Brian Beaty, Ph.D.

Postdoctoral Scholar
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About

Research interests: global biogeochemical cycles and climate regulation across Earth history; weathering and the geologic carbon cycle; marine nutrient cycling; mass extinctions

Technical skills: clean laboratory operation; mass spectrometry (ICP-MS); geochemical modelling and data analysis (Matlab, R); field-based environmental data collection (geologic, hydrologic, atmospheric)

Academic appointments

Aug. 2025 – present **Postdoctoral Scholar, Stanford University**, Stanford, CA
Department of Earth and Planetary Sciences

Faculty sponsor: Prof. Jonathan Payne

Education

Fall 2019 – Spring 2025 **Ph.D., Yale University**, New Haven, CT
Department of Earth and Planetary Sciences

Dissertation title: The roles of terrestrial weathering and marine bioturbation in shaping Earth's surface habitability across time

Dissertation committee: Prof. Noah Planavsky, Prof. Lidya Tarhan, Prof. Alan Rooney, Prof. Ruth Blake

Fall 2013– Spring 2017 **B.A., Amherst College**, Amherst, MA
Geology, *summa cum laude*

Undergraduate thesis: Mercury enrichments in the Triassic-Jurassic rift basins of eastern North America: Facies dependence, volcanic associations, and relationship to the End-Triassic Extinction

Undergraduate thesis advisor: Prof. David Jones

Publications

First author, published

2025 **Beaty, B.**; Foster, W. J.; Zuchuat, V.; Buchwald, S. Z.; Brooks, H.; Rauzi, S.; Isson, T.; Planke, S.; Rodriguez-Tovar, F. J.; Senger, K.; Planavsky, N. J.; and Tarhan, L. G., 2025. Bioturbation shapes marine biogeochemical cycling following the end-Permian mass extinction in northern Pangea. *Geobiology* Vol. 25, No. 5., e70032. https://doi.org/10.1111/gbi.70032

2020 **Beaty, B.**; and Planavsky, N. J., 2020. A 3 by record of a biotic influence on terrestrial weathering. *Geology* Vol. 49, No. 4, 407-411. https://doi.org/10.1130/G47986.1

First author, in prep

in prep **Beaty, B.**; Longley, M.*; Katchinoff, J.; Kalderon-Asael, B.; Asael, D.; McKenzie, N. R.; and Planavsky, N. J. A topographic control on silicate weathering efficiency demonstrated by Li isotopes in Thailand rivers. **co-first author*

Coauthor, published

2026 Cheung, C. T. Z.; Bauer, K. W.; **Beaty, B.**; Guotana, J. M.; Faustino-Eslava, D. B.; Kalderon-Asael, B.; Asael, D.; Luk, K.; DeFrancesco, G.; Newby, S. M.; Qin, Y.; Planavsky, N. J.; and McKenzie, N. R., 2026. Tropical mafic rock weathering, riverine lithium isotopes, and the evolution of Cenozoic seawater chemistry. *Earth and Planetary Science Letters.* https://doi.org/10.1016/j.epsl.2026.119917

Farrell, Ú.; Olson, H. C.; Thompson, M. O., [146 alphabetically listed authors, including **Beaty, B.**] … and E. A. Sperling, 2026. The sedimentary geochemistry and paleoenvironments project phase 2 data release: An open data resource for the study of Earth's environmental history. *Chemical Geology,* 123311. https://doi.org/10.1016/j.chemgeo.2026.123311

Zuchuat, Z.; Janocha, J.; Brooks, H. L.; Buchwald, S. Z.; **Beaty, B.**; Tarhan, L. G., Gilmullina, A.; Jones, M. T.; Frank, A. B.; Lahajnar, N.; Augland, L. E.; Felten, B. S.; and Foster, W. J., 2026. New insights on the depositional environment and dynamics of the lowermost Triassic in Svalbard: linking the Sørkapp-Hornsund High to western and central Spitsbergen. *Sedimentologika* Vol. 4 No.1. https://doi.org/10.57035/journals/sdk.2026.e41.2413

