

Curriculum Vitae - Madeline J. Lewis

Division of Geological and Planetary Sciences
California Institute of Technology, Pasadena, CA 91125
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EDUCATION**Ph.D. Candidate, California Institute of Technology** (2017-pres., graduation May 2021)

Ph.D. in Geochemistry (in progress)

Areas of study: Igneous Petrology, Volcanology, Geochemistry

Principal Advisors: P.D. Asimow and C.E. Bucholz

Committee: G.R. Rossman (academic advisor), E.M. Stolper, W.W. Fischer

M.S. in Geology, California Institute of Technology (June 2017)

Advisors: P.D. Asimow and C.E. Bucholz

B.S. in Geological Sciences, Indiana University- Bloomington (May 2015)

Magna cum laude, Hutton Honors College

Undergraduate Honors Thesis: Petrology of Ngorongoro Volcanic Highlands, Tanzania

Advisor: J.G. Brophy

Minor: Studio Art, painting and sculpture focus

PROFESSIONAL EXPERIENCE**Graduate Research Assistant in Geology and Geochemistry** (Sept 2015- present)

California Institute of Technology, CA

Graduate ICPMS Lab Technician (Jan 2020- present)

Environmental Analysis Center, California Institute of Technology

Intern: National Association of Geoscience Teachers (May 2015-Sept 2015)

US Geological Survey, Menlo Park, CA

Supervisor: S. Kirby

Science, Research, and Technology Scholars Researcher (Aug 2012- May 2015)

Indiana University- Bloomington, IN

Advisor: J. Brophy

TEACHING EXPERIENCE**Associate Instructor- Indiana University** (Summer 2020)

X428 and X498c, Field Geology in the Rocky Mountains (virtual)

Teaching Assistant- Caltech (Spring 2020)

Ge120a, Introduction to Field Geology (virtual)

Teaching Assistant- Caltech (Summer 2019)

Ge120b, Field Camp

Teaching Assistant- Caltech (Fall 2018)

Ge114, Mineralogy

Teaching Assistant- Caltech (Fall, Winter, and Spring 2016-2017)
Ge136a,b,c, Regional Geology of the Southwestern United States

Geochemistry Tutor (Fall 2014)
Indiana University Department of Geological Sciences

FELLOWSHIPS AND AWARDS

Ian Campbell Award for outstanding performance in field geology courses, Caltech (2017)
National Science Foundation Graduate Research Fellowship Honorable Mention (2016)
California Institute of Technology Graduate Research Fellowship (2015-2016)
Magna Cum Laude, Indiana University (2015)
Phi Beta Kappa, Indiana University (2015)
Faculty Scholarship, Indiana University Department of Geological Sciences (2015)
ConocoPhillips Brunton Compass Award: Top Student at Indiana University Field Camp (2014)
Judson Mead Geologic Field Station Anadarko Scholarship (2014)
Indiana University Alumni Council Undergraduate Geology Scholarship (2014-2015)
Mineralogical Society of America Undergraduate Prize (2014)
Professional Development Award, Indiana University Department of Geological Sciences (2014)
N. Gary Lane Beginning Geologist Award, Indiana University (2013)
William L. Frye Scholarship, San Fernando, CA Elks Lodge #1539 (2012-2016)
Hutton Honors College Member at Indiana University (2012-2015)
Richard and Virginia Stoner Scholarship (2012-2015)
Indiana University Distinction Scholarship (2012-2015)
William L. Frye Scholarship San Fernando, CA Elks Lodge #1539 (2012-2016)

GRANT FUNDING

GSA: Awards for Geochronology Student Research 2

Project: Timing of Mafic Intrusions Relative to Granitic Pluton Emplacement in the Sierra Nevada Batholith
Awarded: \$8,987 (2019-2020)

GSA Student Travel Grant

Awarded: \$150 (2018)

NASA Indiana Space Grants Consortium: Undergraduate Research Grant

Project: Petrology of Ngorongoro Volcanic Highlands, Tanzania
Awarded: \$1,500 (2014-2015)

PUBLICATIONS

Lewis, M.J. & Bucholz, C.E., (*in review for Contributions to Mineralogy and Petrology*). "Upper crustal mafic magmatism and evidence for polybaric crystallization in a continental arc: Hidden Lakes Mafic Complex, Sierra Nevada Batholith, California."

Lewis, M.J., McCart, S., Asimow, P.D., & Lund, D.C., (*in prep for Geochemistry, Geophysics, Geosystems*). "Multi-sill fractionation beneath the East Pacific Rise and Strombolian eruptions recorded by submarine sediment cores."

