

# Joshua Murray

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## EDUCATION

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

## PUBLICATIONS

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- **Sub-aerial formation of carbonate on Mars**  
Joshua Murray, PB Kelemen, JA Leong, JF Mustard      *In review – 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 40Ar/39Ar 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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- **Invited: Ophiolite weathering and the Palaeozoic carbon cycle**  
*University of Miami, Florida – October 2025*
- **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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| • <b>MIT EAPS Award for Excellence in Teaching</b>   | 2021      |
| • Awarded to teaching assistants 'who have met the highest levels of performance'                  |           |
| • <b>MIT Presidential Fellowship</b>   | 2018-2019 |
| • Funds tuition and living costs for the first academic year at MIT                                |           |
| • <b>William Bonini '48 Teaching Award</b>   | 2018      |
| • Awarded to Princeton Geosciences Senior for commitment to teaching                               |           |
| • <b>Smith-Newton Environmental Scholar</b>  | 2016-2018 |
| • Research funding (\$16,000) and support from the High Meadows Environmental Institute            |           |
| • <b>Fulbright Sutton Trust US Programme</b>   | 2012-2014 |
| • Supports first-generation, low-income UK state school students in attending university in the US |           |

## TEACHING EXPERIENCE

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| • <b>MIT 12.116 - Analysis of Geologic Data</b>  | Spring 2024          |
| • TA. Lead digitization of field maps. Work through cross sections, stratigraphic columns, final report etc.   |                      |
| • <b>MIT 12.115/12.482 - Field Geology</b>   | January 2024         |
| • TA. Organised 3-week trip to Muddy Mountains, NV. Instructed mapping techniques, paper and digital.          |                      |
| • <b>MIT 12.001 - Introduction to Geology</b>  | Fall 2020, Fall 2022 |
| • TA. Organised Western MA trip. Led labs and some lectures. Wrote exam questions. Graded.                     |                      |
| • <b>MIT 12.S597 - Seminar on Teaching in Earth Science</b>  | January 2022         |
| • Participant in seminar on pedagogical concepts & strategies for teaching equitably, course design, feedback. |                      |
| • <b>Princeton GEO 370 - Sedimentology</b>   | Spring 2018          |
| • TA. Organised trip to Shark Bay, Australia. Assisted problem sets.   |                      |
| • <b>Princeton GEO 373 - Structural Geology</b>  | 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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<b>Geodynamics Seminar Organiser</b>	2024-
• One of three organisers of Lamont-Doherty's interdisciplinary Geodynamics Seminar	
<b>Reviewer</b>	2024-
• EPSL; PNAS; JGR	
<b>COG3 Seminar Organiser</b>	2022-2023
• One of two organisers of MIT's seminar in Chemical Oceanography, Geology, Geochemistry, and Geobiology	
<b>President - EAPS Student Advisory Committee (ESAC)</b>	2020-2021
• Liaise with students and leadership to build meaningful community through events and dialogue	
<b>Mentor - Fulbright Sutton Trust US Programme Mentor</b>	2019-2024
• Mentored two first-generation British students each year through US university and financial aid apps	
<b>Assistant Coach - MIT Men's Ultimate</b>	2019-2024
• Lead practices, logistics, and strategy over short-term (tournaments) and long-term (seasons)	
<b>Mathey College RCA of the Year</b>	2017-2018
• Acknowledged for my work building community within the residential college system	
<b>President - Princeton Undergraduate Geologic Society (PUGS)</b>	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
- **North Cascades, Washington** 2 weeks, August 2025