David G. Litwin

david.litwin@gfz-potsdam.de Homepage Google Scholar GitHub

Education

8/2018 – 8/2023 **Ph.D.** Geography and Environmental Eng. Johns Hopkins University, Baltimore, MD
Concentration in Landscape Hydrology
Thesis: *The coevolution of topography and runoff generation in humid landscapes*

8/2013 – 8/2018 **B.S.** Civil Eng. (University Honors) University of Illinois at Urbana-Champaign, Urbana, IL
Concentration in Hydrology and Hydraulic Engineering

8/2013 – 8/2018 **B.M.** Music Performance University of Illinois at Urbana-Champaign, Urbana, IL
Concentration in Double Bass Performance

Research Experience

8/2023 – Present **Postdoctoral Researcher** Helmholtz Center GFZ Potsdam, Germany

- Used landscape evolution models and dimensional analysis to study channel-hillslope coupling
- Developed a model of karst scarp evolution
- Collaborated on study of hydrological controls on seismic shaking

8/2018 – 8/2023 **Doctoral Researcher** Johns Hopkins University, Baltimore, MD

- Developed new open source model of runoff generation and landscape evolution
- Conducted dimensional analysis to show importance of hydrological coevolution
- Developed hydrological datasets at new research watershed to test model predictions

6/2019 – 12/2019 **Research Associate** INSTAAR, University of Colorado, Boulder, CO

- Developed and published a shallow groundwater model for Landlab, supported by a highly selective Horton Research Grant ($10,000) from the American Geophysical Union.

6/2017 – 8/2017 **Undergraduate Researcher** Biosphere 2, University of Arizona, Oracle, AZ

- Developed numerical scheme to test recovery of soil parameters from electrical resistivity tomography at the Landscape Evolution Observatory.

6/2016 – 8/2016 **Undergraduate Researcher** NGRREC and University of Illinois, Urbana, IL

- Deployed water quality instruments at small stream confluences to quantify controls on mixing as a National Great Rivers Research and Education Center (NGRREC) REU.

Teaching Experience

Sp. 2021 **Lead Course Assistant** Johns Hopkins University, Baltimore, MD
Gateway Computing: Python. Held weekly office hours, assisted with lecture three times weekly, graded bi-weekly assignments.

Fa. 2018, Sp. 2020 **Teaching Assistant** Johns Hopkins University, Baltimore, MD
Hydrology. Held weekly office hours, gave three lectures and prepared associated course material.

Mentorship

GFZ Potsdam

10/2023 – 12/2023 Mingyue Yuan, masters student at ETH Zurich. Supervised internship project on karst effects on landscape evolution.

Johns Hopkins University

6/2022 – 7/2022 Samantha Motz, undergraduate at Georgia Tech. Co-supervised UNAVCO internship on critical zone structure and water table dynamics at Panola Mountain Research Watershed.

9/2021 – 5/2022 Joseph Stanley, undergraduate at Johns Hopkins. Co-supervised project on saturated areas and runoff generation.

Publications

Journal Publications

1. Haendel, A., Pilz, M., Malatesta, L. M., **Litwin, D. G.**, Cotton, F. (2024). Seasonal variations of the high-frequency site ground shaking. Under Review.
2. **Litwin, D. G.** Malatesta, L. M., Sklar, L. S. (2024). Hillslope diffusion and channel steepness in landscape evolution models. *EGUSphere*. Under Review. https://doi.org/10.5194/egusphere-2024-2418.
3. **Litwin, D. G.**, Harman, C. J. (2024). Evidence of subsurface control on the coevolution of hillslope morphology and runoff generation. *Water Resources Research*, 60(10), e2024WR037301. https://doi.org/10.1029/2024WR037301.
4. **Litwin, D. G.**, Tucker, G. E., Barnhart, K. R., Harman, C. J. (2024). Catchment coevolution and the geomorphic origins of variable source area hydrology. *Water Resources Research*, 60(6), e2023WR034647. https://doi.org/10.1029/2023WR034647.
5. **Litwin, D. G.**, Tucker, G. E., Barnhart, K. B., Harman, C. J. (2022). Groundwater affects the geomorphic and hydrologic properties of coevolved landscapes. *Journal of Geophysical Research: Earth Surface*, 127, e2021JF006239. https://doi.org/10.1029/2021JF006239.
6. **Litwin, D. G.**, Tucker, G. E., Barnhart, K. B., Harman, C. J. (2020). GroundwaterDupuitPercolator: A Landlab component for groundwater flow. *Journal of Open Source Software*, 5(46), 1935. https://doi.org/10.21105/joss.01935.

