

# ALLAN H. LERNER

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## EDUCATION

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- Ph.D. Student, Department of Earth Sciences, University of Oregon** 2015 - 2020  
Primary Research adviser: Dr. Paul Wallace (expected)  
Co-advisers: Leif Karlstrom (UO) Peter Kelly (USGS-CVO)  
Thesis: *Sulfur Systematics at Active Volcanoes via Studies of Active Degassing and Melt Inclusions*
- M.Sc., College of Earth, Ocean, & Atmospheric Sciences, Oregon State University** 2013 - 2015  
Research adviser: Dr. Adam Kent  
Thesis: *Insights into the Geochemical Evolution of the Youngest Toba Tuff (Sumatra, Indonesia) Magma Chamber through the Lens of Zircon-hosted Melt Inclusions*
- B.A., Department of Geology, Amherst College, MA** 2006 - 2010  
Thesis: *The Eruption Dynamics of the 8.5 ka Driftwood Pumice-fall, Makushin Volcano, Alaska*

## HONORS AND AWARDS

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- National Science Foundation: Graduate Research Fellowship (NSF-GRFP) 2015 - present
- NSF-GRFP Graduate Research Internship Program (GRIP) recipient:  
USGS - Volcano Emissions Project Gas Geochemistry Internship Collaboration with the USGS to study volcanic degassing at Mt. St. Helens 2016 - present
- Argonne National Laboratories, Advanced Light Source (APS) user proposal beamtime award (PI – Allan Lerner):  
“Investigating the effects of mantle source and sulfur degassing on the fO<sub>2</sub> of magmatic systems via  $\mu$ XANES measurements of melt inclusions” 2017 - present
- University of Oregon Graduate School: Special “OPPS” Travel and Research grant 2018
- University of Oregon Dept. of Earth Sciences: Staples Scholarship for Research 2016, 2017
- Mazamas Graduate Research Grant 2014, 2017
- Geological Society of America (GSA): Graduate Research Grant 2017
- Mineralogical Society of America: Mineralogy/Petrology Research Award 2017
- Jack Kleinman Award for Volcano Research (awarded by USGS and the Community Foundation for Southwest Washington) 2016
- Geological Society of America (GSA): Graduate Research Grant, with Outstanding Proposal Mention distinction 2014
- Oregon State University: Provost’s Distinguished Graduate Fellow 2013

Amherst College: <i>Summa Cum Laude</i> distinction	2010
Amherst College Geology Department:	
Walter F. Pond Prize for the most distinguished senior thesis	2010
Belt-Brophy Prize for student showing the greatest promise for a career in geology	2009
Richard M. Foose Award to support summer field work	2007, 2008, 2010

## RESEARCH, WORK, AND FIELD EXPERIENCE

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Hawaiian Volcano Observatory (HVO) Gas Geochemistry interim group head Helped lead HVO gas monitoring efforts leading up to and during the 2018 Lower East Rift Zone eruption, conducting field measurements, and interfacing with monitoring, research, and public health efforts	3 - 6/2018
Field Assistant/Technician NOVAC installations, Sinabung and Gamalama Volcanoes, Indonesia Aided in joint installations with the Indonesian Center for Volcanology and Geologic Hazard Mitigation (CVGHM) and the USGS Volcanic Disaster Assistance Program (VDAP) to install networks of NOVAC SO <sub>2</sub> scanners to monitor gas emissions at the currently erupting Sinabung Volcano (2016) and the frequently active Gamalama Volcano (2017)	8/2016, 5/2017
Research Assistant, Geology and Geochemical Monitoring of Ijen Volcano, Indonesia: Assisted in a collaborative workshop between the USGS Volcanic Disaster Assistance Program (VDAP) and the Indonesian Center for Volcanology and Geologic Hazard Mitigation (CVGHM), conducting geologic mapping, aqueous geochemical sampling, and installing and operating UV spectrometers and Multi-Gas instruments to monitor gas emissions from Kawah Ijen Volcano	9/2015
Field Assistant, Volcanic Stratigraphy of the Deschutes Basin, OR: Assisted in field mapping and interpretation of ignimbrite and tephra fall deposits within the Miocene-Pliocene Deschutes Basin, assisting the PhD research of Bradley Pitcher (Oregon State University)	2013, 2014
Field Assistant, Imaging Magma Under St. Helens (iMUSH), WA: Participated in planning and deployment of a seismometer network around Mt. St. Helens volcano as part of a large-scale active-seismic project to image the underlying magma body and broader lithospheric structure	6 - 7/2014
Field/Research Assistant, Centro de Intercambio y Investigación en Vulcanología (CIIV), Universidad de Colima, Mexico: Led a group of international interns in supporting ongoing monitoring and research on the actively erupting Volcán de Colima, working under Dr. Nick Varley. Monitoring efforts included thermal analysis, field mapping, ash collection, SO <sub>2</sub> gas emission via scanning UV spectrometer (FLYSPEC) and SO <sub>2</sub> cameras, spring geochemistry, and soil gas flux measurements	4 - 5/2013
Gas Geochemistry Intern, USGS Hawaiian Volcano Observatory (HVO), HI: Measured SO <sub>2</sub> , CO <sub>2</sub> , H <sub>2</sub> O, H <sub>2</sub> S, HF, and HCl emissions from Kīlauea's active vents using UV and FTIR spectrometers and LI-COR gas analyzers, maintained network of ambient SO <sub>2</sub> monitors, assisted with developing a radiative-transfer reprocessing protocol for SO <sub>2</sub> , developed an ArcGIS-based map and visualization tool for SO <sub>2</sub>	2012 - 2013

