



ETHAN LOPES

*Dated February 13, 2025

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397 Panama Mall Mitchell Building • 3rd Floor Stanford University • Stanford, CA 94305-2215

EDUCATION

Stanford University

Ph.D. Student in Geophysics

Thesis Advisor: Sonia Tikoo

Stanford, CA

September 2021 – Present

Williams College

B.A. in Astrophysics and Geosciences with honors

Williamstown, MA

September 2016 – June 2020

University of Edinburgh

IFSA Butler Program, no degree awarded

Edinburgh, U.K

January 2019 – May 2019

THESIS

“Serpentinization in the Lab and Nature: Implications for Seafloor and Martian Magnetism”

Ph.D. Candidate

September 2021 – Exp. June 2026

My thesis examines how fluid-rock interactions change the rock magnetic properties of mantle-derived rocks. I tackle this topic using a two-pronged approach, combining laboratory experiments that simulate hydrothermal conditions with the study of naturally altered rocks from the Atlantic Ocean. A key focus of my research is exploring how these processes serve as planetary analogs, providing insights into the origins of magnetic anomalies observed on Mars.

PROFESSIONAL EXPERIENCE

Stanford Teaching Assistant

GEOPHYS 259 – Properties of Rocks and Geomaterials

Stanford, CA

April 2024 - June 2024

- Developed lecture materials on how the properties of rocks and geomaterials relate to chemo-mechanical processes in crustal settings, reservoirs, and industrial settings
- Taught and supervised the hands-on laboratory portion of the course for the 7 enrolled students

International Ocean Discovery Program

Expedition 399 Paleomagnetist

Atlantis Massif, Atlantic Ocean

April 2023 – June 2023

- Conducted paleomagnetism analyses onboard the Joides Resolution for rocks collected at the Mid-Atlantic Ridge
- Collected remanence measurements and performed supplementary rock magnetism analyses
- Principal editor for the paleomagnetism section of the expedition’s proceedings chapter

Stanford Rock Physics Research

Research Project supervised by Drs. Sonia Tikoo & Tiziana Vanorio

Stanford, CA

September 2021 – Present

- Studied the permeabilities of shocked and hydrothermally altered rocks from Chicxulub Crater using samples collected from International Ocean Discovery Program Expedition 364
- Analysis of effective porosity and permeability determined using a Frank Jones Inc. porosimeter, a CoreTest AP-608, and LabView acquisition software

NASA Goddard Space Flight Center Planetary Internship

GEM Fellowship supervised by Dr. Terry Hurford

Greenbelt, MD

June 2021 – August 2021

- Improved upon a dynamic model for predicting planetary seismicity
- Constrained the model by bootstrapping existing Apollo data
- Explored the implications of these results for future Europa seismic missions

Lawrence Berkeley National Laboratory Geophysics Internship

BLUR Fellowship supervised by Dr. Michael Commer

Berkeley, CA

August 2020 – December 2020

- Developed a machine learning algorithm using Python-based SIMPeg and PyTorch coding packages for simulated crosswell electromagnetic imaging data in order to improve carbon capture and storage techniques
- Used algorithm to apply a complex factor to correct for steel-casing-induced numerical errors

Yale University Seismology Internship

Summer Science Research supervised by Professor Maureen Long

New Haven, CT

June 2019 – July 2019

- Completed necessary field work and initial shear wave splitting measurements as part of yearlong thesis
- First author in paper summarizing results, which contain MatLab-generated stereoplots and fast wave plots
- Installed seismometers for an upcoming seismic array in central New England

Colgate University Astrogeology Internship

Hamilton, NY

KNAC REU Fellowship supervised by Jonathan Levine

June 2018 – July 2018

- Worked on saturation correction and standard normalization for a portable mass spectrometer
- Research focused on perfecting an autonomous instrument to date planetary samples in-situ on Mars
- Presented research and submitted paper at KNAC Research Symposium held at Middlebury College

Nevada Terawatt Facility Physics Internship

Stead, NV

Summer research assistant supervised by Aaron Covington

July 2017 - August 2017

- Calibrated visible spectrometers by taking data from HeNe laser and Broad-Spectrum Lamp-Low
- Resolution sources and fitting them to known carbon species transitions