Selected Conference Presentations and Posters

*Presenting author

7. **Litwin, D. G.***, Sklar, L. S., Malatesta, L. C. (2024). EGU24-15831: Right for the wrong reasons? On hillslope sediment and the streampower model. Poster. *European Geosciences Union General Assembly*.
8. **Litwin, D. G.***, Harman, C. J., Tucker, G.E., Barnhart, K. R. (2024). EGU24-7612: Catchment coevolution and the geomorphic origins of variable source area hydrology (Invited). Oral. *European Geosciences Union General Assembly*.
9. **Litwin, D. G.***, Harman, C. J. (2023). EP42C-07: Testing hypotheses linking hillslope morphology to variable source area runoff generation: a natural experiment (Invited). Oral. *American Geophysical Union Fall Meeting*.
10. Alley, C.*, Lewis, K., Kimble-Holls, N., Cambeiro, J., Keating, K., Hayes, J. L., Donaldson, Y. Y., Moore, J., Harman, C. J., **Litwin, D. G.**. (2023). H33N-1970: Using seismic refraction tomography to compare critical zone structure within first-order basins in two distinct lithologies in Baltimore County, MD. Poster. *American Geophysical Union Fall Meeting*.
11. Marbles, A.*, Thomas, A., Dasher, J., Galatioto, M., Avelar, A., Estrada, J., Keating, K., Hayes, J. L., Donaldson, Y. Y., Moore, J., **Litwin, D. G.**, Harman, C. J. (2023). H33N-1973: Uncovering the Critical Zone Structure at Two Catchments in the Baltimore Piedmont Using Ground Penetrating Radar. Poster. *American Geophysical Union Fall Meeting*.

12. **Litwin, D. G.***, Harman, C. J., Tucker, G.E., Barnhart, K. R. (2022). EP25D-1431: DupuitLEM and the Search for Fundamental Insights into the Coevolution of Landscape Hydrology and Geomorphology (Invited). Poster. *American Geophysical Union Fall Meeting*.
13. **Litwin, D. G.**, Harman, C. J.*, Tucker, G.E., Barnhart, K. R. (2022). H43D-07: The Geomorphic Origins of Variable Source Area Hydrology. Oral. *American Geophysical Union Fall Meeting*.
14. Motz, S.*, **Litwin, D. G.**, Chiaviello, A., Flinchum, B., Harman, C. J. (2022). NS32B-0369: Looking for the Fill-and-Spill Mechanism with Ground Penetrating Radar–Panola Mountain, Georgia. Poster. *American Geophysical Union Fall Meeting*.
15. Chiaviello, A.*, Flinchum, B., Harman, C. J., Hayes, J. L., Motz, S., **Litwin, D. G.**, Holbrook, H. (2022). NS32B-0367: Defining Spatial Heterogeneity: Using Ground Penetrating Radar to Map the Boundaries between Soil, Saprolite, and Bedrock in the Critical Zone. Poster. *American Geophysical Union Fall Meeting*.
16. **Litwin, D. G.***, C. J. Harman, Tucker, G.E., Barnhart, K. R. (2021). EP45G-1574: The Hydrogeomorphic Evolution of Variable Source Areas. Poster. *American Geophysical Union Fall Meeting*.
17. Sklar, L. S.*, Callahan, R. P., Carr, B., Chiaviello, A., Cist, N., Davis, E., Flinchum, B., Harman, C. J., Hayes, J. L., Holbrook, H., **Litwin, D. G.**, Moon, S., Neely, A., Plante, Z., Richter Jr, D. B., Riebe, C. S., Singha, K., Weinheimer, N. (2021). EP45G-1573: Variation in Hillslope Sediment Size Controlled by Differences in Subsurface Weathering in a Transient Piedmont Landscape, South Carolina, USA. Poster. *American Geophysical Union Fall Meeting*.
18. Harman, C. J.*, Bemis, S. P., Callahan, R. P., Carr, B., Eppinger, B., Flinchum, B., Hayes, J. L., Holbrook, H., **Litwin, D. G.**, Moon, S., Riebe, C. S., Singha, Sklar, L. S. (2021). H41B-06: Panola Mountain revisited: intensive geophysical and geochemical studies reveal the structure of the deep critical zone at a classic hydrologic study site. Oral. *American Geophysical Union Fall Meeting*.
19. **Litwin, D. G.***, Harman, C. J., Tucker, G.E., Barnhart, K. R. (2021). EGU21-5863: A hydrogeomorphic perspective on emergent topographic properties at landscape equilibrium. Virtual. *European Geosciences Union General Assembly*.
20. **Litwin, D. G.***, Harman, C. J., Tucker, G.E., Barnhart, K. R. (2020). EP040-03: Groundwater affects geomorphic and hydrologic properties of coevolved landscapes. Oral. *American Geophysical Union Fall Meeting*.
21. **Litwin, D. G.***, Harman, C. J., Tucker, G.E., Barnhart, K. R. (2019). H31O-1954: A Numerical Exploration of Coevolution Between Runoff Pathways, Climate, and Landscape Morphology. Poster. *American Geophysical Union Fall Meeting*.
22. **Litwin, D. G.***, Meira Neto, A., Troch, P. A. (2017). 304919: Evaluating the effectiveness of ERT for assessing subsurface structure at the landscape evolution observatory. Poster. *Geological Society of America Annual Meeting*.

