

Emily C. First

Postdoctoral research associate

Department of Earth, Environmental and Planetary Sciences (DEEPS)
Brown University, Providence, RI 02912

Education

- 2017 PhD in Geology & Geophysics, University of Hawaii at Mānoa (UH)
2015 M.S. in Geology & Geophysics, UH
2011 B.A. in French, University of Georgia (UGA)
B.S. in Geology, UGA
— *summa cum laude* with highest honors
2010 Exchange semester at Institut d'études politiques de Paris

Research Interests

My research focuses on phase relationships in silicate melts, including the texture and chemical composition of laboratory-grown minerals, to constrain the magmatic and extrusive histories of volcanic materials. I have used dynamic crystallization experiments to determine the eruptive context of a martian meteorite, and phase equilibrium experiments to pinpoint pre-eruptive storage conditions at Quizapu, Chile. I am particularly intrigued by the kinetics of mineral re-equilibration and reaction, including Fe-Ti oxide exsolution, amphibole rim formation, and diffusive exchange in plagioclase. My current project involves static experiments on synthetic lunar samples, with the aim of investigating the origin of the silicic “red spots” and the effect of H₂O and pressure on silicate liquid immiscibility.

Honors and Awards

- 2016 ARCS Honolulu Scholar - Toby Lee award in Geology & Geophysics
2015 UH Geology & Geophysics achievement award
2013 ARCS Honolulu Scholar
2011-present Member of Phi Beta Kappa
2011-2013 Fred M. Bullard Graduate Fellowship, UH Geology & Geophysics
2011 UGA First Honor Graduate, a distinction for graduates with a 4.00 GPA
2011 UGA Honors Program Joy P. Williams Science Award
2011 Undergraduate Student of the Year, UGA Geology
2010 Vernon Hurst Undergraduate Research Award, UGA Geology
2009 Field School Student of the Year, UGA Geology
2007-2011 Honors Program student at UGA
2007-2011 HOPE scholarship, a state of Georgia merit-based scholarship
2007-2011 National Merit Scholarship

Laboratory and Analytical Experience

- 2018-present Postdoctoral research associate, Brown University DEEPS, *M. Rutherford*
— experimental lab work: TZM, capsule welding, thin section prep
— analytical work: EDS and WDS spot analyses and imaging (EPMA)
- 2011-2018 Research Assistant, UH Geology & Geophysics, *J. Hammer*
— experimental lab work: 1-atm gas-mixing furnace (CO₂+H₂), water-medium cold-seal pressure line, thin section preparation, capsule welding
— analytical work: EDS and WDS spot analyses and maps (on SEM and EPMA), electron backscatter diffraction, MATLAB coding
- 2008-2009 Lab Assistant, UGA Geology, *J. Wright*
— processed samples in preparation for a detrital zircon project, using: jaw crusher, disk mill pulverizer, Gemini table

Field Experience

- 2016 Mapping a recent explosive deposit on the rim of Halema'uma'u Crater, Kilauea Volcano
- 2016 Field campaign in Maule region of Chile, to sample dacite lava flows of Volcán Quizapu, along with geology of nearby mafic volcanic centers
- 2014 Participant in Goldschmidt conference field trip in and around Yosemite National Park – pluton emplacement, recrystallization features, megacryst formation
- 2011-2014 Volcanology/petrology activities and classwork research in Hawaii – Ko'olau, Wai'anae, Kilauea, West Maui, Haleakala; and New Zealand – Ruapehu, Ngauruhoe, Tongariro, Taupo, White Island
- 2009 UGA Field School student participant
— Six-week field camp for geology majors, based in Cañon City, CO with trips to Utah and southern Colorado; four projects mapping Laramide structures in basement rocks and overlying sedimentary and metamorphic units; GIS short course; other field work in the Uinta and Paradise basins, Great Sand Dunes NP, Summitville Mine Superfund site, Valles caldera
- 2008 UGA Honors Interdisciplinary Field Program (IFP) student participant
— Summer program of coursework in geology, anthropology, and ecology while camping across the country; locations include Sapelo Island, Mesa Verde, Crater Lake, Mount St. Helens, Yellowstone, Grand Tetons, Denver ice core lab; activities include geologic mapping, soil coring, assessment of stream remediation, research papers

Teaching Experience

- 2017 Co-leader of GSA Cordilleran section post-meeting field trip to Kilauea Volcano (historical and active flows, explosive deposits, caldera history)
- 2015 Taught mini-workshop on using the MELTS and alphaMELTS programs, open to all in the UH Geology & Geophysics department
- 2011 Teaching Assistant, UH Geology & Geophysics, *supervisor Scott Rowland* — teaching and grading two sections of introductory geology lab; classroom experiments and problem solving, outdoor labs, field trips around Oahu and to Kilauea
- 2011 Teaching Assistant & Bookkeeper, UGA Field School, *head Doug Crowe*
- 2011, 2010 Teaching Assistant & Aide/Driver, UGA IFP, *head Dr. Paul Schroeder*

Peer-Reviewed Publications

* indicates undergraduate mentee of E. First

First, E., Hammer, J., Ruprecht, P. (2018) Experimental constraints on dacite magma storage beneath Volcán Quizapu, Chile. *Journal of Petrology*, in review.