Williams College Teaching Assistant

Williamstown, MA

Various positions in the Astronomy and Geosciences Departments

September 2017 - May 2020

- *Observatory (5x)*: Instructed Intro. to Astro. students how to recognize constellations and operate telescopes, including 24-inch Cassegrain with color CCD camera, 4-inch Stellarvue, and 6-inch Meade refractor
- *Geos 102 (2x), 201, 203*: Lead lab sessions and helped teach students about introductory geology, geomorphology, and structural geology

TEACHING EXPERIENCE

Sustainability, Engineering, and Science Undergraduate Research Mentor

Stanford, CA

Advisee: Olivia Ju '27

April 2024 - October 2024

- Taught an undergraduate researcher how to conduct microscopy, rock magnetic, and paleomagnetic experiments
- Scientific work spanned 10 weeks and focused on characterizing the magnetic carriers of my Atlantis Massif samples
- Mentee presented research results at a fall scientific symposium

Stanford Teaching Assistant

Stanford, CA

GEOPHYS 259 – Properties of Rocks and Geomaterials

April 2024 - June 2024

- Developed lecture materials on how the properties of rocks and geomaterials relate to chemo-mechanical processes in crustal settings, reservoirs, and industrial settings
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RELATED COURSEWORK

Stanford University

Stanford, CA

Natural Sciences

September 2021- Present

- *Geophysics*: Paleomagnetism, Experimental Rock Physics, Modelling Earth, Formation and Dynamics of Planets
- *Mathematics*: Introduction to Scientific Computing

Williams College

Williamstown, MA

Natural Sciences

September 2016- June 2020

- *Astrophysics*: Introduction to Astrophysics; Interstellar Medium; Mechanics & Waves: Modern Physics; Electricity & Magnetism; Math Methods for Scientists; Quantum Physics; Heliophysics
- *Geosciences*: Unfinished Planet; Geomorphology; Mineralogy; Climate Science and Politics; Structural Geology; Igneous & Metamorphic Petrology; Global Tectonics, Thesis
- *Mathematics*: Multivariable Calculus, Linear Algebra, Statistics & Data Science

University of Edinburgh

Edinburgh, U.K

Natural Sciences

January 2019- June 2019

- *Astrophysics*: Introductory Fields and Waves; High Energy Astrophysics
- *Chemistry*: Thermodynamics

PUBLICATIONS

Lopes, E., Tikoo, S., Ju, O., Mells, J., Hatfield, R., Vanorio, T. and Expedition 399 Scientists, 2025. Serpentinization and magnetic properties of the lower oceanic lithosphere: Insights from the Atlantis Massif. *JGR Planets*, in preparation.

- Lopes, E.,** Vanorio, T., Ding, J., Tikoo, S., 2025. Fibrous Mineral Arrangements and Fault Slip: Decoding Failure Modes. *Geophysical Research Letters*, in preparation
- Lang, S., Wheat, C., Dickerson, K., Reagan, M., Savov, I., Robare, J., Brazelton, W., Suhonen, J., Cavazos, O., McCaig, A., Blum, P., Abe, N., Coltat, R., Deans, J., Godard, M., John, B., Klein, F., Kuehn, R., Lin, K., Lissenberg, J., Liu, H., **Lopes, E.,** Nozaka, T., Parsons, A., Pathak, V., Rodgers, J., Seewald, J., Sims, K., Sylva, S. and Wang, F., 2025. Hydrogen and single carbon constituents in the oceanic ultramafic dominated lithosphere. *Geochimica*, submitted.
- McCall, N., Gulick, S., Tikoo, S., Bhandari, A., Hesse, M., Vanorio, T., Malenda, M., Chaffee, T., **Lopes, E.,** Rasmussen, C., Kring, D., Wittmann, A., Ketcham, R., Le Ber, E., Lofi, J. and Loggia, D., 2025. Comparative study of the porosity and permeability of Chicxulub peak ring rocks. *Icarus*, submitted.
- Lissenberg, J., McCaig, A., Lang, S., Blum, P., Abe, N., Brazelton, W., Coltat, R., Deans, J., Dickerson, K., Godard, M., John, B., Klein, F., Kuehn, R., Lin, K., Liu, H., **Lopes, E.,** Nozaka, T., Parsons, A., Pathak, V., Reagan, M., Robare, J., Savov, I., Schwarzenbach, E., Sissmann, G., Southam, G., Wang, F., Wheat, G., Anderson, L., Treadwell, S., 2024. A long section of serpentinized depleted mantle peridotite. *Science*, 385(6709), pp.623-629.
- Lopes, E.,** Long, M.D., Karabinos, P. and Aragon, J.C., 2020. SKS splitting and upper mantle anisotropy beneath the southern New England Appalachians: Constraints from the dense SEISConn array. *Geochemistry, Geophysics, Geosystems*, 21(12), p.e2020GC009401.

