

# Joshua Murray

Lamont-Doherty Earth Observatory, Columbia University  
Comer Geochemistry Building, 207  
61 Rte 9W  
Palisades, NY  
10964

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Phone: +1 (609)356-9088  
Email: joshuam@ldeo.columbia.edu

## EDUCATION

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- Columbia University** New York, NY  
• *Postdoctoral Research Scientist*  
*Lamont-Doherty Earth Observatory* With Prof. Peter Kelemen  
September 2024 -
- Massachusetts Institute of Technology** Cambridge, MA  
• *Ph.D. Ultramafic alteration and the cooling of Earth and Mars.*  
*Earth, Atmospheric and Planetary Sciences* Advised by Prof. Oli Jagoutz  
September 2018 - August 2024
- Princeton University** Princeton, NJ  
• *A.B. A deterministic approach to geochemical stratigraphy.*  
*Concentration in Geosciences. Certificate in Applications of Computing*  
September 2014 - June 2018

## PUBLICATIONS

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- **Sub-aerial formation of carbonate on Mars**  
Joshua Murray, Peter Kelemen, James Leong, John Mustard, Bethany Ehlmann, *In prep – preprint available upon request*
- **Sedimentary constraints on silicate weathering during the Taconic orogeny in Newfoundland**  
Joshua Murray, Oliver Jagoutz, Kristin Bergmann. *In prep – preprint available upon request*
- **Olivine alteration and the loss of Mars' early carbon**  
Joshua Murray, Oliver Jagoutz. *Science Advances* (2024)
- **Clay minerals store organic carbon and cool Earth's climate over millions of years**  
Joshua Murray, Oliver Jagoutz. *Nature Geoscience - Research Briefing* (2024)
- **Palaeozoic cooling modulated by ophiolite weathering through organic carbon preservation**  
Joshua Murray, Oliver Jagoutz. *Nature Geoscience* (2023)
- **Eruption history of the Columbia River Basalt Group constrained by high-precision U-Pb and  $^{40}\text{Ar}/^{39}\text{Ar}$  geochronology**  
Jennifer Kasbohm, Blair Schoene, Darren Mark, **Joshua Murray**, Stephen Reidel, Dawid Szymanowski, Dan Barfod, Tiffany Barry. *Earth and Planetary Science Letters*, 617, 118269 (2023)

## TALKS AND PRESENTATIONS

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- **Subaerial carbonate formation on Mars**  
*Goldschmidt Conference 2025 - Prague*
- **Invited: Palaeozoic changes in weathering and organic carbon burial**  
*Pennsylvania State University Geochemistry - April 2025*
- **Carbon cycle changes during the Taconic orogeny in Newfoundland, Canada**  
*AGU Fall Meeting 2024 - Poster*
- **How rocks keep Earth cool**  
*MIT Abstracts - December 2024*
- **Ultramafic alteration and the cooling of Earth and Mars**  
*Lamont-Doherty Geodynamics Seminar - November 2024*
- **Invited: Ultramafic weathering and the carbon cycle of Earth and Mars**  
*Princeton University Department of Geosciences - April 2024*
- **Invited: Glaciations induced by ophiolite weathering through clay formation**  
*Stanford University Earth & planetary science seminar - February 2024*
- **Invited: Ophiolite obduction and clay formation as a driver of Paleozoic glaciations**  
*Brown University geochemistry, mineralogy, and petrology seminar - Fall 2023*

- **Increased organic carbon burial through ophiolite obduction**  
*NSF-FRES Climate-tectonics workshop 2023 - Talk*
- **A sedimentary sink for Mars' early carbon**  
*AGU Fall Meeting 2022 - Talk*
- **Ophiolite-derived clays enhance organic carbon burial**  
*AGU Fall Meeting 2022 - Poster*
- **The natural levers of Earth's long-term climate**  
*New England Aquarium Carlson lecture 2022 - Poster*
- **Silicate weathering products of mafic and ultramafic rocks as a control on steady state climate**  
*AGU Fall Meeting 2021 - Talk*

