

## CURRICULUM VITAE

### Tom Shea

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<http://www.soest.hawaii.edu/GG/FACULTY/tshea/index.html>

### Research Interests and activities

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I broadly investigate volcanoes and volcanic processes around various geodynamic settings on our planet. I use field, laboratory, experimental and analytical techniques to link volcanic deposits to magma storage, ascent, fragmentation, and ash transport, in order to understand the behavioral patterns and timescales of volcanic phenomena.

### Education

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**2010:** PhD – Geology and Geophysics, University of Hawai'i at Mānoa, USA. Subject: the AD79 eruption of Vesuvius, Italy.

**2006:** MSc – Earth Sciences, Université Blaise Pascal, Clermont-Ferrand, France. Subject: Analogue modeling of rockslide avalanches.

**2005:** MSc – Natural Hazard Mitigation, Universidad Autónoma de Barcelona, Barcelona, Spain. Subject: Mitigation of landslide hazards around Central American volcanoes.

**2003:** BA – Earth Sciences, Université Blaise Pascal, Clermont-Ferrand, France. Subject: monazite dating of eclogitic host rocks from Vendée, France.

### Professional experience

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**2023-present:** Associate Professor - University of Hawai'i at Mānoa, USA

**2018-2023:** Assistant Professor - University of Hawai'i at Mānoa, USA

**2010-2018:** Assistant Researcher - University of Hawai'i at Mānoa, USA

### Extramural support (active grants with years in bold)

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*Funded as PI (total: \$2.35m):*

**[1]** National Science Foundation EAR Grant 'Analyses of volatiles in volcanic glasses: bridging the gap between the macroscopic and the micron scale' (PI, \$191,591), 2013-2016.

**[2]** National Science Foundation EAR Grant 'Pursuing the nucleus: experimental, theoretical, and analytical investigations of bubble and crystal formation in magma' (PI, \$266,200), 2013-2016.

**[3]** National Science Foundation EAR Program 'Experimental Investigation of Chemical Zoning in Olivine: Applications to Hawaiian Basalt.' (PI, \$346,000), **2017-2021**.

**[4]** National Science Foundation EAR Grant 'Collaborative Research: Size, depth and longevity of magma reservoirs under Kilauea's rift zones: Integrating melt inclusion data and thermal modeling' (PI, \$397,816), **2020-2023**.

**[5]** National Science Foundation CAREER Grant 'Winding up our crystal clocks: Experimental studies of element diffusion in igneous minerals' (PI, \$554,181), **2021-2026**.

Funded as co-PI (total: \$1.31m):

[6] NASA Solar System Workings Grant 'Exploring the Time-Temperature Characterization of Troctolite 76535.' (co-PI, \$426,388), **2016-2021**. PI: Julia Hammer.

[7] NSF EAR Program 'Advances in crystal growth: Experimental and microscopic study of olivine phosphorus zoning' (co-PI, \$395,566), 2017-2020. PI: Benoit Welsch.

[8] NSF RAPID Program 'Tracking magmatic and volcanic changes in the May 2018 Kilauea Eruption' (co-PI, \$119,821), 2018-2020. PI: Ken Rubin

[9] NSF EAR Program 'Collaborative Research: Elucidating the Role of Titanomagnetite in Vesiculation of Silicic Magmas' (co-PI, \$373,112), **2019-2022**. PI: Julia Hammer

### Awards and Honors

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- Geological Society of America Mineralogy-Geochemistry-Petrology-Volcanology (MGPV) Early Career Award in 2017
- ARCS Graduate Student Award 2009 (\$5,000)
- IAVCEI conference travel grants from NSF (\$1,600) and IAVCEI organization (\$1,000)
- Graduate Student Organization travel grant, August of 2007 for field work in Italy (\$600).
- CROUS French University Excellence scholarship awarded in 2005-2006 for MSc degree (\$5,000)
- CentralRisk European scholarship awarded in 2004-2005 for first MSc degree (\$10,000)

