

# ERIN P. FITCH, PH.D.

NSF Postdoctoral Fellow | University of Oregon | efitch@uoregon.edu

---

## RESEARCH INTERESTS

I am a volcanologist studying the effects of external water on volcanic eruptions using field methods, laboratory analysis, and numerical modeling. I investigate the interaction of magma and external water over a wide range of scales, from the evolution and dynamics of hydrothermal systems, to micro-scale dynamic processes occurring at the magma–water interface during fuel-coolant interactions (FCI). Recently, this work has focused on estimating the heat-transfer and fragmentation energetics of lava–water explosions to better understand the dynamics of FCI in a natural system. This research supports eruption forecasting efforts by providing a better quantitative understanding of (1) the risk potential of phreatic or phreatomagmatic eruptions, and (2) the explosion energy imparted to the overall eruption by magma–water interactions.

---

## EDUCATION

- Ph.D.**            **Geology & Geophysics, University of Hawai‘i at Mānoa** | Advisor: Sarah Fagents  
2018            Dissertation: Mechanisms and Dynamics of Explosive Lava–Water Interactions
- M.S.**            **Earth & Planetary Sciences, University of New Mexico** | Advisor: Grant Meyer  
2013            Thesis: Holocene Fire-Related Alluvial Chronology and Geomorphic Implications in the Jemez Mountains, NM
- B.S.**            **Geology, University of Texas at Arlington**  
2007            Graduated Cum Laude with Minor in Mathematics
- 

## APPOINTMENTS

- 09/2020–Present    **NSF Postdoctoral Fellow** | Dept. of Earth Sciences, University of Oregon  
Advisor: Joe Dufek  
Project: Investigating the Explosive Effect of External Water on Volcanic Eruptions:  
Developing a Scalable Simulation of Explosion Energetics
- 06/2019–07/2019    **Geologist** | Hawai‘i Groundwater and Geothermal Resources Center, Honolulu, HI  
Prepared, described, and stored drill core for future analysis during the Pālāwai Basin  
Drilling Project, Lāna‘i Island, HI
- 01/2013–12/2018    **Research/Teaching Assistant** | Dept. of Earth Sciences, Univ. of Hawai‘i at Mānoa  
Courses Taught: Introduction to Earth Sciences Lab (2 semesters); Sedimentology and  
Stratigraphy Lab (1 semester)
- 08/2010–05/2012    **Teaching Assistant** | Dept. of Earth & Planetary Sciences, University of New Mexico  
Courses Taught: Introduction to Earth Sciences Lab (3 semesters); Geomorphology  
Lab (1 semester)
- 07/2009–07/2010    **Flood Researcher** | LPS National Flood, Arlington, TX  
Completed flood zone determinations for lender properties as required by federal law
- 01/2009–06/2009    **Research Specialist** | Lunar and Planetary Laboratory, Univ. of Arizona at Tucson  
Assisted Dr. H. Jay Melosh in the modeling of the impact into comet Tempel 1 as a  
result of the NASA Deep Impact Mission using the iSALE Hydrocode
- 10/2007–12/2008    **Geologist I** | Benchmark Environmental Consultants, Dallas, TX

Prepared Phase I and Phase II Environmental Site Assessments and performed core logging, soil and ground water sample collection, hydrogeologic mapping, technician training, and development of training material

08/2007–12/2007

**Teaching Assistant** | Dept. of Earth and Enviro. Science, Univ. of Texas at Arlington  
Course Taught: Mineralogy Lab (1 semester)

---

## TECHNICAL SKILLS

<b>Computer</b>	<u>Applications &amp; Languages</u> : ANSYS, FORTRAN, MATLAB, ArcGIS, C++
<b>Field Geology</b> <b>(25 Weeks Total)</b>	<u>Mapping</u> : general geologic, structural, hydrogeologic, and geomorphic mapping <u>Stratigraphy</u> : general geologic, volcanic, sequence, alluvial, and soil stratigraphy
<b>Laboratory</b>	Grain-size (315 samples) and componentry (4000 clasts) analysis Density/Vesicularity analysis (1000 clasts) Scanning Electron Microscope and Energy Dispersive Spectroscopy analysis Ash morphology (7500 grains) and crystal texture (4800 grains) analysis Ash shape statistics using ImageJ Charcoal preparation and combustion for AMS dating (50 samples)

