

Education

PhD Candidate, Earth and Climate Sciences, Duke University
Graduate Certificate in College Teaching

August 2021 – Present
Expected May 2026

University of Illinois at Urbana-Champaign

May 2019

B.S. Environmental Geology and Sustainability Double Major, Chemistry Minor

Research

Research Experience

Superfund Trainee, Duke University Superfund Research Center - Developmental Co-Exposures: Mechanisms, Outcomes, and Remediation, August 2022 – June 2025

Graduate Researcher, Advisor: Avner Vengosh, Earth and Climate Sciences, Nicholas School of the Environment, Duke University, August 2021 – Present

Undergraduate Researcher, Advisor: Tom Johnson, Department of Geology, University of Illinois at Urbana-Champaign, December 2017 – May 2019

Research Intern at the Centro de Investigación en Productos Naturales, Universidad de Costa Rica, August 2018 (Short-term Summer Internship)

Undergraduate Researcher, Advisor: Ray Schaak, Department of Chemistry & Materials Research Institute, Pennsylvania State University, May 2017 – August 2017 (Summer REU Internship)

Publications

- (9) **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 (*submitted*)
- (8) **Hil, R.C.**; Pieńkowska, A.; Merbach, I.; Reitz, T.; Muehe, E.M.; Vengosh, A. Impacts of fertilization on metal(loid) enrichment in soil and wheat in a long-term fertilization experiment – using ⁸⁷Sr/⁸⁶Sr isotopes as metal(loid) tracer (*submitted*)
- (7) Williams, G. D. Z.; Saltman, S.; Wang, Z.; Warren, D.M.; **Hill, R. C.**; Vengosh, A. 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* **2024**, 177281.
<https://doi.org/10.1016/j.scitotenv.2024.177281> .
- (6) Cowan, E.A.; Wang, Z.; Brachfeld, S.A.; Hageman, S.J.; Seramur, K.C.; Pearson, W.F.; Wilson, J.; Karcher, R.; **Hill, R.**; Vengosh, A. Role of coal ash morphology and composition in delivery and transport of trace metals in the aquatic environment. *Environmental Pollution* **2024**, 124982.
<https://doi.org/10.1016/j.envpol.2024.124982>.

- (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. Tracing the Environmental Effects of Mineral Fertilizer Application with Trace Elements and Strontium Isotope Variations. *Environmental Science and Technology Letters* **2024**, *11* (6), 604–610. <https://doi.org/10.1021/acs.estlett.4c00170>.
- (4) **Hill, R.C.**; Wang, Z.; Williams, G.D.Z.; Polyak, V.; Singh, A., Kipp, M.A., Asmerom, Y.; Vengosh, A. Reconstructing the depositional environment and diagenetic modification of global phosphate deposits through integration of uranium and strontium isotopes. *Chemical Geology* **2024**, *662*, 122214. <https://doi.org/10.1016/j.chemgeo.2024.122214>.
- (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. Lead Isotopes and Rare Earth Elements Geochemistry of Global Phosphate Rocks: Insights into Depositional Conditions and Environmental Tracing. *Chemical Geology* **2023**, *639*, 121715. <https://doi.org/10.1016/j.chemgeo.2023.121715>.
- (2) Vengosh, A.; Wang, Z.; Williams, G.; **Hill, R.**; Coyte, R.; Dwyer, G. S. Response to Comments on Vengosh et al. (2022): The Strontium Isotope Fingerprint of Phosphate Rocks Mining. *Science of The Total Environment* **2023**, *870*, 161878. <https://doi.org/10.1016/j.scitotenv.2023.161878>.
- (1) Vengosh, A.; Wang, Z.; Williams, G.; **Hill, R.**; M. Coyte, R.; Dwyer, G. S. The Strontium Isotope Fingerprint of Phosphate Rocks Mining. *Science of The Total Environment* **2022**, *850*, 157971. <https://doi.org/10.1016/j.scitotenv.2022.157971>.