### Teaching

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Fall 2020, -22, Geology of the Hawaiian Islands (ERTH-103), 3 cr., lectures, *UH Mānoa*

Spring 2019, -20, -21, -22, -23 Igneous & Metamorphic Petrology (ERTH-302), 3 cr., lectures/labs, *UH Mānoa*

Fall 2017, -19, -21 Lava flow rheology and morphology (ERTH-605), 3 credits, lectures, *UH Mānoa*

Fall 2016, Geospatial Information (ERTH-461), 3 credits, lectures and labs, *UH Mānoa*

Invited Lecturer, Spring 2013, Volcanology Graduate course, 4 units over 4 weeks, *Université Blaise Pascal, Clermont-Ferrand, France*

Teaching Assistant, Mineralogy (301), Fall 2009 with Julia Hammer, *UH*

Teaching Assistant, Intro to geology (101), Fall 2009 with Scott Rowland, *UH*

Teaching Assistant, Mineralogy (301), Fall 2008 with John Sinton, *UH*

### Students mentored in advisory or co-advisory role

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Rebecca deGraffenried (PhD, 2021), Adrien Mourey (PhD, 2021), Kelly McCartney (PhD, current), Rose Gallo (PhD, current), Nabila Nizam (PhD, current), Andrea Tonato (MS, current), Will Nelson (PhD, current), Kendra Lynn (PhD, 2017), Tanis Leonhardi (BSc, 2015), Charline Lormand (MSc, 2015), Natalie Yakos (BSc, 2008).

### Graduate student committees (UH Mānoa)

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Jonathan Tree (MSc), Olliander Beucler (MSc), Malia Zinn (MSc), Emily First (PhD), Kendra Lynn (PhD), Sam Mitchell (PhD), Samantha Isgett (PhD), Rebecca deGraffenried (PhD), Adrien Mourey (PhD), Kelly McCartney (PhD), Rose Gallo (PhD, current), Nabila Nizam (PhD, current), Andrea Tonato (MS, current), Will Nelson (PhD, current), Tommy Haensel (PhD, current), Ian Wynn (PhD, current).

## Student comprehensive exam committees (UH Mānoa)

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Sam Mitchell (PhD), Thomas Giguere (PhD), Rebecca deGraffenried (PhD), Lauren Ward (PhD), Adrien Mourey (PhD), Will Nelson (PhD), Kelly McCartney (PhD), Rose Gallo (PhD)

## *Journal articles published (students advised marked with \*) h-index: 18, 1269 citations 8/29/2022 (Scopus)*

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[47] Anderson, K, **Shea T**, Lynn KJ, Montgomery-Brown E, Swanson D, Patrick M, Shiro B, Neal C (2023) The 2018 eruption of Kilauea: New insights, challenges and opportunities for volcano science. *Annual Reviews in Earth and Planetary Sciences*, in press.

[46] \*Mourey, A, **Shea T**, Costa F, Shiro B, Longman R, (2023) Years of magma intrusion primed Kīlauea Volcano (Hawai'i) for the 2018 eruption: evidence from olivine diffusion chronometry and monitoring data. *Bulletin of Volcanology*, in press.

[45] \*Mourey, A, **Shea T**, Hammer J, (2022) Preservation of Magma Recharge Signatures in Kīlauea Olivine During Protracted Storage. *Journal of Geophysical Research: Solid Earth*, 128(1), e2022JB025523.

[44] **Shea T**, Matzen A, \*Mourey, A, (2022) Experimental study of Fe–Mg partitioning and zoning during rapid growth of olivine in Hawaiian tholeiites. *Contributions to Mineralogy and Petrology*, 177(12)

[43] \*Mourey, A.J., **Shea, T.**, Lynn, K.J., Lerner, A.H., Lambart, S., Costa, F., Oalmann, J., Lee, R.L., Gansecki, C., (2022). Trace elements in olivine fingerprint the source of 2018 magmas and shed light on explosive-effusive eruption cycles at Kīlauea Volcano. *Earth and Planetary Science Letters* 595, 117769.