---

## GRANTS & AWARDS (\$286,550 total; \$63,800 for research expenses)

2021	\$78,700	<b>NASA Postdoctoral Program Fellowship</b>	Rosaly Lopes at NASA JPL
2020	\$174,000	<b>NSF Postdoctoral Fellowship</b>	Joe Dufek at the Univ. of Oregon
2018	\$750	<b>Graduate Student Grant</b>	University of Hawai'i at Mānoa
2017	\$750	<b>Graduate Student Grant</b>	University of Hawai'i at Mānoa
2016	\$250	<b>Outstanding Student Paper Award</b>	American Geophysical Union
2015	\$1,000	<b>Outstanding Student Award</b>	University of Hawai'i at Mānoa
2015	\$1,000	<b>Jack Kleinman Grant</b>	US Geological Survey
2014	\$15,000	<b>Bullard Fellowship</b>	University of Hawai'i at Mānoa
2013	\$2,000	<b>Bullard Fellowship</b>	University of Hawai'i at Mānoa
2012	\$1,800	<b>Grants-In-Aid</b>	New Mexico Geological Society
2011	\$3,000	<b>Grad. Research and Development Grant</b>	University of New Mexico
2011	\$3,000	<b>Graduate Student Grant</b>	Geological Society of America
2011	\$2,000	<b>Grants-In-Aid</b>	New Mexico Geological Society
2011	\$1,500	<b>Graduate Mentorship Grant</b>	New Mexico Geological Society
2009	\$1,000	<b>Workshop Travel Scholarship</b>	Lunar & Planetary Institute
2007	\$300	<b>Wanda Slagle Field Camp Scholarship</b>	University of Texas at Arlington
2005	\$500	<b>Academic Achievement Scholarship</b>	University of Texas at Arlington

---

## PUBLICATIONS

**Fitch EP, Fagents SA (2020)** Using rootless tephra characteristics to estimate the energetics of explosive lava–water interactions. *Bulletin of Volcanology*. 82:83. <https://doi.org/10.1007/s00445-020-01422-3>

**Fitch EP, Fagents SA (2020)** Characteristics of rootless tephra emplaced by high-energy lava–water explosions. *Bulletin of Volcanology*. 82:62. <https://doi.org/10.1007/s00445-020-01393-5>

**Fitch, EP, Fagents, SA, Thordarson, T, Hamilton, CW (2017)** Fragmentation mechanisms associated with explosive lava–water interactions in a lacustrine environment. *Bulletin of Volcanology*. 79:12. [doi:10.1007/s00445-016-1087-3](https://doi.org/10.1007/s00445-016-1087-3)

Hamilton, CW, **Fitch, EP**, Fagents, SA, Thordarson, T (2017) Rootless tephra stratigraphy and emplacement processes. *Bulletin of Volcanology*. 79:11. doi:10.1007/s00445-016-1086-4

**Fitch, EP**, Meyer, GA (2016) Temporal and spatial climatic controls on Holocene fire-related erosion and sedimentation, Jemez Mountains, New Mexico. *Quaternary Research*. 85:1, 75–86

---

## **PRESENTATIONS**

### **Invited Presentations**

**Fitch, EP**, Fagents, SA (2017) Constraining the Energetics of Explosive Lava–Water Interactions (**Invited**). American Geophysical Union Fall Meeting, oral presentation U13B-15.

**Fitch, EP**, Meyer, GA (2017) The Influence of Wildfire on Long-Term Erosion: Insights from the Jemez Mountains, NM and the Western USA (**Invited**). American Geophysical Union Fall Meeting, oral presentation EP51E-05.

**Fitch, EP**, Fagents, SA (2016) The mechanisms and dynamics of high-energy lava–water explosions (**Invited**). American Geophysical Union Fall Meeting, oral presentation V14A-03.