Lewis, M.J., Bucholz, C.E., & Ryan-Davis, J.R., (*in prep for Geology*). “Arc tempos driven by mantle input: A zircon geochronology study of upper crustal mafic intrusions.”

Lewis, M.J., Dalleska, N.F., & Asimow, P.D., (*in prep for Chemical Geology*). “A solution ICP-MS protocol for high precision bulk-rock trace element analysis in Li-borate glasses.”

Lewis, M.J., Asimow, P.D., Maurice, A., Fischer, W.W., (*in prep for Precambrian Research*). “Primary hosting of REEs in apatite the Wadi Karim BIF: Implications for REE chemistry in BIFs.”

Lund, D.C., Seeley, E.I., Asimow, P.D., **Lewis, M.J.**, McCart, S., & Mudahy, A. (2018) “Anomalous Pacific-Antarctic Ridge volcanism precedes glacial Termination 2.” *Geochemistry, Geophysics, Geosystems*. 19.8 (2018): 2478-2491.

MEETING ABSTRACTS

(*indicates oral presentation)

***Lewis, M. J.**, Asimow, P. D., Lund, D. C., & McCart S. (2020). Multiple sills tapped by a series of explosive eruptions from the East Pacific Rise. *AGU Fall Meeting, 2020*, V004-06.

Lewis, M. J., Bucholz, C. E., & Ryan-Davis, J.R. (2020). Geochronology and Petrology of Upper Crustal Mafic Plutons Support a Mantle Connection to Arc Magmatic Productivity: Eastern Sierra Nevada Batholith, CA. *GSA Annual Meeting - 2020*.

Lewis, M. J. & Bucholz, C. E. (2019). Mafic Intrusions in the Sierra Nevada Batholith: Evidence for Polybaric Crystallization in a Continental Arc. *GranitesII Summer School on Magmatic Differentiation*. Roscoff, France.

***Lewis, M. J.**, Bucholz, C. E., & Jagoutz, O. E. (2018). Polybaric crystallization of hydrous basalts in a continental arc: evidence from Hidden Lakes mafic complex, Sierra Nevada batholith, California. *AGU Fall Meeting, 2018*, V34C-08.

Lewis, M. J., Asimow, P. D., Maurice, A. E., & Fischer, W. W. (2018). REE budget in a Neoproterozoic iron formation dominated by accessory apatite: Wadi Karim BIF, Eastern Desert, Egypt. In *GSA Annual Meeting in Indianapolis, Indiana, USA-2018*. GSA.

***Lewis, M. J.**, Bucholz, C. E., Jagoutz, O. E., & Eddy, M. P. (2017). Petrology and Geochemistry of an Upper Crustal Mafic Complex-Hidden Lakes, Sierra Nevada Batholith, California. *AGU Fall Meeting, 2017*, V24D-02.

Asimow, P. D., **Lewis, M. J.**, Lund, D. C., Seeley, E., McCart, S., & Mudahy, A. (2017). Glacial modulation of mid-ocean ridge magmatism and anomalous Pacific Antarctic Ridge volcanism during Termination II. *AGU Fall Meeting, 2017*, PP13E-03.

***Lewis, M. J.**, Asimow, P. D., & Lund, D. C. (2017). Petrology of Explosive Eruptions from the Pacific-Antarctic Ridge and Ties to Sea Level Variation, *IAVCEI Scientific Assembly, 2017*.

Lewis, M. J., Asimow, P. D., & Lund, D. C. (2017). Petrologic Controls on Explosive Eruptions from the Pacific-Antarctic Ridge. *AGU Chapman Conference on Submarine Volcanism, 2017*.

Lewis, M. J., Asimow, P. D., & Lund, D. C. (2016). Controls on Explosive Eruptions along the Pacific-Antarctic Ridge. *AGU Fall Meeting, 2016*, OS31D-2055.

***Lewis, M. J.**, & Kirby, S.H. (2015). Regional Sampling of Mantle Peridotites in Serpentinite Blocks Collected from Serpentinite Bodies in the San Francisco Bay Area, California: Petrological Trends. *AGU Fall Meeting, 2015*, T13H-05.