[42] Crozier, J., Tramontano, S., Forte, P., Oliva, S.J.C., Gonnermann, H.M., Lev, E., Manga, M., Myers, M., Rader, E., Ruprecht, P., Tuffen, H., Paisley, R., Houghton, B.F., **Shea, T.**, Schipper, C.I., Castro, J.M., (2022) Outgassing through magmatic fractures enables effusive eruption of silicic magma. *Journal of Volcanology and Geothermal Research* 430:107617. doi: 10.1016/j.jvolgeores.2022.107617

[41] Saalfeld M., Myers, M., \*deGraffenried, R.D., **Shea T**, Walkens, C., (2022) On the rise: using reentrants to extract magma ascent rates in the Bandelier Tuff caldera complex, New Mexico, USA. *Bulletin of Volcanology*, 84(1), 4.

[40] \*Nelson, W., Hammer, J.E., **Shea T**, Taylor, G.J., Hellebrand, E.W.G, (2021) Chemical heterogeneities in troctolite 76535: rapid cooling in the slowest cooled Apollo sample. *Nature Communications*, 12(1), 7054.

[39] Giachetti, T., Trafton, K.R., Wiejaczka, J., Gardner, J.E., Watkins, J.M., **Shea T**, Wright, H.M.N., (2021) The products of primary magma fragmentation finally revealed by pumice agglomerates. *Geology*, 49(11), 1307-1311.

[38] \*deGraffenried, R., Hammer, J., Dietterich, H., Perroy, R., Patrick, M., **Shea, T.** (2021) Evaluating lava flow propagation models with a case study from the 2018 eruption of Kīlauea Volcano, Hawai'i. *Bulletin of Volcanology*, 83:65.

[37] Lerner, A.H., Wallace, P.J., **Shea, T.**, \*Mourey, A., Kelly, P., Nadeau, P., Elias, T., Kern, C., Clor, L.E., Gansecki, C., Lee, R.L., Moore, L.R., Werner, C.A. (2021) The petrologic and degassing behavior of sulfur and other magmatic volatiles from the 2018 eruption of Kīlauea, Hawai'i: melt concentrations, magma storage depths, and magma recycling. *Bulletin of Volcanology*, 83:43. <https://doi.org/10.1007/s00445-021-01459-y>