2025 Cheung, C. T. L.; **Beaty, B.;** Bauer, K. W.; Colleps, C. L.; Asael, D.; Crowe, S. A.; Planavsky, N. J.; Savage, P. S.; and McKenzie, N. R., 2025. Lithological influence on Li isotope fractionation during silicate weathering. *Geochimica et Cosmochimica Acta* Vol. 414, 217-235. https://doi.org/10.1016/j.gca.2025.12.043

Buchwald, S. Z.; Frank, A. B.; Birgel, D.; Senger, S.; Mosociova, T.; Pei, Y.; **Beaty, B.**; Tarhan, L., Galasso, F.; Gómez Correa, M. A.; Grasby, S. E.; Struck, U.; Yuan, D.; Steinkrauss, R.; Gliwa, J.; Lahajnar, N.; Peckmann, J.; and Foster, W.J.; 2025. Reconstructing environmental and microbial ecosystem changes across the Permian-Triassic mass extinction at Lusitaniadalen, Svalbard. *Paleoceanography and Paleoclimatology* Vol. 41 No. 2, e2025PA005321. https://doi.org/10.1029/2025PA005321

Nsingi, M.; Cui, Y.; Cepin, E.; **Beaty, B.**; Planavsky, N. J.; Wu, Q; Adloff, M.; Wang, J.; Selby, D.; Liu, Z.; Dong, Y.; Jiang, S.; and Zhu, F., 2025. Changes in continental weathering across the Permian-Triassic transition: A global review. *Global and Planetary Change,* Vol. 254, 105015. https://doi.org/10.1016/j.gloplacha.2025.105015

Wu, Q.; Nsingi, M.; Kürschner, W. M.; **Beaty, B.**; Planavsky, N. J.; Schneebeli-Hermann, E.; Yao, W.; Cepin, E. R.; and Cui, Y., 2025. Impacts of volcanism on geochemical records during the Late Permian-Early Triassic transition in northern and middle

Norwegian continental margins. *Global and Planetary Change*, Vol. 252, 104874. https://doi.org/10.1016/j.gloplacha.2025.104874

2024 Rauzi, S.; Foster, W. J.; Takahashi, S.; Hori, R.; **Beaty, B.**; Tarhan, L. G.; and Isson, T., 2024. Lithium isotopic evidence for enhanced reverse weathering during the Early Triassic warm period. *Proceedings of the National Academy of Sciences*, Vol. 121, No. 32, e2318860121. https://doi.org/10.1073/pnas.2318860121

2023 Zhao, M.; **Beaty, B.**; Tarhan, L. G.; and Planavsky, N. J., 2023. Resetting of shallow-water carbonate B isotope values during marine burial diagenesis. *American Journal of Science*, Vol. 323, No. 11. https://doi.org/10.2475/001c.91398

2021 Planavsky, N. J.; Crowe, S. A.; Fakhraee, M.; **Beaty, B.**; Reinhard, C. T.; Mills, B. J.; Holstege, C.; and Konhauser, K. O., 2021. Evolution of the structure and impact of Earth's biosphere. *Nature Reviews Earth & Environment*, Vol. 2, No. 2, 123-139. https://doi.org/10.1038/s43017-020-00116-w

Conference presentations

Talks

Beaty, B.; Longley, M.; Katchinoff, J.; Kalderon-Asael, B.; Asael, D.; McKenzie, R.; and Planavsky, N. J., 2025. Li isotopes in Thailand rivers record highly variable weathering congruency in tropical upland settings. *Goldschmidt 2025, Prague, Czech Republic*

Beaty, B.; Foster, W. J.; Zuchuat, V.; Buchwald, S. Z.; Brooks, H.; Rauzi, S.; Isson, T.; Planke, S.; Rodriguez-Tovar, F. J.; Planavsky, N. J.; and Tarhan, L. G., 2025. Bioturbation shapes high-latitude marine biogeochemical cycling following the end-Permian mass extinction. *3rd Geobiology Society Conference, Banff, Canada*

Beaty, B.; Foster, W. J.; Zuchuat, V.; Buchwald, S. Z.; Brooks, H.; Rauzi, S.; Isson, T.; Planke, S.; Rodriguez-Tovar, F. J.; Planavsky, N. J.; and Tarhan, L. G., 2024. Bioturbation shapes marine nutrient cycling following the end-Permian mass extinction. *Geological Society of America 2024, Anaheim, CA*

