



Emily H. Cunningham

Ph.D. Candidate

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Education

Ph.D. Candidate in Geology, University of Utah, January 2021 – Present

Focus: Using geochemical and numerical modeling to better understand mantle processes controlling continental rifting (Advisor: Sarah Lambart, Ph.D.)

Master of Science in Geology, University of Missouri – 2020

Bachelor of Science in Geology, Middle Tennessee State University – 2018

Publications

Cunningham E.H., Hartley, A.H., Lambart, S., Guo, P., Chatterjee, S., Tegner, C., Planke, S., Berndt, C., Alvarez Zarikian, C., and the IODP Expedition 396 Scientists, in review, Evolution of the Source Mineralogy and Lithospheric Controls on Magmatism During the Northeast Atlantic Continental Breakup. *Submitted to G-Cubed (submission: July 2025)*

Cunningham, E.H., Lambart, S., and Brown, E.L., in prep, BaSIC: A Markov Chain Monte Carlo Melting Model to Trace Mantle Mineralogical Heterogeneity. *In prep for submission in Volcanica*

Filina, I.Y., Loreto, M.F., Shuck, B.D., Abe, N., Pezard, P.A., Malinverno, A., Zitellini, N., Estes, E.R., Akizawa, N., Bickert, M., **Cunningham, E.H.**, Di Stefano, A., Fu, Q., Gontharet, S.B.L., Kearns, L.E., Koorapati, R.K., Lei, C., Magri, L., Menapace, W., Morishita, T., Pandey, A., Pavlovics, V.L., Poulaki, E.M., Rodriguez-Pilco, M.A., Sanfilippo, A., Vannucchi, P., Zhao, X., in review, Physical properties of rocks recovered during Exp. 402 – Trends, averages and observed heterogeneities. *Submitted to G-Cubed (submission: July 2025)*

Poulaki, E.M., Bickert, M., Vannucchi, P., Shuck, B.D., Akizawa, N., Pandey, A., Morishita, T., Sanfilippo, A., **Cunningham, E.H.**, Barnes, J.D., Garber, J.M., Nistor, C., Bernard, R., Tribuzio, R., Loocke, M., Abe, N., Di Stefano, A., Filina, I.Y., Fu, Q., Gontharet, S.B.L., Kearns, L.E., Koorapati, R.K., Lei, C., Loreto, M.F., Magri, L., Menapace, W., Pavlovics, V.L., Pezard, P.A., Rodriguez-Pilco, M.A., Zhao, X., Ranero, C.R., Garrido, C.J., Pérez-Gussinyé, M., Estes, E.R., Malinverno, A., and Zitellini, N., in review, Granitic intrusions facilitate rapid mantle exhumation along an oceanic detachment fault. *Submitted to Science Advances (submission: August 2025)*

Zitellini, N., Malinverno, A., Estes, E.R., and the **Expedition 402 Scientists**, 2025, Tyrrhenian Continent-Ocean Transition: Proceedings of the International Ocean Discovery Program, 402, doi: 10.14379/iodp.proc.402.2025

