JULIA EVE HAMMER

CURRICULUM VITAE – UHM Regents Version
2024-10-09

CONTACT Department of Earth Sciences (formerly Geology and Geophysics)
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BIOGRAPHICAL Position: Professor
Citizenship: United States of America

EDUCATION

UNIVERSITY OF OREGON
Eugene, OR — PhD, 1998; Advisor: Katharine V. Cashman
Dissertation topic: Magma crystallization, degassing, and vesiculation

DARTMOUTH COLLEGE
Hanover, NH — BA, 1993; Advisor: C. Page Chamberlain
Thesis topic: Formation of Himalayan leucogranite

LABORATORIES DIRECTED

Experimental Petrology Laboratory, University of Hawaii, POST732	2002-present
Electron Microprobe Laboratory, University of Hawaii, POST621	2020-2024

RESEARCH INTERESTS

Experimental, field, and theoretical investigations of the phase equilibria of tholeiitic and calc-alkaline magmas with application to volcanology and magmatic processes; crystal nucleation and growth; magmatic processes on the Moon and Mars; lava rheology.

EMPLOYMENT HISTORY

GRADUATE PROGRAM CHAIR	University of Hawaii, Honolulu, HI	2024
VISITING PROFESSOR	University of Clermont-Ferrand, France	2015
PROFESSOR	University of Hawaii, Honolulu, HI	2013-present
ASSOCIATE PROFESSOR	University of Hawaii, Honolulu, HI	2006-13
ASSISTANT PROFESSOR	University of Hawaii, Honolulu, HI	2002-06
SENIOR RESEARCH ASSOCIATE	Brown University, Providence, RI	2001-02
NSF POSTDOCTORAL FELLOW	Brown University, Providence, RI	1999-00

HONORS AND AWARDS

Fellow of the Geological Society of America	2018
University of Hawaii Regents' Medal for Excellence in Teaching	2015
White House invitee, NSF Career-Life Balance Initiative, Obama Admin.	2011
Presidential Early Career Award for Scientists and Engineers (PECASE), Bush Admin.	2006
National Science Foundation CAREER Award	2005

NATIONAL & INTERNATIONAL SERVICE (since 2019)

Editor, *Journal of Petrology*	2024
Advisory Board, *Journal of Petrology*	2023
Associate Editor, *Bulletin of Volcanology*	2022-2024
Guest Associate Editor, *Frontiers in Science*	2019-20
Mineralogical Society of America Lecture Program Committee	2017-20
NSF-EAR Petrology and Geochemistry Program Panel	2019

LOCAL SERVICE (selected since 2019)

SOEST Dean Search Advisory Committee	2022
Undergraduate Academic Advisor	2022-2024
Curriculum Committee, co-Chair of BA, BS redesign	2016-21

GRADUATE STUDENTS ADVISED (as primary or co-advisor)

Patrick Shamberger, MSc (2004); Owen Neill, MSc (2010), Lisa Tatsumi-Petrochilos, MSc (2010), Carrie Brugger, PhD (2011), Gabriele Lanzafame, PhD (2012 visitor), Emily First, PhD (2017), Rebecca deGraffenried, PhD (2021), William Nelson, PhD (2024), Kelly McCartney PhD (2024).

GRADUATE STUDENTS MENTORED (as dissertation or thesis committee member) since 2019

Xiaojing Lai (2019), Tommy Yong (2019), David Frank (2019), Adrien Mourey (2019), Sasithorn Chornkrathok (2020), Chao Keng-Hsien (2020), Camila Pineda (2021 visitor), Annie Chien (2024), Rose Gallo (in progress), Nabila Mohd-Nizam (in progress).

POSTDOCTORAL FELLOWS MENTORED

Julie Bowles (2006-07), Thomas Shea (2010-13), Hidemi Ishibashi (2011), Benoit Welsch (2011-14), William Nelson (2023-2024).