Beaty, B.; Kalderon-Asael, B.; Rauzi, S.; Isson, T.; and Planavsky, N. J., 2023. Paleosol lithium isotopes indicate limited clay production in the weathering zone before land plants. *Goldschmidt 2023, Lyon, France*

Beaty, B.; Rauzi, S.; Isson, T.; Kalderon-Asael, B.; and Planavsky, N. J., 2022. Silicate weathering regimes before land plants informed by paleosol Li isotopes. *Geological Society of America 2022, Denver, CO*

Beaty, B.; and Planavsky, N. J., 2020. A record of long-term terrestrialization? *Goldschmidt 2020, online*

Posters

Beaty, B.; Jones, D. S.; and Schaller, M. F., 2017. Do mercury enrichments in the Mesozoic rift basins of Eastern North America provide a link between flood basalt volcanism and the End-Triassic Extinction? *Northeastern Geobiology Symposium 2017*, *University of Connecticut*

Awards

Grants

2024 **Paleontological Society Student Research Grant**
For fieldwork across the Permian-Triassic boundary in Svalbard, Arctic Norway, conducted Summer 2024

2024 **Yale Institute for Biospheric Studies Doctoral Improvement Grant**
For fieldwork across the Permian-Triassic boundary in Svalbard, Arctic Norway, conducted Summer 2024

2020 **Yale Institute for Biospheric Studies Doctoral Pilot Grant**
For fieldwork across the Permian-Triassic boundary in Svalbard, Arctic Norway, conducted Summer 2022

2020 **Geological Society of America Graduate Student Research Grant**
For fieldwork in the mid-Proterozoic Belt Supergroup of Montana, conducted Summer 2021

Honors

2025 **Karl K. Turekian Prize**, Yale University, 2025
For excellence in geochemical or cosmochemical studies

2019 **Bateman Award,** Yale University, 2019

2016 **Walter F. Pond Prize,** Amehrst College, 2016
Given to the student who prepares the most distinguished thesis in geology

2015 **Belt-Brophy Prize**, Amherst College, 2015
Given to the student who has shown the greatest promise for success as a geologist

Press

Spring 2026 **Yale Scientific Magazine**
"Tunneling Through Time: Earth's Recovery from the End-Permian Mass Extinction"

Dec. 2025 **Yale News Insights & Outcomes**
"Following the Tracks After a Mass Extinction"

Teaching experience

Teaching fellow, Yale University Department of Earth and Planetary Sciences

Spring 2021 **History of Life:** Paleontology lecture course for undergraduates; responsible for grading and leading discussion sections

Fall 2019 **Natural Disasters:** Introductory geoscience lecture course for undergraduate non-majors; responsible for grading and office hours

Field assistant, Yale EPS

Spring 2022 and Spring 2024 **The Geology of North America Through its National Parks:** Introductory geoscience lecture course for undergraduates with spring break trip to Arizona

Spring 2023 **Global Tectonics:** Introductory tectonics lecture course for undergraduates with spring break trip to Oman

Teaching assistant, Amherst College

Spring 2014 **Principles of Geology:** Introductory geoscience lecture course; responsible for facilitating weekly laboratory sessions on rock and mineral identification

Training

Aug. 2023 **Agouron Institute Advanced Geobiology Field Course**, Montana
One of 12 PhD students invited to participate in a research-based field course investigating previously unstudied exposures of Proterozoic stromatolites in Montana

Summer 2014 **Geology Field Camp, Indiana University Geologic Field Station**, Montana
Participated in a 6-week intensive field course run through Indiana University in the Tobacco Root Mountains of southwestern Montana

Professional engagement

Peer reviewer: *Science Advances, Geology, Earth and Planetary Science Letters, Geochimica et Cosmochimica Acta, Geobiology, Global and Planetary Change*

Grant reviews: Executive Secretary on a NASA Astrobiology review panel

2026 **Conference session convener,** Goldschmidt 2026, Montreal Canada
07g: From Early Earth to Other Worlds: Geochemical Perspectives on the Causes, Consequences, and Assessment of Planetary Habitability

2024 **Conference organizer,** Northeastern Geobiology Symposium, Yale University
Developed program and managed poster session

