N., Bautista V., and Saltikov C (2023). Linking nitrate removal, carbon cycling, and mobilization of geogenic trace metals during infiltration for managed recharge. *Water Research*. 239, 120045.  
doi.org/10.1016/j.watres.2023.120045

Schrad N., Pensky J., **Gorski G.**, Beganskas S., Fisher A.T., Saltikov C., (2022) Soil characteristics and redox properties of infiltrating water are determinants of microbial communities at managed aquifer recharge sites. *FEMS Microbiology Ecology*. 19, 12.  
doi.org/10.1093/femsec/fiac130

**Gorski G.**, Fisher A.T., Beganskas S., Dailey H., Schmidt C. (2022) Mapping the potential for denitrification during infiltration with machine learning informed by field and laboratory experiments. *Hydrologic Processes*. 36, 11, e14750.  
doi.org/10.1002/hyp.14750

Pensky J., Fisher A.T., **Gorski G.**, Schrad N., Dailey H., Beganskas S., and Saltikov C. (2022) Enhanced cycling of nitrogen and metals during rapid infiltration: implications for managed recharge. *Science of the Total Environment*. 838, 156439.  
doi.org/10.1016/j.scitotenv.2022.156439

**Gorski G.**, and Zimmer M.A. (2021) Hydrologic regimes drive nutrient export behavior in human impacted watersheds. *Hydrology and Earth System Science*. 25, 1333-1345. doi.org/10.5194/hess-25-1333-2021

Van der Valk M., ElHariry N.H., **Gorski G.**, and Goode D.J. (2021) Suitability mapping for regional screening, section p. 4-27 of Goode D.J. ed., Managed aquifer recharge suitability—Regional screening and case studies in Jordan and Lebanon. *U.S. Geological Survey Open-File Report 2021-1089* doi.org/10.3133/ofr20211089

Pensky J., Richardson C., Serrano A., **Gorski G.**, Price A.N., and Zimmer M.A. (2021) Disrupt and demystify the unwritten rules of graduate school. *Nature Geosciences*. 14, 538-539. doi.org/10.1038/s41561-021-00799-w

**Gorski G.**, Dailey H., Fisher A.T., Schrad N., and Saltikov C. (2020) Denitrification during infiltration for managed aquifer recharge: Infiltration rate controls and microbial response. *Science of the Total Environment*. 727, 138642. doi.org/10.1016/j.scitotenv.2020.138642

Balestra B., Orland I.J., Fessenden-Rahn J., **Gorski G.**, Franks R., Rahn T., and Paytan A. (2020) Paired analyses of oxygen isotope and elemental ratios within individual shells of benthic foraminifera genus *Uvigerina*. *Chemical Geology*. 533, 119377. doi.org/10.1016/j.chemgeo.2019.119377

**Gorski G.**, Fisher A.T., Beganskas S., Weir W., Redford K., Schmidt C., and Saltikov C. (2019) Field and laboratory studies linking hydrologic, geochemical, and microbiological processes and enhanced denitrification during infiltration for managed recharge. *Environmental Science and Technology*. 53, 9491-9501. doi/10.1021/acs.est.9b01191

Beganskas S., **Gorski G.**, Weathers T., Fisher A.T., Schmidt C., Saltikov C.W., Redford K., Stoneburner B., Harmon R., and Weir W. (2018) A horizontal permeable reactive barrier stimulates nitrate removal and shifts microbial ecology during rapid infiltration for managed recharge. *Water Research*. 144, 274-284. doi.org/10.1016/j.watres.2018.07.039

Griffis T.J., Wood J.D., Baker J.M., Lee X., Xiao K., Chen Z., Welp L.R., Schultz N.M., **Gorski G.**, Chen M., and Nieber J. (2016) Investigating the source, transport, and isotope composition of water vapor in the planetary boundary layer. *Atmospheric Chemistry and Physics Discussion*. 16, 5139-5157. doi.org/10.5194/acp-16-5139-2016

**Gorski G.**, Strong C., Good S.P., Bares R., Ehleringer J.R., and Bowen G.J. (2015) Vapor hydrogen and oxygen isotopes reflect water of combustion in the urban atmosphere. *Proceedings of the National Academy of Sciences*. 112, 3247-3252. dx.doi.org/10.1073/pnas.1424728112

**SELECTED  
PRESENTATIONS  
AND PANELS**

Chini C., William R., Rao P., Marston L., Stillwell A.S., Stokes-Draut J.R., **Gorski G.**, and Ajami N.K. Where Have All the Data Gone? Finding Frameworks for Improved Data Accessibility Within the Food-Energy Water Nexus *Townhall at the Fall meeting of the American Geophysical Union* (San Francisco, CA December 2023)

**Gorski G.**, and Lane J., The importance of open, transparent, and accessible hydrologic data in issues of shared water *Arab Water Experts Network conference: "Water Diplomacy in the Arab Region: The opportunities and challenges"* (Amman, Jordan September 2023)

**Gorski G.**, Larsen L., Wingenroth J., Zhang L., and Bellugi D., Using deep learning and site clustering to develop predictions of in-stream nitrate in intensively managed watersheds *Fall meeting of the American Geophysical Union* (Chicago, IL December 2022)

**COMPUTER SKILLS**

Adobe Illustrator, ArcGIS, EddyPro, github, gitlab, HYDRUS (Variably saturated hydrologic modeling), L<sup>A</sup>T<sub>E</sub>X, MatLab, MySQL, Python, Pytorch, R, Rshiny, UNIX shell scripting

**AWARDS AND FELLOWSHIPS**

UCSC Aaron and Elizabeth Waters Award for best qualifying exam	<i>June 2018</i>
NSF Graduate Research Fellowship –3 years full funding	<i>March 2016</i>
UCSC Environmental Studies Hammett Graduate Fellowship	<i>March 2016</i>