INSTRUCTIONAL PORTFOLIO (since 2020)

ERTH 101L Dynamic Earth Laboratory (S20, F20, S21, F21, S22)

In this online section of the course, students practice what they learn with hands-on activities. We develop and practice skills in reading topographic and geologic maps; identifying mineral, fossil, and rock samples; measuring stream flow and beach profiles; building geologic structures with analog materials. This course features field trips to Oahu and off-island localities.

ERTH301 Mineralogy (F20, F22, F23)

In this course, we tackle crystallography, crystal chemistry, phase equilibria, and crystal structures. Students learn and practice the principles of chemistry and optical microscopy as they develop skills in mineral identification in hand sample and thin section. Students are introduced to modern analytical methods of mineralogy and crystallography utilizing the electron microprobe and x-ray diffraction facilities within SOEST. Geologic context is emphasized, as the course culminates in a systematic examination of major rock-forming minerals.

ERTH 402 Hawaiian Geology (S20, F21, F24)

We examine the scientific methods (geophysical, geochemical, etc.) and geologic processes influencing the Hawaiian islands: plate tectonics, mantle melting, effusive and explosive eruptions, landsliding and other forms of mass wasting, groundwater flow, sea level change, earthquakes, and tsunami. The course features guest lectures from EARTH faculty on topics of their research specialization and numerous field trips.

ERTH602 Theoretical Petrology (S21, S23)

This course prepares students to understand and critically evaluate the theoretical basis for leading quantitative petrologic models involving phase equilibria. Topics covered include Gibbs free energy and its temperature, pressure, and composition derivatives; phase equilibria and liquid immiscibility; fugacity, activity, and chemical potential; ideal and nonideal solutions; volatile solubilities; kinetic theory; diffusion; and phase transformations.

PUBLICATIONS (*Italics* = student or postdoctoral fellow at time of writing); h-INDEX (ALL) 28; (SINCE 2019) 22. i10-INDEX (ALL) 42; (SINCE 2019) 34 CITATIONS (ALL) 3949; (SINCE 2019) 1892

[56] Nelson, W., Hammer, J., and Shea, T. (2024) Re-evaluating the diffusivity of phosphorus in olivine: Implications of low diffusive mobility for thermochronology. Geochimica et Cosmochimica Acta.

[55] *Halverson, B.A.*, Emerson, A., Hammer, J., Lira, J., and Whittington, A. (2024) Estimates of Crystallinity Utilizing Differential Scanning Calorimetry: Application to the K{\=\i}lauea 2018 Lower East Rift Zone Eruption. Journal of Petrology, 65, egae010.

[54] Brachfeld, S., *McCartney, K.N.*, Hammer, J.E., Shea, T., and Giachetti, T. (2024) Evaluating the role of titanomagnetite in bubble nucleation: Rock magnetic detection and characterization of

