

Bolton Howes

NSF EAR Postdoctoral Fellow

University of Washington & Western Washington University

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Professional Experience

2024–2025	University of Washington & Western Washington University NSF Postdoctoral Fellow Leveraging remote sensing, data science, and computational methods to understand how rivers respond to climate change Advisors: Akshay Mehra and Brady Foreman
2023–2024	University of Miami (Rosenstiel School of Marine, Atmospheric, and Earth Science) Postdoctoral Researcher, Marine Geology Remote sensing of sedimentology to determine the natural hazard risk of the Red Sea Advisor: Sam Purkis

Education

2017–2023	Princeton University , Princeton, NJ Ph.D., Geosciences Dissertation: Developing physical paleoenvironmental proxies: from ooids to extinction Advisor: Adam Maloof
2015–2017	University of Georgia , Athens, GA M.Sc., Geology Thesis: The application of sequence stratigraphic principles to constrain the onset of thrust load-induced subsidence: the Jurassic Twin Creek Limestone of Southwest Wyoming Advisor: Steven Holland
2011–2015	Macalester College , St. Paul, MN B.A., Geology Thesis: Characterization of a regionally significant terrestrial bounding surface in the Upper Cretaceous Two Medicine Formation, northwestern Montana Advisor: Raymond Rogers

Awards and Honors

2024	UW eScience Postdoctoral Fellowship [\$4,000]
2023	NSF EAR Postdoctoral Fellowship [\$180,000]
2017–2022	Department of Geosciences Graduate Research Fund [3x\$5,000]
2017	Master's Student of the Year, University of Georgia
2015–2017	Graduate Student Assistantship. University of Georgia (fully-funded master's program)
2016	Graduate Research Grant, Geological Society of America
2016	Miriam Watts-Wheeler Award, University of Georgia [\$1,600]
2015	Henry Lepp Award for Dedication to Scientific Research, Macalester College

Publications

Submitted & In Review

12. Kevin I. Velez-Rosado, Olga Zalles-Grebetskaya, Jeffrey A. Wilson Mantilla, Blair Schoene, Adam Maloof, **Bolton Howes**. New material of *Dolichochoampsia minima* (Archosauria: Crocodylia) from the Cretaceous–Paleogene El Molino Formation of Bolivia sheds light on the early evolution of Gavialinae. *in revision Journal of Systematic Paleontology*.

In prep.

11. **Bolton Howes**, Delaney Todd, Katherine Sullivan, Akshay Mehra, Brady Foreman. Seasonality and discharge variability cause increased river mobility and floodplain erosion during the Paleocene-Eocene global warming event.
10. **Bolton Howes**, Morgan Chakraborty, Sam Purkis. The afterlife of lowstand sediments.
9. Anthony Semerraro, Brian Cardenas, **Bolton Howes**, Brady Foreman. Reconstructing river planform morphology in alluvial stratigraphy using paleocurrents.

Published

8. Morgan Chakraborty, Francesca Benzoni, Francois Tissot, Ali Pourmand, Marco Taviani, **Bolton Howes**, Peter Swart, Mattie Rodrigue, Sam Purkis. Deep-water corals indicate the Red Sea survived the last glacial lowstand. 2025. *PNAS*.
7. Sam Purkis, Steve Ward, **Bolton Howes**, Morgan Chakraborty, Jake Longenecker. A 1600-year record of extreme rainfall in northern Arabia. 2025. *Science Advances*.
6. **Bolton Howes**, Akshay Mehra, Emily Geyman, Julia Wilcots, Ryan Manzuk, Curtis Deutsch, Adam Maloof. The where, when, and how of ooid formation: what ooids tell us about ancient seawater chemistry. 2025. *Earth and Planetary Science Letters*.
5. Gaelle Duchtellier, Amanda M. Oehlert, Hannah Shernisky, Clement G.L. Pollier, Peter K. Swart, **Bolton Howes**, Sam J. Purkis. Sedimentary porewaters record regional tectonic and climate events that perturbed a deep-sea brine pool in the Gulf of Aqaba, Red Sea. 2024. *Science of the Total Environment*.
4. Akshay Mehra, **Bolton Howes**, Ryan Manzuk, Alec Spatzier, Bradley Samuels, Adam Maloof. A novel technique for producing three-dimensional data using serial sectioning and semi-automatic image classification. 2022. *Microscopy and Microanalysis*.
3. Emily Geyman, Ziman Wu, Matthew Nadeau, Stacey Edmonson, Andrew Turner, Sam Purkis, **Bolton Howes**, Blake Dyer, Anne-Sophie Ahm, Nan Yao, Curtis Deutsch, and Adam Maloof. The origin of carbonate mud and implications for global climate. 2022. *PNAS*.
2. **Bolton Howes**, Akshay Mehra, and Adam Maloof. Three-Dimensional Morphometry of Ooids in Oolites: a new tool for more accurate and precise paleoenvironmental interpretation. 2021. *Journal of Geophysical Research: Earth Surface*.
1. Paul Hoffman, Galen Halverson, Daniel Schrag, John Higgins, ... **Bolton Howes**. Snowballs in Africa: sectioning a long-lived Neoproterozoic carbonate platform and its bathyal foreslope (NW Namibia). 2021. *Earth-Science Reviews*.

