Gordon Williams
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## EDUCATION

**Duke University** 2020-present
PhD Candidate, Earth and Climate Sciences
Advisor: Avner Vengosh

**University of California, Santa Barbara** 2015 – 2019
B.S. Earth Science, Emphasis in Geohydrology

## PUBLICATIONS

(*co-first author, †undergraduate mentee)
Google Scholar Profile

*In Preparation (In Manuscript Form)*

[3] †Hall, G.A.; **Williams, G.D.Z.**; Vengosh, A., The Potential Water Quality Impacts of Mining Critical Raw Materials: Comparative Analysis of Simulated Leachates of Sulphide and Laterite Ores

[2] Nativ, P.; **Williams, G.D.Z.**; Vengosh, A., From pond to process: a reliable method for pH measurements in hypersaline solutions

[1] Wudke, H.; **Williams, G.D.Z.**; Vengosh, A., Assessing the baseline water quality of drinking water in indigenous communities prior to lithium mining at the Salar de Uyuni, Bolivia

*Submitted or In-Review*

[4] **Williams, G.D.Z.**; Petrović, M.; Hill, R.C.; †Hall, G.A.; Vengosh, A., *Submitted to Environmental Science & Technology.* The water quality impacts of legacy hard-rock lithium mining and processing in North Carolina

[3] *†Hall, G.A.; ***Williams, G.D.Z.**; Sirbescu, M.L.C.; Lu, P.L.; Dwyer, G.S.; Richter, D.D.; Vengosh, A., *In-Review at Applied Geochemistry.* Evaluating Rb/Sr and Sr isotopes in soils as exploration tools for subsurface LCT pegmatites

[2] **Williams, G.D.Z.**; Barre, J.; Louvat, P.; Bérail, S.; Millot, R.; Vengosh, A., *In-Review at Earth and Planetary Science Letters*. Geochemical controls on the formation of lithium brines in closed-basins of the Lithium Triangle

[1] Nativ, P.; **Williams, G.D.Z.**; Vengosh, A. *In-Review at Environmental Science & Technology Letters.* Discrepances Between pH and Corrosive Indexes of Hypersaline Effluents

*Published*

[11] Hill, R.C.; Wang, Z.; Hu, J.; **Williams, G.D.Z.**; Vengosh, A., Radionuclides and the uranium isotope fingerprint of globally produced phosphate rocks, mineral fertilizers, and phosphogypsum waste and its potential effect on the environment. *In-Press at Journal of Hazardous Materials.*

[10] Lopez, R.F.; Huayta, J.; **Williams, G.D.Z.**; Seay, S.A.; Lalwani, P.D.; Bacot, S.; Vengosh, A.;, Meyer, J., 2025. Lithium Nickel Manganese Cobalt Oxide Particles Cause Developmental Neurotoxicity in *Caenorhabditis elegans*. *Environmental Science: Advances*. https://doi.org/10.1039/D5VA00103J

[9] **Williams, G.D.Z.**; Nativ, P.; Vengosh, A., 2025. The role of boron in controlling the pH of lithium brines. *Science Advances* 11, eadw3268. *https://doi.org/10.1126/sciadv.adw3268*

[8] **Williams, G.D.Z.**; Vengosh, A., 2025. Quality of Wastewater from Lithium-Brine Mining. *Environmental Science & Technology Letters* 12, 151–157. https://doi.org/10.1021/acs.estlett.4c01124

[7] **Williams, G.D.Z.**; Saltman, S.; Wang, Z.; Warren, D.M.; Hill, R.C.; Vengosh, A., 2024. The potential water quality impacts of hard-rock lithium mining: Insights from a legacy pegmatite mine in North

Carolina, USA. *Science of The Total Environment* 956, 177281. https://doi.org/10.1016/j.scitotenv.2024.177281

[6] Hill, R.C.; Wang, Z.; **Williams, G.D.Z.**; Polyak, V.; Singh, A.; Kipp, M.A.; Asmerom, Y.; Vengosh, A., 2024. Reconstructing the depositional environment and diagenetic modification of global phosphate deposits through integration of uranium and strontium isotopes. *Chemical Geology* 662, 122214. https://doi.org/10.1016/j.chemgeo.2024.122214

[5] Hill, R.C.; **Williams, G.D.Z.**; Wang, Z.; Hu, J.; El-Hasan, T.; Duckworth, O.W.; Schnug, E.; Bol, R.; Singh, A.; Vengosh, A., 2024. Tracing the Environmental Effects of Mineral Fertilizer Application with Trace Elements and Strontium Isotope Variations. *Environmental Science & Technology Letters* 11, 604-610 https://doi.org/10.1021/acs.estlett.4c00170