nanolites and ultra-nanolites in rhyolite pumice and obsidian from Glass Mountain, California. Geochemistry, Geophysics, Geosystems, 25, e2023GC011336.
[53] *McCartney, K.N.*, Hammer, J.E., Shea, T., Brachfeld, S., and Giachetti, T. (2024) Evaluating the role of titanomagnetite in bubble nucleation: Novel applications of low temperature magnetic analysis and textural characterization of rhyolite pumice and obsidian from Glass Mountain, California. Geochemistry, Geophysics, Geosystems, 25, e2023GC011338.
[52] Preece, K., van der Zwan, F., Hammer, J., Gertisser, R. (2023). A Textural Perspective on the Magmatic System and Eruptive Behaviour of Merapi Volcano. In: Gertisser, R., Troll, V.R., Walter, T.R., Nandaka, I.G.M.A., Ratdomopurbo, A. (eds) Merapi Volcano. Active Volcanoes of the World. Springer, Cham. https://doi.org/10.1007/978-3-031-15040-1_9
[51] Mourey, A.J., Shea, T., Hammer, J.E., 2023. Preservation of magma recharge signatures in Kīlauea olivine during protracted storage. J. Geophys. Res. Solid Earth 128, e2022JB025523.
[50] deGraffenried, R., J Hammer, H Dietterich, R Perroy, M Patrick, and T Shea. (2021) Evaluating lava flow propagation models with a case study from the 2018 eruption of Kīlauea Volcano, Hawai'i, Bull. Volcanol., 83, 1-19.
[49] *Nelson, W.S.*, J.E. Hammer, T. Shea, E. Hellebrand, G.J. Taylor, Chemical heterogeneities reveal early rapid cooling of Apollo Troctolite 76535, *Nat. Commun.* 12 (2021). https://doi.org/10.1038/s41467-021-26841-4.
[48] Pineda, C., J. Hammer, E. First, and D. Morata (2021), Storage conditions of a caldera-forming volcanic eruption: Insights from the Pudahuel rhyolitic ignimbrite in central Chile (32° 10′S), Lithos, 400–401, doi:10.1016/j.lithos.2021.106382.
[47] First, E. C., J. E. Hammer, P. Ruprecht, and M. Rutherford (2021), Experimental constraints on dacite magma storage beneath Volcán Quizapu, Chile, J. Petrol., 1–26, doi:10.1093/petrology/egab027.
[46] Iezzi, G., Hammer, J., A. Whittington, D. Neuville (2020) Editorial: Research Topic Crystal Nucleation and Growth in Magmatic Suspensions. Frontiers in Earth Science. Frontiers Media, 8, pp.607972. 10.3389/feart.2020.607972.
[45] First, EC, TC Leonhardi, and JE Hammer (2020), Effects of superheating magnitude on olivine growth, Contrib. to Mineral. Petrol., 175(2), 1–14, doi:10.1007/s00410-019-1638-7.
[44] Shea, T, JE Hammer, E Hellebrand, A. J. Mourey, F. Costa, E. C. First, K. J. Lynn, and O. Melnik (2019), Phosphorus and aluminum zoning in olivine: contrasting behavior of two nominally incompatible trace elements, Contrib. to Mineral. Petrol., 174(10), doi:10.1007/s00410-019-1618-y.
[43] Zhang, D, Hu, Y, Xu, J, Downs, RT, Hammer, JE, Dera, PK. (2019) High-pressure behavior of liebenbergite: The most incompressible olivine-structured silicate. Am Mineral. 104, 580-587.
[42] Mollo, S. and Hammer, J.E., (2017) Dynamic Crystallization in Magmas, in: Mineral reaction kinetics: microstructures, textures, and chemical compositions, EMU Notes in Mineralogy, v. 16, Abart, R., and Heinrich, W., Eds. 373-418.
[41] Welsch, B., Hammer, J., Baronnet, A., Jacob, S., Hellebrand, E., and Sinton, J. (2016) Clinopyroxene in postshield Haleakala ankaramite: 2. Texture, compositional zoning and supersaturation in the magma. Contrib. Mineral. Petrol. 171:6, DOI 10.1007/s00410-015-1213-9
[40] Hammer, J., Jacob, S., Welsch, B., Hellebrand, E., and Sinton, J. (2016) Clinopyroxene in postshield Haleakala ankaramite: 1. Efficacy of thermobarometry. Contrib. Mineral. Petrol. 171:7, DOI 10.1007/s00410-015-1212-x.
[39] First. E., and Hammer, J. (2016) Igneous cooling history of olivine-phyric shergottite Yamato 980459 constrained by dynamic crystallization experiments. Meteoritics. Planet. Sci. 1-23, doi: 10.1111/maps.12659.
[38] Shea, T., Costa, F., Krimer, D., Hammer, JE. (2015) Accuracy of timescales retrieved from diffusion modeling in olivine: A 3D perspective. Am. Mineral. 100, 2026-2042.
[37] Brachfeld, S., Shah, D., First, E., Hammer, JE, and Bowles, J. (2015) Influence of redox conditions on the intensity of Mars crustal magnetic anomalies. Meteoritics and Planet. Sci. 50, 1703-1717.
[36] Brugger, CR, Hammer, JE. (2015) Prevalence of growth twins among anhedral plagioclase microlites. Am. Mineral. 100, 385-395.