- [36] \*deGraffenried, R., **Shea, T. (2021)** Using Volatile Element Concentration Profiles in Crystal-Hosted Melt Embayments to Estimate Magma Decompression Rate: Assumptions and Inherited Errors. *Geochemistry, Geophysics, Geosystems*, 10.1029/2021GC009672
- [35] Wallace, P.J., Plank, T., Bodnar, R.J., Gaetani, G.A., **Shea, T. (2021)** Olivine-Hosted Melt Inclusions: A Microscopic Perspective on a Complex Magmatic World. *Annual Reviews Earth and Planetary Sciences*, 49, 10.1146/annurev-earth-082420-060506.
- [34] Patrick, M., Johanson, I., **Shea, T. (2020)** The historic events at Kilauea Volcano in 2018: summit collapse, rift zone eruption, and M-w 6.9 earthquake: preface to the special issue. *Bulletin of Volcanology*, 82:46, doi: 10.1007/s00445-020-01377-5.
- [33] Gordeychik, B., Churikova, T., **Shea, T.**, Kronz, A., Simakin, A., Worner, G. (2020) Fo and Ni Relations in Olivine Differentiate between Crystallization and Diffusion Trends. *Journal of Petrology*, 60:9, doi: 10.1093/petrology/egaa083
- [32] Colombier, M., **Shea, T.**, Burgisser, A., Druitt, T.H., Gurioli, L., Muller, D., Caceres, F., Hess, K.-U., Boivin, P., Miallier, D., Dingwell, D.B. (2020) Rheological change and degassing during a trachytic Vulcanian eruption at Kilian Volcano, Chaîne des Puys, France. *Bulletin of Volcanology*, 82:78, doi: 10.1007/s00445-020-01420-5
- [31] \*Lynn KJ, Garcia MO, **Shea T. (2020)** Phosphorous obscures lithium geospeedometry in olivine. *Frontiers in Earth Science*, doi: 10.3389/feart.2020.00135.
- [30] Costa F, **Shea T**, Ubide T (2020) Diffusion chronometry and the timescales of magmatic processes. *Nature Reviews – Earth and the Environment*. doi : 10.1038/s43017-020-0038-x
- [29] Gansecki C, Lee RL, **Shea T**, Lundblad S, Hon K, Parcheta C (2019) The tangled tale of Kilauea's 2018 eruption as told by geochemical monitoring. *Science*, 366. 10.1126/science.aaz0147.
- [28] \*Mourey AJ, **Shea T (2019)** Forming olivine phenocrysts in basalt: a 3D characterization of growth rates in laboratory experiments. *Frontiers in Earth Sciences*, 7 doi: 10.3389/feart.2019.00300 .
- [27] Giachetti T, Hudak MR, **Shea T**, Bindeman I, Hoxsie EC (2019) D/H ratios and H<sub>2</sub>O contents record degassing and rehydration history of rhyolitic magma and pyroclasts. *Earth and Planetary Science Letters*. doi: 10.1016/j.epsl.2019.115909
- [26] **Shea T**, Hammer JE, Hellebrand E, \*Mourey A, Costa F, First E, \*Lynn KJ, Melnik O, (2019) Phosphorus and aluminum zoning in olivine: contrasting behavior of two nominally incompatible elements. *Contributions to Mineralogy and Petrology*. 174:85.
- [25] Owen J, **Shea T**, Tuffen H, (2019) Basalt, Unveiling Fluid-filled Fractures, Inducing Sediment Intra-void Transport, Ephemeral: examples from Katla 1918. *Journal of Volcanology and Geothermal Research*. 369:121-144.
- [24] \*Lynn KJ, **Shea T**, Garcia MO, Costa F, Norman MD (2018) Lithium diffusion in olivine records priming of explosive basaltic eruptions, *Earth and Planetary Science Letters*, 500:127-135.
- [23] Mitchell SJ, McIntosh IM, Houghton BF, Carey RJ, **Shea T (2018)** Dynamics of a powerful deep submarine eruption recorded in H<sub>2</sub>O contents and speciation in rhyolitic glass: The 2012 Havre eruption, *Earth and Planetary Science Letters*, 494:135:147.