INVITED PRESENTATIONS

University of Southern California- Lithospheric Dynamics Seminar (2019)

Title: Upper Crustal Mafic Intrusions in the Sierra Nevada Batholith: Evidence for Polybaric Crystallization in a Paleo-Continental Arc

OUTREACH, VOLUNTEER, AND SERVICE

Session Convener- GSA Cordilleran Section Meeting (originally 2020, postponed to 2021)

Session: Petrology, Geochemistry, and Structure of Cordilleran Batholiths through Space and Time

Participant in Certificate of Practice in University Teaching program (2019-present)

Through Center for Teaching, Learning and Outreach at Caltech

Equity and Title IX Advocacy Certification (2019- present)

Trained and serve as a confidential resource for Title IX concerns, prevention, and intervention.

Reviewer- Journal of African Earth Sciences (2019)

Presenter & Volunteer- Skype a Scientist (2018-present)

Chair- Caltech Arts Committee (2017-2019)

Advocate for the arts on campus, organize art and science outreach events

Graduate Student Representative- Institute Arts Committee (2018-present)

Select and approve art installations at Caltech

Volunteer- Science Olympiad (2017-2019)

Roles: proctor and grader at State tournament

Officer- Caltech Alpine Club (2018-2019)

Safety officer and hike organizer

Volunteer- Pacific Crest Trail Association (2018-2019)

Trail repair team member

Volunteer- Arroyos and Foothills Conservancy (2016)

Geologic mapping to secure land for wildlife corridor

PROFESSIONAL MEMBERSHIPS

American Geophysical Union (2015- present)

Geological Society of America (2016- present)

WORKSHOPS AND TRAINING

GSA Short Course (2020, virtual)

Topic: Petrochronologic Applications of U-Pb Geochronology and Lu-Hf and Trace/REE Geochemistry by LA-ICPMS (Organizers: G. Gehrels, K. Sundell, S. George)

Goals: Gain experience with petrochronologic analysis methods, data reduction, statistical tools, and data interpretation.

GSA Field Short Course (2019, Mammoth Lakes, CA)

Topic: Pluton Construction Using StraboSpot Field Data System (Organizers: A. Glazner, B. Tickoff, J. Bartley, D. Coleman)

Goals: Introduction to, practice with, and suggestions for improvements to the StraboSpot program and associated geologic data repository.

Granites II Summer School (2019, Roscoff, France)

Topic: Magmatic Differentiation (Organizers: L. Arbaret, F. Gaillard, E. Hallot)

Goals: Explanation of magmatic differentiation mechanisms and the generation of granitic magmas across all tectonic settings. Summarizing current theories and determining directions for future research.

UCLA SIMS Workshop (2017, Los Angeles, CA)

Topic: Fundamentals of SIMS Analysis and Roles in Geology (Organizers: M. Harrison, E. Bell, H. Tang, K McKeegan)

Goals: Chemical explanation of the ion probe and introduction to sample preparation, data acquisition, and applications.

MELTS workshop (2015, Caltech)

Topic: Thermodynamic Modeling with alphaMELTS (Organizers: P Asimow, P. Antoshechkin)

Goals: Understanding the thermodynamics and experimental data that forms the basis of alphaMELTS, and practice with application of the software.

FIELD EXPERIENCE

Ph.D Fieldwork (2016, 2017, 2018, 2019)

Eastern Sierra Nevada, California – Igneous Petrology

Goals: Detailed mapping of igneous intrusions, sampling of mafic complexes and associated granitoids for geochemistry and geochronology.

Field Assistant (2018)

Isla Ángel de la Guarda, Baja California, Mexico – Structural Geology/ Igneous Petrology

Goals: Assisted Caltech grad. student L. Sabbeth (structural geologist) with interpretations of volcanic rocks, sampling, drone data collection, and mapping.

Field Assistant (2017,2018)

Northwestern Ontario, Canada – Igneous/ Metamorphic Petrology

Goals: Sampling of S-type granites and TTGs for geochronology and oxygen isotope analysis (PI: Prof. C. Bucholz), and metamorphic aureole sampling (Caltech grad. student J. Biasi)

USGS Internship Fieldwork (2015)

San Francisco Bay Area, California – Structural Geology/ Metamorphic Petrology

Goals: Sampling of >200 serpentinites and associated metamorphic rocks in the Franciscan mélange to assess their geologic history and emplacement mechanisms.

Field Camp, Student (2014)

Tobacco Root Mountains, Montana – Structural Geology/ Stratigraphy

Course: Field Geology in the Rocky Mountains, G429, Indiana University

Geologic mapping of sedimentary, igneous, and metamorphic rocks deformed by Sevier and Laramide tectonics. Received course top score.