[35] Brachfeld, S, Cuomo, D, Tatsumi-Petrochilos, L, Bowles, J, Shah, D, and Hammer, J. (2014) Contribution of Multidomain Titanomagentite to the Intensity and Stability of Mars Crustal Magnetic Anomalies. Geophys. Res. Lett., 41, 7997–8005, doi:10.1002/ 2014GL062032.
[34] Welsch, BT, Hammer, JE and Hellebrand, E (2014) Phosphorus zoning reveals dendritic architecture of olivine. Geology doi: 10.1130/G35691.1
[33] Shea, T. and Hammer, J.E. (2013) Kinetics of cooling- and decompression-induced crystallization in hydrous mafic-intermediate magmas. J. Volcanol. Geotherm. Res. http://dx.doi.org/10.1016/j.jvolgeores.2013.04.018
[32] Shea, T, Hammer, J, First, E. (2013) Magma balloons or bombs? Nature Geoscience. 6, 802-803.
[31] Shea, T. and Hammer, J.E. (2013) Oxidation in CSPV experiments involving H2O-bearing mafic magmas: Quantification and mitigation. Am. Mineral. 98, 1285-1296.
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[27] Brugger, CR, Hammer, JE. (2010) Crystal size distribution analysis of plagioclase in experimentally decompressed hydrous rhyodacite magma. Earth Planet. Sci. Lett. 300, 246-254.
[26] Brugger, CR, Hammer, JE. (2010) Crystallization kinetics in continuous decompression experiments; implications for interpreting natural magma ascent processes. J. Petrology, 51, 1941-1965.
[25] Houghton, BF, Carey, RJ, Cashman, KV, Wilson, CJN, Hobden, BJ, and Hammer, JE. (2010) Diverse patterns of ascent, degassing, and eruption of rhyolite magma during the 1.8 ka Taupo eruption, New Zealand: Evidence from clast vesicularity. J. Volcanol. Geotherm. Res. 195, 31-47.
[24] Hammer, JE, Sharp, TG, and Wessel, P. (2010) Heterogeneous nucleation and epitaxial crystal growth of magmatic minerals. Geology, 38, 367-370.
[23] Neill, OK, Hammer, JE, Izbekov, PE, Belousova, MG, Belousov, AB, Clarke, AB, Voight, B. (2010) Influence of pre-eruptive degassing and crystallization on the juvenile products of laterally directed volcanic explosions. J. Volcanol. Geotherm. Res. 198, 264-274.
[22] Shea, T, Gurioli, L, Larsen, JF, Houghton, BF, Hammer, JE, Cashman, KV. (2010) Linking experimental and natural vesicle textures in Vesuvius 79AD white pumice. J. Volcanol. Geotherm. Res., 192, 69-84.
[21] Shea, T., Houghton, B.F., Gurioli, L., Cashman, K.V., Hammer, J.E., Hobden, B.V. (2010), Textural studies of vesicles in volcanic rocks: An integrated methodology. J. Volcanol. Geothermal Res., 190, 271-289.
[20] Hammer, JE (2009) Application of a textural geospeedometer to late-stage magmatic history of MIL03346. Meteoritics Planet. Sci. 44. 141-154.
[19] Hammer, JE (2009) Capturing crystal growth, Geology, v. 37, p. 1055-1056, doi:10.1130/focus112009.1.
[18] Shea, T, Larsen JF, Gurioli L, Hammer JE, Houghton BF, Cioni R. (2009) Leucite crystals: surviving witnesses of magmatic processes preceding the 79AD eruption at Vesuvius, Italy. Earth and Planet. Sci. Lett., 281, 88-98.
[17] Bowles, JA, Hammer, JE, Brachfeld, SA. (2009) Magnetic and petrologic characterization of synthetic Martian basalts and implications for the surface magnetization of Mars. J. Geophys. Res. – Planets 114, E10003, doi:10.1029/2009JE003378.
[16] Hammer, JE (2008) Experimental Studies of the Kinetics and Energetics of Magma Crystallization. Reviews in Mineralogy and Geochemistry. v. 69. 9-59.
[15] Vazquez, JA, Shamberger, PJ, and Hammer, JE. (2007) Plutonic xenoliths reveal timing of magma evolution at Hualalai and Mauna Kea, Hawai'i. Geology. 35. 695-698.