### **Regular Presentations**

**Fitch, EP**, Fagents, SA (2021) Constraining the Energetics of Explosive Lava–Water Interactions. USGS Volcano Science Center virtual seminar, February 18, 2021.

**Fitch, EP**, Fagents, SA (2020) Active Particle Characteristics and Energetics of Lava–Water Explosions. American Geophysical Union Fall Meeting, poster presentation V008-0009.

**Fitch, EP**, Fagents, SA (2018) Constraining the Energetics of Explosive Lava–Water Interactions. American Geophysical Union Fall Meeting, poster presentation V23J-0174.

Tremblay, J, **Fitch, EP**, Fagents, SA (2017) The Influence of Topography on the Emplacement Dynamics of Martian Lava flows. American Geophysical Union Fall Meeting, poster presentation P13E-2595.

Langdalen, Z, Fagents, SA, **Fitch, EP** (2017) Dispersal of Volcanic Ash on Mars: Ash Grain Shape Analysis. American Geophysical Union Fall Meeting, poster presentation V13C-0391.

**Fitch, EP**, Fagents, SA (2017) Ash Formation Mechanisms Associated with Lava–Water Explosions: Implications for Estimating Explosion Energy. IAVCEI Meeting, poster presentation 990.

**Fitch, EP**, Fagents, SA (2017) High-energy lava–water explosions: a case study from Hawai‘i. Geological Society of America Cordilleran Meeting, oral presentation 43-7.

Fagents, SA, Baloga, SW, **Fitch, EP**, Langdalen, Z, (2017) Dispersal of ash in the Martian atmosphere. Geological Society of America Cordilleran Meeting, oral presentation 20-4.

Fagents, SA, Baloga, SW, **Fitch, EP**, Tremblay, J, (2017) The influence of topography on the emplacement dynamics of lava flows on Mars. Geological Society of America Cordilleran Meeting, oral presentation 20-2.

Langdalen, Z, Fagents, SA, **Fitch, EP** (2017) Dispersal of volcanic ash on Mars: ash particle shape analysis. Geological Society of America Cordilleran Meeting, poster presentation 52-13.

**Fitch, EP**, Fagents, SA, Thordarson, T, Hamilton, CW (2015) Fragmentation mechanisms associated with lacustrine lava–water explosions. American Geophysical Union Fall Meeting, poster presentation V33B-3107.

Pierce, J, Meyer, G, Bigio, E, Nelson, N, Poulos, M, Jenkins, S, Weppner, K, Riley, K, Svenson, L, **Fitch, EP**, Frechette, J (2015) Who is in the driver’s seat? Millennial-scale records of wildfire in the Western USA

reveal a complex interplay of climate, fire and vegetation. American Geophysical Union Fall Meeting, oral presentation B11N-05

Pierce, J, Meyer, G, Bigio, E, Nelson, N, Poulos, M, Jenkins, S, Weppner, K, Riley, K, **Fitch, EP**, Frechette, J (2015) A synthesis of alluvial records of wildfire in the Western USA: a complex interplay of climate and vegetation. Geological Society of America Fall Meeting, oral presentation 331-6.

**Fitch, EP**, Hamilton, CW, Fagents, SA, Thordarson, T (2013) Stages of rootless cone formation observed within the Rauðhólar cone group, Iceland. American Geophysical Union Fall Meeting, poster presentation V41D-2838.

Meyer, GA, **Fitch, EP** (2013) Holocene fire, climate and erosion in the Jemez Mountains, New Mexico: Natural and anthropogenic controls. American Geophysical Union Fall Meeting, oral presentation GC24A-05, presented by EP Fitch.

**Fitch, EP**, Meyer, GA (2011) Geomorphic implications of fire and slope aspect in the Jemez Mountains, New Mexico, USA. American Geophysical Union Fall Meeting, poster presentation EP21C-0719.

---

## CAREER DEVELOPMENT

I'm a member of the American Geophysical Union, Geological Society of America, the Geothermal Resources Council, Women in Geothermal, and the International Association of Volcanology and Chemistry of the Earth's Interior, in addition to its commissions on volcano-ice interactions, explosive eruptions, submarine eruptions, and volcanic lakes.