- Sanfilippo, A., Pandey, A., Akizawa, N., Poulaki, E., **Cunningham, E.H.**, Bickert, M., Lei, C., Vannucchi, P., Estes, E., Malinverno, A., Abe, A., Di Stefano, A., Filina, I., Fu, Q., Gontharet, S., Kearns, L., Koorapati, R., Loreto, M., Magri, L., Menapace, W., Pavlovics, V., Pezard, P., Rodriguez-Pilco, M., Shuck, B., Zhao, X., Garrido, C., Brunelli, D., Morishita, T., and Zitellini, N., 2025, Heterogeneous Earth's mantle drilled at an embryonic ocean: Nature Communications, v. 16, doi: 10.1038/s41467-025-57121-0
- Morris, A.M., Lambart, S., Stearns, M.A., Bowman, J.R., Jones, M.T., Mohn, G.T.F., Andrews, G., Tegner, C., Chatterjee, S., Frieling, J., Guo, P., Jolley, D.W., **Cunningham, E.H.**, Berndt, C., Planke, S., Alvarez Zarikian, C.A., Betlem, P., Brinkhuis, H., Christopoulou, M., Ferré, E., Filina, I.Y., Harper, D., Longman, J., Scherer, R.P., Varela, N., Xu, W., Yager, S.L., Agarwal, A., Clementi, V.J., 2024, Evidence for Low-Pressure Crustal Anatexis During the Northeast Atlantic Break-Up: Geochemistry, Geophysics, Geosystems, v. 25, p. 1–31, doi:10.1029/2023GC011413.
- Cunningham, E.H.**, 2020, The Role of Volatile Elements in Megaspherulite Formation: A Field and Experimental Investigation, Master's Thesis, University of Missouri – Columbia
- Cunningham, E.H.**, 2018, Petrographic and Geochemical Investigation of Magmatic Processes at Olallie, Pinhead, and Clear Lake Buttes, Northern Oregon Cascade Range, Undergraduate Thesis, Middle Tennessee State University

Select Research Presentations **denotes presenting author*

- ***Cunningham, E.H.** and Lambart, S., BaSIC: a Markov chain Monte Carlo melting model for characterizing basalt source region mineralogy, AGU Chapman Conference (Caldera Forming Eruptions at Basaltic Volcanoes), Hilo, Hawai'i, Feb. **2025**.
- *Filina, I., Loreto, F., Shuck, B., Abe, N., Pezard, P.H., Zitellini, N., Malinverno, A., Estes, E.R., Akizawa, N., Bickert, M., **Cunningham, E.H.**, Di Stefano, A., Fu, Q., Gontharet, S., Kearns, L., Koorapati, R.K., Lei, C., Magri, L., Menapace, W., Morishita, T., Pandey, A., Poulaki, E.M., Pavlovics, V., Rodriguez-Pilco, M.A., Sanfilippo, A., Vannucchi, P., Xiangyu, Z., Summary of Physical Properties of Rocks Collected During the IODP Expedition 402 in the Back-Arc Tyrrhenian Basin, American Geophysical Union annual meeting, Washington D.C. Dec. **2024**.
- ***Cunningham, E.H.**, Hartley, A.H., Lambart, S., A tale of two margins: Using geochemistry and petrology to study tectonics, Middle Tennessee State University Colloquium. Oct. **2024**. **Invited talk**.
- Cunningham, E.H.**, Hartley, A.H., *Lambart, S., Guo, P., and the IODP Expedition 396 Scientists, Source mineralogy during continental rifting, 7th Orogenic Lherzolite Conference, Oviedo, Spain. Sept. **2024**.
- *Hartley, A., **Cunningham, E.H.**, and Lambart, S., 2024, MELT-PX 2.0: Effect of the Melting Regime on the Magmatic Productivity of a Heterogeneous Mantle, GSA Connects 2024, Anaheim, California. Sept. **2024**.
- ***Cunningham, E.H.**, Hartley, A.H., Lambart, S., Guo, P., Chatterjee, S., Tegner, C., Planke, S., Berndt, C., Alvarez Zarikian, C., and the IODP Expedition 396 Scientists, Mantle source conditions and their control on magmatic productivity during the Northeast Atlantic

breakup, American Geophysical Union annual meeting, San Francisco, California. Dec. **2023.**