[14] McCanta, MC, Rutherford, MJ, and Hammer, JE (2007) Pre-eruptive and syn-eruptive conditions in the Black Butte, California dacite: Insight into crystallization kinetics in a simplified silicic system. J Volcanol. Geotherm. Res. 160: 263-284.
[13] Hammer, JE (2006) Influence of fO2 and cooling rate on the kinetics and energetics of Fe-rich basalt crystallization. Earth Planet. Sci. Lett. 10.1016/j.epsl.2006.04.022.
[12] Shamberger, PJ and Hammer, JE (2006) Leucocratic and Gabbroic Xenoliths from Hualalai Volcano, Hawai'i. J. Petrology 47: 1785-1808.
[11] Brachfeld, SA and Hammer, JE (2006) Rock-magnetic and remanence properties of synthetic Fe-rich basalts: Implications for Mars crustal anomalies. Earth Planet. Sci. Lett. doi:10.1016/j.epsl.2006.04.015.
[10] Hammer, JE, M Coombs, PJ Shamberger, J Kimura (2006) Submarine sliver in North Kona: A window into the early magmatic and growth history of Hualalai Volcano, Hawai'i. J. Volcanol. Geotherm. Res. 151, 157-188.
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[8] Hammer, JE (2004) Crystal nucleation in hydrous rhyolite: Experimental data applied to classical theory. Am. Mineral. 89, 1673-1679.
[7] Hammer, JE and Rutherford, MJ (2003) Petrologic Indicators of pre-eruption magma dynamics. Geology. 31, 79-82.
[6] Hammer, JE, and Rutherford,MJ (2002) An experimental study of decompression-induced crystallization in silicic melt. J. Geophys. Res. -Solid Earth. 107(B1), 8-1 - 8-24.
[5] Hammer, JE, MJ Rutherford, and W Hildreth (2002) Magma storage prior to the 1912 eruption at Novarupta, Alaska. Contrib. Mineral. Petrol. 144, 144-162.
[4] Hammer, JE, Cashman, KV, Voight, B. (2000) Magmatic processes revealed by textural and compositional trends in Merapi dome lavas. J. Volcanol. Geotherm. Res. 100, 165-192.
[3] Hammer, JE, Cashman, KV, Hoblitt, R.P., Newman, S. (1999) Degassing and microlite crystallization during pre-climactic events of the 1991 eruption of Mt. Pinatubo, Philippines Bull. Volcanol, 60, 355-380.
[2] Hammer, JE, Manga, M, Cashman, KV (1998) Non-equilibrium and unsteady fluid degassing during slow decompression. Geophys. Res. Lett. 25, 4565-4568.
[1] Chamberlain, C.P., Zeitler, P.K., Barnett, D.E., Winslow, D., Poulson, S.R., Leahy, T., Hammer, J.E., 1995. Active hydrothermal systems during the recent uplift of Nanga Parbat, Pakistan Himalaya. J. Geophys. Res. Solid Earth 100, 439–453.