- 2020            **Workshop on Standing up to Bias**, Dec 14<sup>th</sup>, AGU Fall Meeting, Presented by Inclusion & Power Play, Virtual Workshop.
- 2020–Present **Secretary** of the IAVCEI/IACS joint Volcano–Ice Interactions Commission
- 2019            **Session Chair** of the largest session on hydrovolcanism in the 100 years of the American Geophysical Union Fall Meeting, Session V023: Hydrovolcanic, Submarine, and Subglacial Eruptions: Exploring Hydrosphere-Volcano Interactions (59 presentations)
- 2019            **NASA Review Panelist**, Virtual Proposal Review Panel
- 2018            **Session Convener**, American Geophysical Union Fall Meeting, Session V019: Developments in Magma-Water Interaction: Field Work, Experiments, and Computations
- 2017            **Preparing for Volcanic Crisis**, GSA Short Course, presented by Bruce Houghton, May 26<sup>th</sup>, University of Hawai'i at Mānoa, HI
- 2015            **Logistics Assistant**, Spectral Imaging Group, NASA RIS<sup>4</sup>E Field Campaign, June 1<sup>st</sup>–9<sup>th</sup>, Hawai'i
- 2013            **NASA Volcanology Field Workshop**, May 15<sup>th</sup>–22<sup>nd</sup>, Hawai'i
- 2010            **Field Safety Leadership**, GSA Short Course by ExxonMobil, October 29<sup>th</sup>–30<sup>th</sup>, Denver, CO
- 2009            **Workshop on Modeling Martian Hydrous Environments**, June 1<sup>st</sup>–3<sup>rd</sup>, Lunar & Planetary Institute, The Woodlands, TX
- 2009            **The NASA EPOXI Mission 2009 Team Meeting**, February 5<sup>th</sup>–6<sup>th</sup>, Pasadena, CA

---

## VOLUNTEER & OUTREACH ACTIVITIES

- 2021            **Workshop Organizer**, IgDEAS & Talapas Exchange Introduction to Coding 3-Part Workshop Series, Univ. of Oregon
- 2020–Present **Race and Racism Action Group Participant**, Dept. of Earth Sciences, Univ. of Oregon
- 2017            **Invited Presenter**, ThinkTech Hawai'i Talk Show, Nov. 20<sup>th</sup>, When Hot Lava Meets Cold Water ([https://www.youtube.com/watch?v=kF\\_a0zJ0kxs](https://www.youtube.com/watch?v=kF_a0zJ0kxs))
- 2016            **Developed High School Educational Exercise** entitled, “2014 Pu'u 'O'o Lava Flow”

- 2015 **Developed High School Educational Exercise** entitled, “Volcano Hazards: Explosive Interactions between Lava and Water”
- 2015 **Invited Presenter**, Natural Disasters: Geoethics Course, University of Hawai‘i at Mānoa
- 2014–2015 **Seminar Organizer**, Hawai‘i Institute of Geophysics and Planetology (HIGP), University of Hawai‘i at Mānoa
- 2013–2018 **Invited Presenter**, Hawai‘ian Field Studies Summer Program, North Lake College, TX
- 2013–2017 **Open House Volunteer**, Biennial Open House of the School of Ocean & Earth Science & Technology (SOEST), University of Hawai‘i at Mānoa
- 2011–2012 **Earth & Planetary Sciences Department Representative**, Graduate and Professional Student Association (GPSA), University of New Mexico
- 

## REFERENCES

- Dr. Josef Dufek** University of Oregon | (541) 346-4788 | [jdufek@uoregon.edu](mailto:jdufek@uoregon.edu)
- Dr. Sarah A. Fagents** University of Hawai‘i at Mānoa | (808) 956-3163 | [fagents@higp.hawaii.edu](mailto:fagents@higp.hawaii.edu)
- Dr. Carolyn Parcheta** Hawai‘ian Volcano Observatory | (808) 936-6085 | [cparcheta@usgs.gov](mailto:cparcheta@usgs.gov)
- Dr. Grant A. Meyer** University of New Mexico | (505) 277-5384 | [gmeyer@unm.edu](mailto:gmeyer@unm.edu)