Invited Presentations

2024

Department of Physics, Clark University, USA
Department of Earth and Planetary Sciences, Rutgers University, USA
6th Cargese school: Flow and transport in porous and fractured media, France
Department of Geosciences, University of Tübingen, Germany
Geosciences Rennes, University of Rennes, France

2023

Department of Environmental Sciences, University of Virginia, USA

2022

Earth Surface Process Modelling, GFZ Helmholtz Centre Potsdam, Germany

2021

Center for Environmental and Applied Fluid Mechanics, Johns Hopkins University, USA

Honors and Scholarships

1/2019 – 1/2020	Horton Research Grant	American Geophysical Union
8/2018 – 8/2019	M. Gordon Wolman Fellowship	Johns Hopkins University
8/2018	Lee and Albert H. Halff Doctoral Student Award	Johns Hopkins University
5/2018	Melih T. Dural Undergraduate Research Prize	University of Illinois
8/2017	Engineering Achievement Scholarship	University of Illinois
8/2017	Vernon Lucy III/SUEZ Scholarship	American Water Works Association
8/2017	Clean Drinking Water Scholarship	Illinois Water Environment Association
8/2017	Safe Water Scholarship	Illinois Section American Water Works Association
8/2013 – 5/2017	Edward Krolick Music Performance Scholarship	University of Illinois

Service

Service to University

6/2022 – 7/2023 **Founding Leader** — Johns Hopkins University
Environmental Physics, Chemistry, and Biology Seminar (ePCBs)

1/2019 – 8/2021 **Department Representative** — Johns Hopkins University
Graduate Representative Org. (GRO)

8/2019 – 8/2020 **Department Representative** — Johns Hopkins University
Environmental Health and Engineering Student Org. (EHESO)

8/2015 – 5/2017 **Executive Board** — University of Illinois
Water Environment Federation - American Water Works Association (WEF-AWWA) Student Chapter

Service to Community

3/2024 – Present **Conference Session Convener**
HS2.1.12: Advancing Critical Zone Science Across Scales through Synthesis and Collaboration. *EGU General Assembly 2024.*

1/2020 – Present **Journal Peer Review**
Geophysical Research Letters, Water Resources Research, Earth Surface Dynamics, Natural Hazards and Earth System Science

6/2023 **Scientific Advisor** — GNOMES Program
Geophysics of the Near-surface an Outdoor Motivational Experience for Students (GNOMES) scientific advisor for field season in Baltimore, Maryland

1/2020 – 12/2021 **Committee Member** — American Geophysical Union
Member and co-leader of the blog and website for the Hydrological Sciences Student Subcommittee (H3S)

15 May 2020 **Invited panelist** — CUAHSI
Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI) Virtual Forum: Transitioning to Online Education, Graduate Student Panel.

Science Communication and Outreach

1/2022 – 12/2023 **Editorial Team** — Water Underground Blog
Blog posts about groundwater science, teaching, and community.

6/2020 – 6/2022 **Contributing Author** — Geobites.org
Short features of hydrology and geomorphology papers for science–curious audiences.

28 March 2019 **Invited Speaker** Living Classrooms Foundation
Presentation on hydrology and geologic history of the Chesapeake Bay for educators.

10 March 2018 **Engineering Open House Presenter** University of Illinois
Demonstration of groundwater contaminant transport with WEF-AWWA student group.

8 July 2017 **'What if...' Presenter** Biosphere 2
Presentation on the Landscape Evolution Observatory for Biosphere 2 visitors.