

JULIA EVE HAMMER

CURRICULUM VITAE AND PUBLICATIONS

2023-11-28

CONTACT Department of Earth Sciences
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BIOGRAPHICAL Position: Professor
Citizenship: United States of America

EDUCATION

UNIVERSITY OF OREGON
Eugene, OR — PhD, 1998; Advisor: Katharine V. Cashman

DARTMOUTH COLLEGE
Hanover, NH — BA, 1993; Advisor: C. Page Chamberlain

LABORATORIES

Experimental Petrology Laboratory, University of Hawaii
Electron Microprobe Laboratory, University of Hawaii

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.

APPOINTMENTS

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

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
GSA Exceptional Reviewer for <i>Geology</i>	2006, 2009
Presidential Early Career Award for Scientists and Engineers (PECASE), Bush Admin.	2006
National Science Foundation CAREER Award	2005

NATIONAL & INTERNATIONAL SERVICE

Advisory Board, <i>Journal of Petrology</i>	2023
Associate Editor, <i>Bulletin of Volcanology</i>	2022-present
Guest Associate Editor, <i>Frontiers in Science</i>	2019-20
Mineralogical Society of America Lecture Program Committee	2017-20
NASA- Solar System Workings Review Panel Chief	2018
Associate Editor, <i>American Mineralogist</i>	2013-18
Special Collection Editor, <i>American Mineralogist</i>	2013-15
AGU Executive Committee: VGP Section Secretary and Fall Meeting Chair	2011-13
Associate Editor, <i>GSA Bulletin</i>	2011-13
NASA-Mars Fundamental Research Review Panel	2003, 2005, 2011

Editorial Board, *Geology* 2005-08
Co-Chair of Science Program Committee, Western Pacific Geophysics Mtg., AGU 2004
NSF-EAR Petrology and Geochemistry Program Panel 2002, 2019

LOCAL SERVICE selected recent

SOEST Dean Search Advisory Committee 2022
Undergraduate Academic Advisor 2022-2023
Division Chair, VGP 2018-20
Curriculum Committee, co-Chair of BA, BS redesign 2016-21
SOEST Research Council 2013-15, 18-19

GRADUATE STUDENTS (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), Camila Pineda, PhD Univ. Chile (2021 visitor), William Nelson, PhD (2023), Kelly McCartney PhD (in progress)

INSTRUCTIONAL PORTFOLIO since 2018

ERTH 101L Dynamic Earth Laboratory (F19, S20, F20, S21, F21), ERTH 301 Mineralogy (F19, F20, F22, F23); ERTH 402 Hawaiian Geology (F18, S20, F21); ERTH602 Theoretical Petrology (S19, S21)

RESEARCH

h-INDEX (ALL) 27; (SINCE 2018) 21. i10-INDEX (ALL) 39; (SINCE 2018) 29

CITATIONS (ALL) 3504; (SINCE 2018) 1657

PUBLICATIONS (*Italics* = student or postdoctoral fellow at time of writing)

- [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: Cimarelli, C., Muller, S. (Eds.), *Merapi Volcano: Geology, Eruptive Activity, and Monitoring of a High-Risk Volcano*. Springer, Zurich. 265-289.
- [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] Nelson, W.S., J.E. Hammer, T. Shea, E. Hellebrand, G.J. Taylor, Chemical heterogeneities reveal early rapid cooling of Apollo Troctolite 76535, *Nat. Com.* 12 (2021). <https://doi.org/10.1038/s41467-021-26841-4>.
- [49] deGraffenried, R., Hammer, J., Dietterich, H., Perroy, R., Patrick, M., and Shea, T., (2021). Evaluating lava flow propagation models with a case study from the 2018 eruption of Kīlauea Volcano, Hawai'i, *Bull. Volcanol.*, 83, 1-19.
- [48] 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.
- [47] 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.
- [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 Titanomagnetite 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.
- [30] Bowles, J.A., Tatsumi-Petrochilos, L., Hammer, J.E., Brachfeld, S.A. (2012) Multicomponent cubic oxide exsolution in synthetic basalts: Temperature dependence and implications for magnetic properties. *J. Geophysical Res.–Solid Earth.* doi:10.1029/2011JB008867
- [29] Stovall, WK, Houghton, BF, Hammer, JE, Fagents, SA, Swanson, DA (2012) Vesiculation of high fountaining Hawaiian eruptions: episodes 15 and 16 of 1959 Kīlauea Iki. *Bull. Volcanol.* 74, 441-455.
- [28] Zinin, P, Tatsumi-Petrochilos L, Bonal, L, Acosta, T, Hammer, J, Gilder, S, Fuller, M. (2011) Raman spectroscopy of titanomagnetites: calibration of the intensity of Raman peaks as a sensitive indicator for their Ti content. *Am. Mineral.*, 96, 1537-1546.
- [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. Geotherm. 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.
- [9] Hammer, JE (2006) Interpreting Inclusive Evidence. *Nature*. 439: 26-27.
- [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 2020*)

- Bowles, J.A., Fearn, S.S., Abdulghafur, F., and Hammer, J.E. (2020) Effects of Artificial Aging and Hydration on Magnetic Mineralogy in Volcanic Glasses. In *AGU Fall Meeting Abstracts Vol. 2020*, pp. GP004--03.