- [22] \*Lynn KJ, Garcia MO, **Shea T**, Costa F, Swanson DA (2017) Timescales of mixing and storage for Keanakako'i Tephra magmas (1500-1820 C.E.), Kilauea Volcano, Hawai'i, *Contributions to Mineralogy and Petrology*. 172:76.
- [21] **Shea T** (2017) Bubble nucleation in magmas: a dominantly heterogeneous process? *Journal of Volcanology and Geothermal Research*. 343:155-170.
- [20] **Shea T**, \*Leonhardi T, Giachetti T, Larsen J, Lindoo A, Sinton, J, Parson E, (2017) Dynamics of an unusual cone-building trachyte eruption at Pu'u Wa'awa'a, Hualālai, Hawaii, *Bulletin of Volcanology*. 79:2.
- [19] Colombier M, Gurioli L, Druitt TH, **Shea T**, Boivin P, Miallier D, (2017) Textural evolution of magma during the 9.4 ka trachytic explosive eruption at Kilian Volcano, Chaîne des Puys, France, 2015, *Bulletin of Volcanology*. 79:17.
- [18] \*Lynn KJ, **Shea T**, Garcia MO, (2017) Nickel variability in Hawaiian olivine: Evaluating the relative contributions from mantle and crustal processes, online first, *American Mineralogist*. DOI 10.2138/am-2017-5763.
- [17] Graham DW, Michael PJ, **Shea T**, (2016) Extreme Incompatibility of Helium During Mantle Melting: Evidence from Undegassed Mid-Ocean Ridge Basalts. *Earth and Planetary Science Letters*. 454:192-202.
- [16] **Shea T**, Owen J., (2016) Discovery of a trachyte ignimbrite sequence at Hualalaī, Hawaii, *Bulletin of Volcanology*. 78, 34.
- [15] **Shea T**, \*Lynn, K.J., Garcia, M.O., (2015) Cracking the olivine zoning code: Distinguishing between crystal growth and diffusion, *Geology*, 43:935-938.
- [14] **Shea T**, Costa, F., Krimer D., Hammer J.E, (2015) Accuracy and precision of timescales retrieved from diffusion modeling in olivine: a 3D perspective, *American Mineralogist*, 100:2026-2042.
- [13] Giachetti T, Gonnermann H, Gardner, J, **Shea T**, Gouldstone A (2015) Discriminating secondary from magmatic water in rhyolitic matrix-glass of volcanic pyroclasts using thermogravimetric analysis. *Geochimica and Cosmochimica Acta*, 148:457-476.
- [12] **Shea T**, Gurioli L, Hellebrand E, Tuffen, H (2014) Conduit to localized scale degassing during Plinian eruptions: insights from major element and volatile (Cl and H<sub>2</sub>O) analyses within AD79 Vesuvius pumice. *Journal of Petrology*, 55:315-344.
- [11] **Shea T**, Hammer JE, First E (2013) Pumice balloons or bombs? *Nature Geoscience (Corresp.)*, 6:802-803.
- [10] **Shea T**, Hammer JE (2013) Rates of oxidation in CSPV experiments involving H<sub>2</sub>O-bearing mafic magmas. *American Mineralogist*, 98:1285-1296.
- [9] **Shea T**, Hammer JE (2013) Kinetics of cooling- and decompression-induced crystallization in hydrous mafic-intermediate magma. *Journal of Volcanology and Geothermal Research*, 260:127-145.
- [8] **Shea T**, Gurioli L, Houghton, BF (2012) Transitions between fall phases and pyroclastic density currents during the AD 79 eruption at Vesuvius: building a transient conduit model from the textural and volatile record. *Bulletin of Volcanology*, 74:2363-2381.
- [7] **Shea T**, Gurioli L, Houghton, BF, Cioni, R, Cashman KV (2011) Column collapse and generation of pyroclastic density currents during the AD 79 eruption of Vesuvius: the role of pyroclast density. *Geology*, 39, 695-698.

[6] **Shea T**, Houghton BF, Gurioli L, Cashman KV, Hammer JE, Hobden B (2010) Textural investigations of vesicles in volcanic rocks : an integrated methodology. *Journal of Volcanology and Geothermal Research*, 190, 271-289.

[5] **Shea T**, v. Wyk de Vries (2010) Collapsing volcanoes: the sleeping giants' threat. *Geology Today*, 26, 2, 72-77.

[4] **Shea T**, Gurioli L, Larsen JF, Houghton BF (2010) Linking experimental and natural vesicle textures in Vesuvius 79AD white pumice. *Journal of Volcanology and Geothermal Research*, 192, 69-84.

[3] **Shea T**, Larsen JF, Gurioli L, Houghton BF, Hammer JE, (2009), Leucite crystals : surviving witnesses of magma storage conditions prior to the 79AD eruption at Vesuvius, Italy. *Earth and Planetary Science Letters*, 281, 88-98.

[2] **Shea T**, van Wyk de Vries B, Pilato M, (2008), Emplacement mechanisms of contrasting debris avalanches at Volcan Mombacho (Nicaragua), provided by structural and facies analysis. *Bulletin of Volcanology*, 70, 899-921.

[1] **Shea T**, van wyk de Vries, (2008), Structural analysis and analogue modelling of the kinematics and dynamics of large-scale rockslide-avalanches. *Geosphere*, 4, 657-686.