## HONOURS AND AWARDS

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- **MIT EAPS Award for Excellence in Teaching** 2021  
*Awarded to teaching assistants 'who have met the highest levels of performance'*
- **MIT Presidential Fellowship** 2018-2019  
*Funds tuition and living costs for the first academic year at MIT*
- **William Bonini '48 Teaching Award** 2018  
*Awarded to Princeton Geosciences Senior for commitment to teaching*
- **Smith-Newton Environmental Scholar** 2016-2018  
*Research funding (\$16,000) and support from the High Meadows Environmental Institute*
- **Fulbright Sutton Trust US Programme** 2012-2014  
*Supports first-generation, low-income UK state school students in attending university in the US*

## TEACHING EXPERIENCE

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- **MIT 12.116 - Analysis of Geologic Data** Spring 2024  
*TA. Lead digitization of field maps. Work through cross sections, stratigraphic columns, final report etc.*
- **MIT 12.115/12.482 - Field Geology** January 2024  
*TA. Organised 3-week trip to Muddy Mountains, NV. Instructed mapping techniques, paper and digital.*
- **MIT 12.001 - Introduction to Geology** Fall 2020, Fall 2022  
*TA. Organised Western MA trip. Led labs and some lectures. Wrote exam questions. Graded.*
- **MIT 12.S597 - Seminar on Teaching in Earth Science** January 2022  
*Participant in seminar on pedagogical concepts & strategies for teaching equitably, course design, feedback.*
- **Princeton GEO 370 - Sedimentology** Spring 2018  
*TA. Organised trip to Shark Bay, Australia. Assisted problem sets.*
- **Princeton GEO 373 - Structural Geology** Fall 2017  
*Field TA. Helped students with mapping and observation in Southern California.*

## LANGUAGES AND SKILLS

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- **Coding** MATLAB, Java, OCaml, HTML, PHP, R
- **Adobe** Illustrator, Photoshop, Premiere, InDesign
- **Mapping** GIS, MATLAB Mapping Toolbox, Paper & pencil
- **Driving** Automatic, Manual, Off-road
- **Laboratory** Mineral separation, Petrographic microscope, Mineral dissolution
- **Interests** Film photography, ultimate (frisbee), cooking and baking

## MENTORING AND SERVICE

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- **Geodynamics Seminar Organiser** 2024-  
*One of three organisers of Lamont-Doherty's Geodynamics Seminar*
- **Reviewer** 2024  
*Proceedings of the National Academy of Sciences; Journal of Geophysical Research*
- **COG3 Seminar Organiser** 2022-2023  
*One of two organisers of MIT's seminar in Chemical Oceanography, Geology, Geochemistry, and Geobiology*
- **President - EAPS Student Advisory Committee (ESAC)** 2020-2021  
*Liaise with students and leadership to build meaningful community through events and dialogue*
- **Mentor - Fulbright Sutton Trust US Programme Mentor** 2019-  
*Mentored two first-generation British students each year through US university and financial aid apps*
- **Assistant Coach - MIT Men's Ultimate** 2019-2024  
*Lead practices, logistics, and strategy over short-term (tournaments) and long-term (seasons)*
- **Mathey College RCA of the Year** 2017-2018  
*Acknowledged for my work building community within the residential college system*
- **President - Princeton Undergraduate Geologic Society (PUGS)** 2017-2018  
*Organised community building events and a 40 person department field trip to Scotland*

## FIELD EXPERIENCE

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- **Isle of Arran, Scotland** 1 week, November 2013
- **Owens Valley, CA** 1 week, March 2015
- **Columbia River Basalt** 11 weeks total. Summer 2015, 2016, 2017
- **Orocopia Mountains, CA** 3 weeks total, October 2015, 2017
- **Andros Island, Bahamas** 2 weeks, March 2016
- **Iceland** 1 week, Summer 2016
- **Altiplano, Bolivia** 4 weeks, Summer 2016
- **Shark Bay, Australia** 2 weeks, March 2018
- **Western Scotland** 1 week, May 2018
- **Piute Mountains, CA** 3 weeks, January 2020
- **White Mountains, NH** 1 week, April 2021
- **Newfoundland, Canada** 2 weeks, November 2021
- **Muddy Mountains, Nevada** 3 weeks, January 2024