- Cannon, K.M., Rampe, E., Malaret, E., King, I., Chen, J., Gross, J., Yen, A., Wilbur, Z., Ewing, R., McNally, P., and others (2023) Mineralogical, Elemental, and Tomographic Reconnaissance Investigation for CLPS (METRIC): A Proposed Mission to the Lunar South Pole-Aitken Basin. In 54th Lunar and Planetary Science Conference (LPSC).
- deGraffenried, R., Cluzel, N., Shea, T., and Hammer, J.E. (2020) Experimental examination of the melt embayment method for determining magma decompression rate. In AGU Fall Meeting Abstracts Vol. 2020, pp. V003--0004.
- Gallo, R., Boro, J., Shea, T., Gansecki, C., and Hammer, J. (2021) Mafic and Crystal-Rich Inclusions in Evolved Lavas from the LERZ 2018 Eruption at Kilauea Volcano. In AGU Fall Meeting Abstracts Vol. 2021, pp. V35D--0165.
- Gansecki, C., Lynn, K.J., Downs, D.T., Hammer, J., and Shea, T. (2022) 2020--21 eruptions of Kilauea reveal steady recovery and mixing in the shallow summit magma chamber. In 2022 Goldschmidt Conference.
- Halverson, B., Whittington, A.G., Hammer, J.E., deGraffenried, R., Lev, E., Birnbaum, J., Dietterich, H.R., Patrick, M.R., Parcheta, C.E., Carr, B.B., and others (2020) Vesicularity, crystallinity, and implications for rheology of the Kilauea 2018 Lava Flows. In AGU Fall Meeting Abstracts Vol. 2020, pp. V002--0016.
- Halverson, B., Whittington, A., Kenderes, S., Hammer, J., Dietterich, H., Lev, E., Llewellyn, E., Patrick, M., Carr, B., Zoeller, M., and others (2021) Correlation of Calculated Cooling Rates with Textural Variations of the Fissure 8 Flow Field, Kilauea 2018: A method for determination of primary and secondary textures. In AGU Fall Meeting Abstracts Vol. 2021, pp. V35F--07.
- 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.
- Lev, E., Birnbaum, J., Conroy, C.J., Whittington, A.G., Hammer, J.E., Llewellyn, E.W., and Halverson, B.A. (2020) The rheology of three-phase lavas. In Chapman Conference on Distributed Volcanism and Distributed Volcanic Hazards.
- Lev, E., Baur, J., Conroy, C.J., Halverson, B.A., Birnbaum, J., Whittington, A.G., Hammer, J.E., Dietterich, H.R., and Llewellyn, E.W. (2021) Rheological Evolution of the Ahu'aikā'au Fissure lavas during the 2018 Kilauea lower East Rift Zone eruption. In AGU Fall Meeting 2021.
- McCartney, K., Hammer, J.E., Shea, T., Giachetti, T., and Brachfeld, S.A. (2020) Nanometer scale titanomagnetite assisted bubble nucleation: a joint magnetic and textural characterization approach. In AGU Fall Meeting Abstracts Vol. 2020, pp. V003--0008.
- McCartney, K., Hammer, J., Shea, T., Brachfeld, S., and Giachetti, T. (2021) Addressing the Mechanism of Bubble Nucleation in Aphyric Rhyolite Using Rock-Magnetism. In AGU Fall Meeting Abstracts Vol. 2021, pp. GP25B--0404.
- 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.
- McKenzie, W., Taylor, G.J., Dera, P., Martel, L.M. V, Lucey, P.G., Hammer, J.E., Blake, D., Sarrazin, P., Lafuente, B., Bristow, T., and others (2020) XTRA, a Combined XRD/XRF Instrument for Use in Lunar Science and Resource Utilization. In 51st Lunar and Planetary Science Conference p. Abstract #2743. Lunar and Planetary Institute, Houston.
- 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.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., Lubbers, J., Mourey, A., Terada, M., Bale, H., Andrew, M., Harris, W., Nelson, W.S., McCartney, K., Hammer, J., and others (2021) Crystallographic orientation of crystal clusters in 3D using laboratory diffraction contrast tomography: initial tests on Kilauea olivine. In AGU Fall Meeting Abstracts Vol. 2021, pp. V11B--08.
- 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.
- Whittington, A., Lira, J., Halverson, B., Hammer, J., and Parcheta, C. (2021) Magmatic Plumbing Samples a Smorgasbord: At Least Four Components in Lava Erupted From Fissure 17, Kilauea 2018. In AGU Fall Meeting Abstracts Vol. 2021, pp. V35D--0157.