## Service

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- Participant in the Huliāmahi Justice-Equity-Diversity-Inclusion working group at UH since 2020
- Co-development and involvement as senior personnel in the NSF ADVANCE Catalyst project “Advancing kaulike (equity) focusing on STEM intersectional experiences at the University of Hawai‘i at Mānoa”, starting Aug 2022, ending Sept 2024.
- In class hands-on experience modules given at local Oahu Schools (SEEQS, Kahala Elementary) 2021-2022.
- Co-organizer since 2019 of CONVERSE (Community Network for Volcanic Eruption Response <https://volcanoresponse.org/>), on the Petrology and Geochemistry working group. Objective: organize the community for coordinated response to volcanic eruptions in the US (NSF-supported RCN project)
- Invited lecturer & participant for the CIDER Workshop in Berkeley (2 weeks, June 2019) (<https://www.deep-earth.org/summer19>)
- Associate editor, *American Mineralogist*, special collection “Volcanic Rocks” (2013-2016)
- Organizer and leader of GSA *Cordilleran Section 2017* field trip on Kilauea volcano (2 days)
- Organizer of Goldschmidt 2020, 2022 Diffusion workshops (2 days long each)
- Co-Chair of sessions at international conference AGU 2007, 2012, 2013, 2019, 2020
- Co-Chair of session at Goldschmidt 2014, 2019, 2022 conference
- Co-Chair of session at IAVCEI 2017 conference, Portland
- EARTH Department committees (4)
- Proposal reviews, *National Science Foundation* ‘EAR’, ‘GeoPRISMS’, and ‘Career’ programs (15)
- Manuscript Reviews for international journals, 2009-2021 (>50): *Earth and Planetary Science Letters* (3), *G-cubed* (4), *Earth Surface Processes and Landforms* (2), *Journal of Volcanology and Geothermal Research* (9), *Geochimica and Cosmochimica Acta* (1), *American Mineralogist* (1), *Solid Earth* (1), *Bulletin of Volcanology* (12), *Journal of Petrology* (2), *Marine Geology* (1), *Computers and Geosciences* (1), *Journal of Asian Earth Sciences* (1), *Lithos* (1), *Geosphere* (1), *Nature Geoscience* (2), *Nature communications* (1), *Contributions to Mineralogy and Petrology* (4), *Geology* (2), *Frontiers in Earth Science* (2), *Journal of Geophysical Research* (1).



- Development and distribution of computer programs *FOAMS* (Fast Object Analysis and Measurement System) since 2009 to facilitate textural investigations in volcanology <http://www.soest.hawaii.edu/GG/FACULTY/tshea/foams/index.html>.
- Development and distribution of *SpeCTRA* (Spectrum Correction Tools for Raman) to facilitate analysis of H<sub>2</sub>O in glass via microRaman spectroscopy since 2016. Distributed on the personal website <http://www.soest.hawaii.edu/GG/FACULTY/tshea/spectra/spectra.html>.
- Organizer of Volcanology-Geochemistry-Petrology discussion seminars at Univ. Hawaii 2010-2015.
- Co-exhibitor at School of Ocean and Earth Science and Technologies (SOEST) Open House 2007, 2009, 2013 and 2015 (Explosive Volcanism, Electron Microprobe). Introduction to fine scale rock analysis using EPMA. Demonstrations of volcanic explosions using dry ice, and liquid nitrogen.

## Community/Outreach

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- Oahu Public Library STEM program (3): “The 2018 Kīlauea eruption”. 1hr presentations followed by hands on activities.
- Development of information pamphlets aimed at the general public about geological features (e.g. the Pu‘u Wa‘awa‘a cone on the island of Hawaii, currently distributed at the location trail head, and available for pdf download at <http://www.soest.hawaii.edu/GG/FACULTY/tshea/outreach.html>).
- Featured scientist in a Hawai‘i television series “Voice of the Sea” about researchers investigating natural processes around the Hawaiian Islands, Sept. 2012, aired 2014 (US).
- Scientific consultant for BBC animated series “Factomania”, featuring one episode on volcanoes and volcanologists, Sept. 2013, aired 2014 (UK).
- Participation in book “Elemental Journeys” (Ken Glaser, ISBN-1450794289, 2012), on the career callings of an earth scientist specializing in the study of volcanoes.
- Featured volcanologist in 110-min prime-time French documentary “Living Earth” for a section on the modern understanding of Hawaiian volcanism, Nov. 2013, aired 2014 (France).