[4] Hu, J.; Wang, Z.; **Williams, G.D.Z.**; Dwyer, G.S.; Gatiboni, L.; Duckworth, O.W.; Vengosh, A., 2024. Evidence for the accumulation of toxic metal(loid)s in agricultural soils impacted from long-term application of phosphate fertilizer. *Science of The Total Environment* 907, 167863. https://doi.org/10.1016/j.scitotenv.2023.167863

[3] Wang, Z.; Hill, R.; **Williams, G**.; Dwyer, G.S.; Hu, J.; Schnug, E.; Bol, R.; Sun, Y.; Coleman, D.S.; Liu, X.-M.; Sandstrom, M.R.; Vengosh, A., 2023. Lead isotopes and rare earth elements geochemistry of global phosphate rocks: Insights into depositional conditions and environmental tracing. Chemical Geology 639, 121715. https://doi.org/10.1016/j.chemgeo.2023.121715

[2] Vengosh, A.; Wang, Z.; **Williams, G**.; Hill, R.; M. Coyte, R.; Dwyer, G. S., 2022. The Strontium Isotope Fingerprint of Phosphate Rocks Mining. *Science of The Total Environment*, *850*, 157971. https://doi.org/10.1016/j.scitotenv.2022.157971.

[1] Wang, K.; Ellsworth, W. L.; Beroza, G. C.; **Williams, G**.; Zhang, M.; Schroeder, D.; Rubinstein, J., 2018, Seismology with Dark Data: Image-Based Processing of Analog Records Using Machine Learning for the Rangely Earthquake Control Experiment. *Seismological Research Letters*, *90* (2A), 553–562. https://doi.org/10.1785/0220180298.

## INVITED PRESENTATIONS

**Indiana University Bloomington, Seminar on Critical Minerals and Climate Change Mitigation**, December 2025 (upcoming), *Lithium Mining, Processing, and Environmental Impacts*

**GSA Geology & Health Division Workshop**, October 2025 (upcoming), *The water quality impacts of lithium mining from brines and pegmatites*

**Goldschmidt Conference Session on Lithium Resources for the Energy Transition**, July 2025, *The Many Roles of Boron in Controlling Lithium-Brine Geochemistry*. Abstract by Williams, G.D.Z. & Vengosh A.

## CONFERENCE PRESENTATIONS & ABSTRACTS

**Williams, GDZ**.; Vengosh, A. (2025) [oral] The Role of Boron in Controlling the pH of Lithium Brines. The 3rd International Association of Geochemistry Conference.

**Williams, GDZ**.; Hall, GA.; Hill, RC.; Petrović, M.; Louvat, P.; Berail, S.; Barre, J.; Millot, R.; Warner, NR.; Baker, P.; Vengosh, A. (2025) [oral] The Origin of Lithium at the Salar de Uyuni: A multi-isotope and elemental approach. The 3rd International Association of Geochemistry Conference.

**Williams, GDZ**.; Vengosh, A. (2025) [oral] The role of boron in controlling the pH of evaporated lithium brines. AEESP Conference

**Williams, GDZ**.; Hill, RC.; Wang, Z.; Kipp, MA.; Vengosh, A. (2024) [poster] Searching for Alternative Critical Mineral Sources. Symposium on Critical Resources, Minerals, and Materials Joint Efforts

**Williams, GDZ**.; Hall, G.; Petrović, M.; Hill, RC.; Dwyer, G.; Vengosh, A. (2024) [oral] Water quality in a legacy lithium mining district of North Carolina. Goldschmidt Conference

**Williams, GDZ**. (2024) [oral] Geology and Production of Latin American Lithium Deposits. North Carolina Conference on Latin American Studies

**Williams, G**.; Wang, Z.; Hill, R.; Vengosh, A. (2023) [oral] Potential Water Quality Impacts of Hard-Rock Lithium Mining. AGU Fall Meeting

**Williams, G**.; Wang, Z.; Hill, R.; Vengosh, A. (2023) [poster] Water Quality and Legacy Lithium Mining in North Carolina: Insights on the Impacts of Future Lithium Mining. Goldschmidt Conference

**Williams, G**.; Vengosh, A.; Wang, Z.; Hill, R. (2022) [oral] Elemental Fluxes in Global Phosphate Ores: Evaluation of a Potential Resource for Critical Elements. GSA Connects

**Williams, G**.; Hill, R.; Wang, Z.; Vengosh, A. (2022) [poster] Multiple Isotopes as Potential Tracers for Contaminants Derived from Lithium Mine Wastes. GSA Connects

**Williams, G**.; Hill, R.; Wang, Z.; Whittaker, M.; Stringfellow, W.; Vengosh, A. (2022) [poster] Strontium Isotope Geochemistry as a Potential Tracer for Contaminants Derived from Lithium Mine Wastes. Goldschmidt Conference