CONFERENCE ABSTRACTS (*since 2022*)

McCartney, K., Hammer, J.E., and Shea, T. (2023) Sessile drop experiments involving rhyolite liquid and mineral pairs performed to evaluate interfacial energies and better understand bubble nucleation. In AGU Fall Meeting Abstracts Vol. 2023, pp. V33C--0178.
Rampe, E.B., Cannon, K.M., Sarrazin, P., Blake, D.F., Obbard, R.W., Yen, A.S., Lucey, P.G., Haberle, C., Bergman, D., Hamilton, J.A., and others (2023) Mineralogical, Elemental, and Tomographic Reconnaissance Investigation for CLPS (Metric). In Technology Showcase for Planetary Science Missions.
Shea, T., McCartney, K., Hammer, J., Terada, M., Bale, H., Lubbers, J., Andrews, M., Harris, W., Nelson, W., Gallo, R., and others (2023) Sticking together mush? A 3D re-evaluation of crystal clustering mechanisms in basaltic magmas.
Gansecki, C., Lynn, K.J., Downs, D.T., Hammer, J., and Shea, T. (2022) 2020--21 eruptions of Kīlauea reveal steady recovery and mixing in the shallow summit magma chamber. In 2022 Goldschmidt Conference.
Hammer, J., Baker, L., Barclay, J., Carroll, M.R., Coombs, M., Cottrell, E., Dygert, N.J., Elkins-Tanton, L., First, E., Gardner, J., and others (2022) How to build a legacy of scientific leadership: the HR formula. In 2022 Goldschmidt Conference.
McCartney, K. N., Hammer, J., Shea, T., Brachfeld, S. & Giachetti, T. Understanding the influence of nm-scale titanomagnetite on bubble nucleation in crystal poor rhyolite using 1-atm crystallization and vesiculation experiments. in 2022 Goldschmidt Conference (2022).

McCartney, K.N., Hammer, J., Shea, T., Brachfeld, S., and Giachetti, T. (2022) Understanding the influence of nm-scale titanomagnetite on bubble nucleation in crystal poor rhyolite using 1-atm crystallization and vesiculation experiments. In 2022 Goldschmidt Conference.
Nelson, W. S., Libourel, G., Hammer, J. & Shea, T. Revealing the Early Cooling Histories of Type 1A Chondrules using Diffusion Chronometry. LPI Contrib. 2695, 6438 (2022).
Nelson, W., Hammer, J., Parman, S., and Akey, A. (2022) Atom by Atom: Investigating phosphorus in olivine using atom probe tomography. In 2022 Goldschmidt Conference.
Nelson, W.S., Libourel, G., Hammer, J., and Shea, T. (2022) Revealing the Early Cooling Histories of Type 1A Chondrules using Diffusion Chronometry. LPI Contributions, 2695, 6438.
Rampe, E. et al. Mineralogical, Elemental and Tomographic Reconnaissance Investigation for CLPS (' METRIC'). 44th COSPAR Sci. Assem. Held 16-24 July 44, 287 (2022).
Rampe, E., Taylor, G.J., Blake, D., Bergman, D., Cannon, K., Sarrazin, P., Obbard, R., Lucey, P., and Vaniman, D. (2022) Mineralogical, Elemental and Tomographic Reconnaissance Investigation for CLPS (" METRIC"). 44th COSPAR Scientific Assembly. Held 16-24 July, 44, 287.
Shea, T. et al. Crystallographic orientation of crystal clusters in 3D using laboratory diffraction contrast tomography: initial tests on Kilauea olivine. in AGU Fall Meeting Abstracts vol. 2021 V11B--08 (2021).
Shea, T. et al. Learning Time: Diffusion chronometry applied to high temperature systems. in 2022 Goldschmidt Conference (2022).
Shea, T., deGraffenried, R., Lynn, K.J., Chakraborty, S., Dohmen, R., and Hammer, J. (2022) Learning Time: Diffusion chronometry applied to high temperature systems. In 2022 Goldschmidt Conference.