- ***Cunningham, E.H.**, Hartley, A.H., Lambart, S., Guo, P., Chatterjee, S., Tegner, C., Planke, S., Berndt, C., Alvarez Zarikian, C., and the IODP Expedition 396 Scientists, The Northeast Atlantic breakup: Why so much magma?, US Advisory Committee for Scientific Ocean Drilling Summer Meeting, New York City. July **2023. Invited talk.**
- ***Cunningham, E.H.**, Lambart, S., Guo, P., Chatterjee, S., Tegner, C., Planke, S., Berndt, C., Alvarez Zarikian, C., and the IODP Expedition 396 Scientists, The Northeast Atlantic Breakup (IODP Exp. 396): A case study for modeling the evolution of mantle source mineralogy during continental rifting, Goldschmidt Conference, Lyon, France. July **2023.**
- *Hartley, A., **Cunningham, E.H.**, and Lambart, S., New Constraints on the Melting Conditions During the Northeast Atlantic Breakup: Preliminary Results from IODP Expedition 396, Goldschmidt Geochemical Conference, Lyon, France. July **2023.**
- *Hartley, A., **Cunningham, E.H.**, and Lambart, S., The Cause of Excess Magmatism in the Northern Atlantic Margin, Utah Conference for Undergraduate Research, Salt Lake City, Utah. May **2023.**
- *Mendoza, K.A., Armstrong, A., Bagge, S., BAI, H., Humphrey, E., Kiessner, C., **Cunningham, E.H.**, Holt, M.M., Lerback, J., St. Pierre, G., Student Resiliency and Advancement of DEI Objectives Through Leadership Change and Pandemic Uncertainties: Perspectives from Inclusive Earth, American Geophysical Union annual meeting, Chicago, Illinois. Dec. **2022.**
- *Hartley, A., **Cunningham, E.H.**, and Lambart, S., Geothermometry of Magmas Produced During Opening of the Northern Atlantic, ACCESS Undergraduate Research Symposium, Salt Lake City, Utah. April **2022.**
- ***Cunningham, E.H.** and Lambart, S., Using First Row Transition Elements to Understand and Trace Mantle Heterogeneity, Italian Mineralogical Society MEREMA School, Sestri Levante, Italy. Oct. **2021.**
- ***Cunningham, E.H.**, Megaspherulite Occurrence in Rhyolite Obsidian: The Result of an Extensively Hydrated Melt?, University of Missouri Geology Graduate Society Student Research Forum, Columbia, Missouri. Jan. **2020.**
- ***Cunningham, E.H.** and Whittington, A., The Role of Volatile Elements in Megaspherulite Formation: Essential to the Recipe or Icing on the Cake?, American Geophysical Union annual meeting, San Francisco, California. Dec. **2019.**
- ***Cunningham, E.H.** and Cribb, W., Crystallization Dynamics and Magma Mixing Beneath Small Quaternary Volcanic Centers, Northern Oregon Cascade Range, MTSU College of Basic and Applied Sciences Scholar's Day, Murfreesboro, Tennessee. April **2018.**
- ***Cunningham, E.H.**, Corey, A., Smith, T., and Cribb, W., Petrographic and Geochemical Investigation of Magmatic Processes at Olallie, Pinhead, and Clear Lake Buttes, Northern Oregon Cascade Range, American Geophysical Union annual meeting, New Orleans, Louisiana. Dec. **2017.**

Grants

- 2025 – NSF Travel Grant to attend AGU Chapman Conference on Caldera Forming Eruptions in Hilo, Hawai'i, \$1,975
- 2024 – IODP Post Expedition Activity Award (**Science PI**; PI: S. Lambart, USSSP, 12/01/2024-11/30/2025, \$20k)
- 2024 – Lipman Student Research Grant, Geological Society of America, \$2,500
- 2024 – Dave and Inga Chapman Grant awarded to travel for IODP Expedition 396 Post-Cruise Meeting, Akureyri, Iceland, \$2,000
- 2024 – Participation in IODP Expedition 402: “Tyrrhenian Continent-Ocean Transition” (**Science PI**; PI: Sarah Lambart, JRSO/IODP/USSUP, 02/01/2024 – 01/01/2025, 22k)
- 2021 – Dave and Inga Chapman Grant awarded to travel for MEREMA School to Sestri Levante, Italy, \$1,726
- 2019 – Megaspherulites: Field and Experimental Investigation of Extensively Hydrated Rhyolite Obsidian and Resulting Crystal Formation, University of Missouri Graduate Student Research Fund, \$2,183
- 2017 – Petrographic and Geochemical Investigation of Magmatic Processes at Olallie, Pinhead, and Clear Lake Buttes, Northern Oregon Cascade Range, Middle Tennessee State University Undergraduate Research and Creative Activity (URECA) Scholar Award, \$3,000