## ACADEMIC SERVICE & EXPERIENCE

**Duke University**, Earth & Climate Science Department Seminar Organizer & Discussion Leader, 2022-2024

**Conference Sessions**

*Session Co-Chair*

- 2025, The 3rd International Association of Geochemistry Conference, Cagliari, Italy, E Sacchi, **GDZ Williams** – *Isotopic Tools and Applications for Sustainable Water Management, Mining-Related Settings, Environmental Sciences, and the Energy Transition*

**Reviewer:** Applied Geochemistry

**Society Affiliations:** Geochemical Society, International Association of Geochemistry, American Geophysical Union, Geological Society of America

## GRANTS & AWARDS

**Global Student Research Fund**, Duke Office of Global Affairs **($2,145)**, 2025

**Fall Tuition Scholarship**, Duke Graduate School **($5,215)**, 2025

**Summer Research Fellowship**, Duke Graduate School **($14,850)**, 2025

**Chateaubriand Fellowship**, French Embassy to the USA **(€7,967)**, to conduct lithium isotope work in Pau, France at UPPA, 2024

**Dissertation Research Travel Award: International**, Duke Graduate School **($5,000)**, 2023-2024

**Dissertation Research Travel Award: Domestic**, Duke Graduate School **($4,000)**, 2023-2024

**Potential Impacts of Lithium Mining on Water Quality in North Carolina**, NC Water Resources Research Institute **($120,000 *direct*)**, PI Avner Vengosh (written with Gordon Williams), 2023-2025

**The Potential Environmental Effects of Lithium Mining and Extraction,** Albemarle Corporation **($396,230 *direct*)**, G. Williams, A. Vengosh, D. Shindell, 2023-2024

**Graduate Student Research Grant**, Geological Society of America **($1,749)**, 2022

**Student Travel Grant**, Geological Society of America, 2022

## TEACHING & MENTORING

*Graduate Teaching Assistant*

**EOS 101 Dynamic Earth** with Dr. Emily Klein, Fall 2020

**EOS 101 Dynamic Earth** with Dr. Alex Glass, Spring 2021

**EOS 220 Water Sciences** with Dr. Avner Vengosh, Fall 2021

**EOS 524 Water Quality and Health** with Dr. Avner Vengosh, Spring 2022
**ECS 401 Geology of North Carolina (with multi-day field trips)** with Dr. Alex Glass, Fall 2022
**ECS 201L Earth Materials** with Dr. Adam Curry, Spring 2023
**ECS 410 Senior Capstone Experience, The Geology of Ireland (with 10-day field trip)** with Dr. Gary Dwyer, Spring 2023 & Spring 2025

*Guest Lectures & Field Trip Demonstrations/Presentations*

ECS 524, Water Quality and Health
ECS 201L, Earth Materials
ECS 210S, Exploring Earth Science: Field and Laboratory Investigations
ECS 226S, Field Methods in Earth and Environmental Sciences

*Mentored Master's Student Research*

1. Sam Saltman, 2022-2023, Investigating the potential environmental impact of lithium mining in North Carolina
2. Ryan Parks, 2022-2023, Investigating the current and historical groundwater quality at the Maplewood Cemetery and Pauli Murray Center

*Mentored Undergraduate Research*

1. Alexandra Schaffer, 2025-present. project: Understanding the lithium isotope and trace metal geochemistry of oyster shells
2. Grace Hall, 2023-2025. thesis: "The Potential Water Quality Impacts of Mining Critical Raw Materials: Comparative Analysis of Simulated Leachates of Sulphide and Laterite Ores"
3. Tiana Dinham, 2023, project: Investigating the water quality impacts of hard-rock lithium mining in North Carolina
4. Carsten Pran, B.S. (2022), thesis: "An Interdisciplinary Approach to Understanding Duke University's Relationship with the Durham County Water System"
5. Bass Connections Project (2021) with an undergraduate team of 5 students: "Inspecting the Taps: Radium, Groundwater, and Public Health in the Heart of Texas"

## PREVIOUS RESEARCH EXPERIENCE

**Research Assistant** in Professor Tiziana Vanorio's group, Department of Geophysics, Stanford University, January 2020 – April 2020 (ended due to COVID)
**Research Assistant** in Professor Tiziana Vanorio's group, Department of Geophysics, Stanford University, June 2019 – August 2019 (Summer Internship)
**Independent Research Assistant** in Professor Matthew Jackson's group, Department of Earth Sciences, University of California, Santa Barbara, February 2019 – June 2019
**Research Assistant** in Professor William Ellsworth's group, Department of Geophysics, Stanford University, June 2018 – August 2018 (Summer Internship)

## PROFESSIONAL REFERENCES

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