First Author Conference Presentations

- (7) **Hill, R. C.**; Pienkowska, A.; Reitz, T.; Merbach, I.; Muehe, E.M.; Vengosh, A. (2025) Utilizing strontium isotopes to trace fertilizer-derived metal(loid) accumulation in the soil-wheat system. *Goldschmidt*. Prague, Czech Republic.
- (6) **Hill, R. C.**; Pienkowska, A.; Muehe, E.M.; Vengosh, A. (2024) Effects of Fertilization on Wheat and Soil Quality: Isotope Tracing and Trace Metal Enrichment. *ECS End of Year Gathering*. Durham, NC.
- (5) **Hill, R. C.**; Wang, Z.; Williams, G. D. Z.; El-Hasan, T.; Vengosh, A. (2024) From Phosphate Rock to Fertilizer: Metal(loid) Enrichment and Isotope Tracing During the Manufacturing of Mineral Fertilizer. *Goldschmidt*. Chicago, IL.
- (4) **Hill, R. C.**; Wang, Z.; Williams, G. D. Z.; Polyak, V.; Kipp, M. A.; Asmerom, Y.; Vengosh, A. (2023) Reconstructing the Depositional Environment and Diagenetic Condition of Global Phosphate Deposits through Integration of Uranium and Strontium Isotopes. *American Geophysical Union Annual Meeting*. San Francisco, CA.
- (3) **Hill, R.**; Wang, Z.; Vengosh, A.; Das, D. (2022) Where does the U.S. stand on the prospect of rare earth element extraction from coal and coal ash sources compared to India. *Geological Society of America Annual Meeting*. Denver, CO.
- (2) **Hill, R.**; Vlahopoulos, T.; Wasserman, N.; Johnson, T. M. (2019) Utilizing Strontium, Chromium, and Selenium Stable Isotope Signatures to Track Coal Ash Contamination. *University of Illinois Undergraduate Research Symposium*. Urbana, IL.
- (1) **Hill, R.**; Mondschein, J. S.; Schaak, R. (2017) Exploration of Nitrides for the Reduction of Nitrogen to Ammonia. *Pennsylvania State University Undergraduate Research Symposium*. State College, PA.

Grants and Awards

Graduate Student Research Grant, *Geological Society of America*, 2025
Graduate Research Fellowship, *National Science Foundation*, 2023
Outstanding Oral Presentation, *Illinois Undergraduate Research Symposium*, 2019
School of Earth, Society, and the Environment Service Award, *Illinois Honors Ceremony*, 2019
Research Support Grant, *University of Illinois at Urbana-Champaign*, 2018
Best Undergraduate Poster, *Illinois School of Earth, Society, and Environment Research Review*, 2018

Teaching and Mentoring

Duke University

ECS 410 Senior Capstone: Geology of Ireland (TA). Spring 2024
ECS 524 Water Quality and Health (TA). Spring 2023
ECS 220 Water Science (TA). Fall 2022
ECS 101 Dynamic Earth, (TA). Spring 2022
ENV 102 Introduction to Environmental Science and Policy (TA). Fall 2021

University of Illinois at Urbana-Champaign

CHEM 199, Introductory Chemistry [Merit Course](#) (Instructor). Fall 2018, Spring 2019
LAS 101, Freshman Seminar (Facilitator). Fall 2017

Undergraduate Student Mentorship

Tiana Dinham, University of North Carolina, Chapel-Hill (2024 – Present)
Grace Hall, Duke University (2023 – 2025)

Outreach and Community Activities

Climate Fresk Facilitator, Duke University Health and Environmental Scholars Program (2024)
Undergraduate Liaison, Duke University NSOE Division of Earth and Climate Science (2022-2024)
Guest Lecture, “Coal Electricity Production: the costs and consequences”, Duke University (2021)
Student Ambassador, University of Illinois at Urbana-Champaign, Department of Geology (2018-2019)
Member of the School of Earth, Society, and Environment Research Review Committee (2018-2019)