## Analytical experience

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Electron Microprobe Analysis (EMPA, instrument calibration, maintenance, troubleshooting)  
 Scanning Electron Microscope (Imaging, Energy-Dispersive X-ray Spectroscopy EDS, Electron Backscatter Diffraction EBSD).  
 Raman Spectroscopy (analysis of minerals and glasses, quantification of glass H<sub>2</sub>O concentrations).  
 Fourier Transform Infrared spectroscopy FTIR (H<sub>2</sub>O-CO<sub>2</sub> in glasses).  
 He-pycnometry, permeametry (porosity-connectivity of vesicles in pyroclasts).

## Laboratory experience

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### *Experimental petrology:*

Horizontal and vertical furnaces using cold-seal pressure vessels (“CSPV”, Rene-Waspaloy®) for cooling, decompression and phase equilibria experiments.  
 High-temperature furnaces (TZM and MHC cold-seal pressure vessels)  
 1-atm gas mixing furnace for cooling and phase equilibria experiments (up to ~1600°C)  
 Vernadsky 1-atm rapid quench Heating stage (up to ~1600°C) (*set up in 2019*)  
 Thin section and polished wafer preparation

*Physical volcanology:*

- Grain-size analysis, componentry
- Density/vesicularity (construction and operation of Archimedes-based setup)
- Permeability (construction and operation of permeameter)

*Analogue modeling:*

- Debris avalanche/rockslide scaled models (ramps, granular media, scaled volcanic edifices)
- Volcano-spreading scale models (immobile and dynamic surfaces, silicon putty, granular media)
- Magmatic intrusions (golden syrup, granular and cohesive media)

**Computer and programming experience**

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*Programming languages:*

Matlab (Advanced), Python (Basic), R (Basic)

*Design and scientific programs:*

ArcGIS (GIS software), Probe for EPMA (electron microprobe), FLIR Software (thermal analysis of IR imagery), Shape (3D crystal morphology), PhotoScan (Structure from Motion, Photogrammetry), AutoCAD Fusion (3D design), Bruker Opus (FTIR software), WiteC Control (Raman software).

**Collaborations (active)**

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Allen, John ( <i>University of Hawai'i</i> )	Kent, Adam ( <i>Oregon State University</i> )
Colombier, Mathieu ( <i>LMU</i> )	Larsen, Jessica ( <i>Univ. of Alaska Fairbanks</i> )
Costa, Fidel ( <i>Earth Observatory Singapore</i> )	Lerner, Allan ( <i>University of Oregon</i> )
Donnelly-Nolan, Julie ( <i>USGS</i> )	Lynn, Kendra ( <i>USGS</i> )
Downs, Drew ( <i>USGS</i> )	Lubbers, Jordan ( <i>USGS</i> )
Gansecki, Cheryl ( <i>University of Hawai'i</i> )	Myers, Madison ( <i>Montana Univ.</i> )
Giachetti, Thomas ( <i>University of Oregon</i> )	Shiro Brian ( <i>USGS</i> )
Gonnermann, Helge ( <i>Rice University</i> )	Tuffen, Hugh ( <i>Lancaster University</i> )
Gordeychik, Boris ( <i>Moscow Uni.</i> )	Ustunisik, Gokce ( <i>South Dakota Sch. of Mines</i> )
Hammer, Julia ( <i>University of Hawai'i</i> )	Wallace, Paul ( <i>University of Oregon</i> )

**Miscellaneous**

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Citizenships: US and French

Languages: Fluent in English, French, Spanish; Good level in Catalan; Very basic German.