PRESENTATIONS

- “Magnetic Characterization of Borehole Samples from IODP Expedition 399: Atlantis Massif, Mid-Atlantic Ridge”
Poster: AGU, Washington D.C., December 2024
- “Fibrous Mineral Arrangements and Fault Slip: Decoding Failure Modes”
Poster: Erasmus 39th General Assembly, Corfu, Greece, September 2024
- “What a 1.2 km Section of Serpentinized Oceanic Rocks from the Atlantis Massif (IODP Expedition 399) Can Tell Us About Martian Magnetic Anomalies”
Presentation: Integrating Ocean Drilling and NASA Science Workshop, Washington, D.C., April 2024
- “A Magnetic Glimpse into the World of Serpentinized Peridotites from IODP Expedition 399”
Poster: AGU, San Francisco, December 2023
- “Quantifying Modes of Failure for Varying Microstructure Assemblages”
Poster: AGU, San Francisco, December 2023
- “SKS Splitting Beneath SEISConn Array.”
Poster: Northeast GSA, Reston VA, March 2021
- “Mapping the Pine Island Glacier’s Internal Geometry.”
Departmental paper” University of Edinburgh Geophysics Department, Edinburgh, UK, May 2019
- “Statistical Correction for Isotopic Abundance Analysis.”
Symposium paper, Presentation, Poster: KNAC Symposium, Middlebury College, October 2018

ACADEMIC SERVICE

Mentorship

- EDGE – VPGE sponsored program dedicated to fostering a vibrant and supportive educational environment for underrepresented students. I assisted my mentee with her successful NSF GRFP fellowship application.
- Montoya Scholars Mentor - El Centro-sponsored program that pairs grad students with first year undergraduate students from Hispanic and Latinx backgrounds

Outreach

- Perteneceer – program designed to introduce K-12 students from underserved communities to careers in the environmental sciences and geosciences. This includes organizing lab visits and leading interactive experiments.
- SDSS Recruitment Ambassador – engage with prospective students interested in applying to an SDSS department
- SURGE PA coordinator – managed weekly workshops and panel discussions designed to foster academic and professional growth among scholars who champion inclusion

Inreach

- DEI Liaison – group of students and postdocs within SDSS that advocate and advance efforts in justice, equity, diversity, and inclusion.
- DEI Student Coordinator – work directly with the DEI office in promoting and putting on school-wide programs and events. This includes creating professional advertisements for the Dean’s Sustainability Leaders Postdoc program.

AWARDS

- NSF Graduate Research Fellowship Program (GRFP) Fellow • International Ocean Discovery Program (IODP) Expedition 399 Researcher • IODP Post-Expedition Award • Institute for Rock Magnetism (IRM) Visiting Fellow • Graduate Education for Minorities (GEM) Full Fellow • Stanford Enhancing Diversity Graduate Education (EDGE) Fellow • Fulbright Semifinalist • Keck Northeast Astronomy Consortium (KNAC) Fellow • Sigma Xi Associate Member

ADDITIONAL INFORMATION

Languages: Fluent in written and spoken Spanish, Basic proficiency in German

Programs: MatLab, Python, Mathematica, R, Schlumberger Petrel, ArcGIS, IRAF

Other: Helped set up the Stanford paleomagnetism laboratory