Department Service

Yale University Department of Earth and Planetary Sciences

2021-2022 **Fieldwork Working Group, Inclusion, Diversity, Equity, and Anti-Racism (IDEA) Committee**
Helped develop fieldwork code of conduct used for all department field trips

2022 **Graduate student liaison, Geochemistry faculty search**
Coordinated graduate student meetings with faculty candidates and solicited feedback

Undergraduate Mentorship

Individual mentorship

2024-2026 Maxwell Cota: Yale University Class of 2026

Supervised for an undergraduate research position, providing training in rock sample preparation and trace fossil analysis; Currently helping supervise senior thesis advised by Prof. Lidya Tarhan

2022-2025 Mary Yao: University of Hong Kong Class of 2024, Yale University exchange student 2022-23, currently geoscience PhD student at University of Minnesota

Supervised for an undergraduate research position, providing training in clean laboratory techniques including column chemistry and basics of mass spectrometry; Supervised application process for geoscience PhD programs and NSF Graduate Research Fellowship Program (awarded 2025)

Mentorship programs

2021-2022 **Undergraduate-Graduate Mentorship Program Coordinator, Yale University Department of Earth and Planetary Sciences**
Matched interested undergraduates with graduate student mentors; organized workshop for non-academic geoscience careers (industry, government, nonprofits)

Community Engagement

2021-2022 **Peabody Museum of Natural History Speaker's Bureau**, New Haven, CT
Developed and presented public talks on hypoxia in Long Island Sound for local Connecticut libraries, community centers, and retirement homes: "You Take My Breath Away: What Long Island Sound Teaches Us About Ocean Oxygen Loss"

2019-2020 **Museum Volunteer, Peabody Museum of Natural History**, New Haven, CT
Presented 45-minute programs for local elementary and middle school classes using museum collections: "Paleoworlds: Interpreting Prehistory Through Fossils" and "Landforms: Evidence of a Changing Earth"

Field Projects

2022, 2024 **Svalbard, Arctic Norway**
Collected sedimentological and ichnological data from outcrops throughout Svalbard spanning the end-Permian extinction over two field seasons (July 2022 and July 2024), returning samples for subsequent geochemical analyses at the Yale Analytical and Stable Isotope Center and the Yale Geochemistry Center. Funded personal travel expenses with a Paleontological Society Student Research Grant and two Yale Institute for Biospheric Studies doctoral research grants. Fieldwork became the basis for a Ph.D. chapter (published in Beaty et al. 2025 *Geobiology*), as well as additional research projects currently in prep.

2017 **Massachusetts and Connecticut**
Stratigraphic logging and sampling of outcrops spanning the end-Triassic extinction followed by geochemical analyses at Amherst College, as part of undergraduate thesis

2015 **Great Basin, Nevada**
Startigraphic logging and sampling of outcrops spanning the end-Ordovician extinction as part of an Amherst College summer undergraduate research fellowship, followed by geochemical analyses at Washington University in Saint Louis (Fike Stable Isotope Biogeochemistry Lab)

Other field experience: Montana, 2023 (1 week): stratigraphic logging for Agouron Institute Advanced Geobiology Field Course; Death Valley, California, 2019 (1 week): stratigraphic logging for a Yale EPS geobiology course; Sierra Nevadas, California, 2019 (6 months): water and air quality monitoring as a National Park Service federal employee; Arizona, 2018 (6 months): archeological site assessments and environmental monitoring for a summer internship at Petrified Forest National Park; Montana, 2014 (6 weeks): geologic mapping for undergraduate field camp at the Indiana University Geologic Field Station

Prior professional employment

2019 **Physical Science Technician (seasonal GS-5 federal employee), Sequoia and Kings Canyon National Parks, CA**

Collected water quality and snowpack data in remote backcountry settings for long-term USGS and EPA monitoring programs

Operated atmospheric instruments including ozone monitors, mercury and nitrate deposition collectors, and wildfire smoke particulate monitors

Produced daily air quality forecasts of potentially hazardous ground-level ozone for the safety of park visitors and staff

Society Membership

Geochemical Society, Geological Society of America, Paleontological Society, Sigma Xi