Conference Abstracts

2022	Bolton Howes , Ryan Manzuk, Akshay Mehra, Adam Maloof. Tales of transport and chemistry from three-dimensional growth histories of ooids. AGU Fall Meeting (Chicago, Illinois).
2022	Ryan Manzuk, Bolton Howes , Emily Geyman, Indu Panigrahi, Dave Singh, Adam Maloof. Multispectral petrography image analysis as a method for paleoenvironmental and paleoecological reconstruction; applications to Earth's first reefs. AGU Fall Meeting (Chicago, Illinois).
2022	Cedric Hagen, John Higgins, Adam Maloof, Stacey Edmonson, Ryan Manzuk, Bolton Howes , Pingping Zhao. Machine learning and computational image analysis leveraged to probe relationships between carbonate isotopic composition, diagenetic alteration, and sedimentary facies isotopic variability. AGU Fall Meeting (Chicago, Illinois).
2022	Adam Maloof, Ryan Manzuk, Emily Geyman, Akshay Mehra, Jaap Kaandorp, Mark Webster, Stacey Edmonson, Bolton Howes , and Cedric Hagen. From modern analogs to three dimensions: Lessons learned for interpreting the stratigraphic record of the Proterozoic–Phanerozoic transition. GSA Annual Meeting (Denver, Colorado).
2018	Bolton Howes , Akshay Mehra, and Adam Maloof. Three-dimensional reconstructions of Holocene and Neoproterozoic oolites to measure porosity, permeability, and volume-shape evolution of ooids. GSA Annual Meeting (Indianapolis, Indiana).
2014	Bolton Howes and Raymond Rogers. Revisiting a regionally significant terrestrial bounding surface in the Upper Cretaceous (Campanian) Two Medicine Formation, northwestern Montana. GSA Annual Meeting (Vancouver, British Columbia).

Invited Talks

2025	University of Washington: PaleoLunch
2025	Western Washington University
2024	Wheaton College
2020	Macalester College, Graduate School Open House
2018	Macalester College, Sed/Strat Seminar

Fieldwork Experience (80 Weeks)

2024	Indonesia	2 weeks	Mapping seafloor ecology and natural hazards
2024	NW Wyoming	4 weeks	The fluvial response to the PETM
2023	Red Sea	3 weeks	Geomorphology and stratigraphy to evaluate natural hazard risk
2019 & 2022	Bolivia	12 weeks	The K–Pg Boundary in lacustrine and fluvial settings
2021	southern Utah	2 weeks	Cyclicity in the Late Paleozoic Ice Age
2019	Calabria, Italy	1 week	Measuring climate change in olive orchards
2019	Yukon, Canada	5 weeks	Archeocyathid reefs and the Cambrian Explosion
2018	Spain and Italy	6 weeks	The K–Pg Boundary and slope sediments
2018	southern Namibia	4 weeks	Neoproterozoic and Paleozoic glacial deposits
2018	Western Australia	1 week	Modern and recent carbonate platforms
2018	Nevada/Arizona	3 weeks	Stratigraphy and Geochemistry of the late Paleozoic ice age
2017	northern Namibia	6 weeks	Field assistant to Paul Hoffman. Mapping Snowball Earth
2016	western Wyoming	6 weeks	Sequence strat. of the Twin Creek Limestone
2014	NW Montana	2 weeks	Sequence strat. and strat. paleobiology of the Two Medicine Formation
2014	Patagonia, Chile	12 weeks	Restoration ecology and conservation biology in the Aysn Region

2013 & 2014	NW Wyoming	5 weeks	Terrestrial stratigraphy and paleobiology of the Cloverly Formation
2014	Tall Dhiban, Jordan	6 weeks	Archeological excavation Early Bronze Age through the 19th century

Undergraduates Advised

2024	Filip Novak	Photogrammetry and fluvial sedimentology
2021	Anubhav Agarwal	Transfer learning for geological image segmentation
2021	Hugh Shields	Transfer learning for geological image segmentation
2021	Anna Krokhine	Numerical models of ooid growth
2020	Emilio Cano-Renteria	Geological image segmentation and ooid growth
2019	Sarah Brown	K–Pg boundary stratigraphy of Bolivia
2018	Celia Aranda-Reina	Climate variability during the K–Pg in Spain

Undergraduates Involved in Fieldwork

2019	10 Undergraduates	1 week	Italy
2019	Sarah Brown	5 weeks	Bolivia
2019	Galen Cadley	5 weeks	Yukon, Canada
2019	8 Undergraduates	1 week	Utah
2018	Celia Aranda-Reina	4 weeks	Spain
2016	Tony Moraes	4 weeks	western Wyoming

Teaching Experience

Spr. 2021	Teaching Assistant	ENV 354-GEO 368 Climate and Weather: Order in the Chaos
Fall 2019 *	Teaching Assistant	FRS 161: Earth: Crops, Culture, and Climate (in Italy)
Fall 2018 *	Teaching Assistant	GEOL 201: Measuring Climate Change: Data Analysis and Science Writing
2016–2017	Geology Tutor	University of Georgia Student-Athlete Academic Center
Spr. 2015	Teaching Assistant	GEOL 165: History and Evolution of the Earth
Fall 2014	Teaching Assistant	GEOL 300: Paleobiology

* Indicates courses that included a fieldwork component consisting of a week-long trip (Utah and Italy) to make observations for research projects. My teaching duties included preparing supplies and logistics, and helping students with both data collection—especially with drones, differential GPS, and surveying equipment—and data analysis. The data collected during fieldwork was part of a semester-long project.

Leadership and Service

2023	SIFP Fellow (mentoring first-gen. students), Princeton University
2018–2021	Residential Graduate Student, Princeton University
2016–2017	Student Volunteer, Geological Society of America
2015	Leadership Committee of Macalester College Fellowship of Christian Athletes
2012–2013	Resident Assistant, Macalester College
2011–2014	Captain of Macalester College Football Team

Professional Activities

Convener	2019 GSA Annual Meeting technical session: Hello (ancient) world!: Exploring the Neoproterozoic to Cambrian interval by quantitatively probing the rock record
Reviewer	NSF EAR Geoinformatics, Geophysical Research Letters