Honors & Awards

- 2nd Place Poster Presentation – Department of Geology and Geophysics Annual Poster Session – Spring 2025
- University Graduate Research Fellowship – University of Utah – 2024 – 2025 Academic Year
- 2nd Place Poster Presentation – Department of Geology and Geophysics Annual Poster Session – Spring 2024
- Williamson Fellowship – University of Utah, Department of Geology and Geophysics – Fall 2023
- Schlanger Ocean Drilling Fellowship – US Science Support Program – 2022 – 2023 Academic Year
- Outstanding Teaching Assistant Award – University of Utah College of Mines and Earth Sciences – 2021 – 2022 Academic Year
- Outstanding Teaching Assistant Award – University of Utah Department of Geology and Geophysics – 2021 – 2022 Academic Year
- Stokes-Eardly Fellowship – University of Utah Department of Geology and Geophysics – Spring 2021
- Estwing Rock Hammer Award – MTSU Department of Geosciences – Spring 2018
- Outstanding Geology Student Award – MTSU College of Basic and Applied Sciences – Spring 2018
- Burt Bordine Scholarship – MTSU Department of Geosciences – Spring 2017

Teaching Experience

- Williamson Fellow, Salt Lake Center for Science Education, Fall 2023
- Lecturer (half semester) and Graduate Teaching Assistant, **Mineralogy**, Fall 2021
- Graduate Teaching Assistant, **Environmental Geology**, Fall 2018, Spring 2020
- Graduate Teaching Assistant, **Mineralogy**, Fall 2019
- Graduate Teaching Assistant, **Principles of Geology**, Spring 2019
- Supplemental Instruction Leader, **Precalculus**, Fall 2017
- Tutor, **Introductory Geology**, Spring 2016-Fall 2017

Professional Development

- Goldschmidt Non-Academic Careers workshop – July 2023
- Goldschmidt Hidden Histories workshop – July 2023
- Goldschmidt Writing Scientific Papers workshop – July 2023
- University of Utah Annual Teaching Symposium – August 2021
- Goldschmidt HDIP Software virtual workshop – July 2021
- Goldschmidt Magma Chamber Simulator virtual workshop – July 2021
- Rift2Ridge NSF workshop, virtual – June 2021
- Undergraduate Research Mentor Development Program graduate, University of Utah – Spring 2021
- Unlearning Racism in Geosciences (URGE) Participant – Spring 2021
- Geochemical Society alphaMELTS2.0 virtual workshop – November 2020

Service & Outreach

- Invited to record on Tales from the Deep: Stories of Scientific Ocean Drilling – Spring 2025
- Research Co-Supervisor of Autumn Hartley through University of Utah ACCESS Program and Undergraduate Research Opportunity Program – November 2021 – May 2025
- Speaker, Grad Student Prep Forum, University of Utah College of Mines and Earth Sciences – Spring 2021
- President, SGE National Geological Honors Society, Eta Sigma Chapter – Fall 2016 – May 2018
- Secretary & Treasurer, SGE National Geological Honors Society, Eta Sigma Chapter – Spring 2016 – Fall 2016

Relevant Analytical Proficiencies

- Electron Probe Microanalysis
- Scanning Electron Microscopy
- Laser Ablation Inductively Coupled Plasma Mass Spectrometry

Relevant Software Proficiencies

- Python
- MATLAB
- Adobe Suite
- Microsoft Office Suite