First, E., Leonhardi, T.* , Hammer, J. (2018) Effects of superheating magnitude on olivine composition and growth morphology. *Contributions to Mineralogy and Petrology*, in review.

First, E., Hammer, J. (2016) Igneous cooling history of olivine-phyric shergottite Yamato 980459 constrained by dynamic crystallization experiments. *Meteoritics and Planetary Science*, 51, 1233-1255.

Brachfeld, S., Shah, D., **First, E.**, Hammer, J., Bowles, J. (2015) Influence of redox conditions on the intensity of Mars crustal magnetic anomalies. *Meteoritics and Planetary Science*, 50, 1703-1717.

Shea, T., Hammer, J., **First, E.** (2013) Magma balloons or bombs? *Nature Geoscience*, 6, 802–803.

Projects in Preparation for Publication

First, E., Hammer, J. Re-equilibration of Fe-Ti oxides: Textural and compositional effects of low fO_2 . *American Mineralogist*, in prep.

First, E., Hammer, J., Shea, T., Hellebrand, E., Tachera, D.* Magnesium diffusion in labradorite at hydrous magmatic conditions. *Contributions to Mineralogy and Petrology*, in prep.

Conference Abstracts

First, E., Hammer, J., Shea, T., Hellebrand, E., Tachera, D.* (2018) Magnesium diffusion in labradorite at hydrous magmatic conditions. *Goldschmidt 2018*, abstract#2018003038. TALK.

Hammer, J., **First, E.**, Shea, T., Leonhardi, T.*, Brachfeld, S. (2018) Nucleation: an existential problem in an extreme environment. *Goldschmidt 2018*, abstract. TALK.

Shea, T., Hammer, J., Hellebrand, E., Mourey, A., **First, E.**, Lynn, K., Costa, F. (2018) Phosphorous and aluminum partitioning during olivine growth: both sides of the story. *Goldschmidt 2018*, abstract. POSTER.

First, E., Hammer, J., Ruprecht, P. (2017) Experimental constraints on dacite magma storage beneath Volcán Quizapu, Chile. *IAVCEI Scientific Assembly 2017*, abstract #917. TALK.

Brachfeld, S., **First, E.**, Hammer, J., Stewart, S., Hankin, M., Spaulding, D., Bowles, J., Strauss, E., Withers, A., Feinberg, J. (2016) Magnetic properties of synthetic Gusev Crater basalts: Implications for remanence acquisition and impact demagnetization of the martian crust. *AGU 2016*, abstract #GP13A-04. TALK.

Leonhardi, T., Hammer, J., **First, E.** (2015) Effect of superheating on olivine nucleation and growth in a silica-undersaturated melt: An experimental study. *AGU 2015*, abstract #V41B-3071. POSTER.

First, E., Hammer, J. (2014) Extrusive history of martian meteorite Yamato 980459: An experimental study. *Goldschmidt 2014*, abstract #698. POSTER.

First, E., Hammer, J., Welsch, B. (2013) Thermal history of Yamato 980459- Constraints from mineralogy, crystal morphology, and dynamic cooling experiments. *LPSC XLIV*, abstract #2943. TALK.

First, E., Hammer, J. (2012) Laboratory studies of crystallization kinetics in magma-Elucidating the crystallization history of a martian meteorite. *10th International Symposium on Crystallization in Glasses and Liquids*. POSTER.

First, E., Summerlin, E.S., Patiño Douce, A., Roden, M.F. (2011) Mineral probes of magmatic processes at Valles caldera, northern New Mexico. *GSA Southeastern Section 60th Annual Meeting*, abstract #184984. POSTER.

Funding Awarded

2017	Lipman Research Award from the GSA (\$2650)
2017	GSA MGPV Student Award (\$2000)
2017	UH Graduate Student Organization Travel Grant (\$732.40)

Synergistic Activities

2017,-15, -13, -11	2-day Open House explosive eruptions demonstration
2012-2016	Ran a weekly reading group for VGP group of UH Geology & Geophysics
2016, 2012	Head of new graduate student welcoming committee
2014-2016	Reviewer of mini-grant proposals for K-12 teachers
2015	Attended MELTS workshop at CalTech
2014-2015	Traveling seismic lab activity at local middle schools
2014	Day of mineralogy experiments with local 6 th graders
2014	Think Tech Hawaii “Petrological Puzzles” interview hour
2014, 2013	Middle School Research Conference at UH
2013	Hawaii Ocean Science Bowl volunteer
2012	Ocean and Earth Science Day at UH
2012	Ocean Science Career Night at Kailua Intermediate School
2010-2011	Outreach Coordinator for Geology Club at UGA
2008-2009	Homework Helpers program volunteer, Clarke County (GA) Libraries
2007-2008	Clarke County (GA) Mentor Program mentor for middle school

Professional Society Memberships

2013-present	American Geophysical Union
2013-present	Geological Society of America
2013-present	Mineralogical Society of America
2017-present	IAVCEI

Additional Skills

MATLAB
R (basics)
Adobe Photoshop
Adobe Illustrator
ImageJ (basics)
MS Office suite (Word, Excel, PowerPoint)
French (proficient reading, writing, and oral communication)