concentration across the island. Gained public outreach experience discussing hazard awareness on an actively erupting volcano	
Post-Baccalaureate Research Assistant, Los Alamos National Laboratory, NM: Supervised by Dr. Donald Hickmott, I investigated <i>a</i> ) the location and behavior of water in the structure and on surface interfaces of minerals at high P/T using neutron scattering techniques, and <i>b</i> ) the ability of mantle minerals to entrain interstitial carbon and water. I led sample preparation, data collection and analysis, conducted literature reviews, and wrote funding and instrument user proposals, as well as journal publications	2011 - 2012
Amherst College Senior Thesis Research: Conducted three weeks of field work through the KECK Geology Consortium on Makushin Volcano on Unalaska Is., Aleutian Islands. I analyzed the geochemistry (XRF, SEM-EDS), petrology, and stratigraphy (field mapping, volumetric reconstructions) of a Holocene pumice deposit to determine the eruption chronology and triggering mechanism. Research eventually led to a publication in 2018.	2009 - 2010
Geology of the Greek Isles; Hawaiian Geology; Geology of the Colorado Plateau: Field courses offered by Amherst College	2007, 2009, 2010
Tropical Biology Semester Abroad In Costa Rica: Studied tropical ecosystems, environmental science and policy, and Spanish language and culture in Costa Rica through the Organization for Tropical Studies, an affiliate of Duke University	2009
Field Geology in the Rocky Mountains: Student in a six-week field camp through Indiana University	2008

## TEACHING EXPERIENCE

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### University of Oregon:

Teaching Assistant for: Introductory Petrology (Dr. Paul Wallace); Mineralogy (Prof. Dave Blackwell)	2018 - 2019
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### Oregon State University:

Teaching Assistant for: Volcanology (Prof. Anita Grunder); Living with Earthquakes in the Pacific Northwest (Prof. Matthew Nyman); Environmental Geology (Prof. Kaplan Yalcin); Environmental Justice (Prof. Stephen Lancaster); Global Change and Earth Science (Prof. Peter Clark); Physical Geology for Science Majors (Prof. Kaplan Yalcin)	2014 - 2015
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### Amherst College:

Teaching Assistant for Field Geology of Hawaii (joint Amherst College and Smith College trip): Organized and co-led a two-week field course for 35 undergraduate students to the Big Island of Hawaii, focusing on volcanology, geology, natural hazards, climate, culture, and environmental issues	2014
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Teaching Assistant for courses: Introduction to Geology (Profs. Tekla Harms & Peter Crowley); Mineralogy (Prof. Jack Cheney)	2008, 2009
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## TECHNICAL SKILLS

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*Proficiencies:* Electron Microprobe Analysis (EMPA); Secondary Electron Microscopy (SEM) and cathodoluminescence (CL) imaging; Ultraviolet (UV) spectroscopy for volcanic plume SO<sub>2</sub> measurements (Differential Optical Absorption Spectroscopy [DOAS], NOVAC [[Network for Observation of Volcanic and Atmospheric Change](#)] scanners, FLYSPEC, UV cameras); Flow-through and passive gas sensors (MultiGAS); X-ray Fluorescence (XRF); X-ray Diffraction (XRD); X-ray Absorption Near Edge Structure (XANES), Neutron Reflectometry (NR); Petrographic microscopy; Thermal camera imaging; Aqueous and gaseous geochemical field sampling and analysis; Geologic field surveying equipment.

*SOFTWARE:* Microsoft and Adobe suites (Word, Excel, Illustrator); Matlab computational language; Origin and IoGAS data analysis software; MELTS thermochemical modeling

*Experience with:* Fourier transform Infrared (FTIR) spectroscopy; Secondary Ion Mass Spectrometry (SIMS) ion imaging and analysis; X-ray Reflectometry (XRR); Neutron Diffraction (ND); Inelastic Neutron Scattering (INS); Ion implantation; Optical profilometry; Seismograph interpretation; Gravimetric surveying; CO<sub>2</sub> and radon soil gas probes. *SOFTWARE:* ArcGIS; Perl computer language; “R” statistical packages; Theriak-Domino thermodynamics/phase equilibrium software

## OUTREACH

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Co-organizer of Volcanology Students of Oregon (Volc-OR) scientific conference Co-founded an entirely student-led regional conference for grad / undergraduate volcanology students in Oregon, which rotates annually between Portland State University, Oregon State University, and University of Oregon.	2018
American Society of Photogrammetry and Remote Sensing (ASPRS), University of Oregon student chapter. Student Chapter Treasurer (2017 - 2019)	2015 - present
“Guest Volcanologist” lessons for elementary school groups in Eugene, OR	2016
University of Oregon, Department of Earth Sciences field trip blogger Created and administered field trip blog for a department “Staple’s” field trip with USGS partners to the Taos Plateau (New Mexico) and the San Juan Volcanic Field (Colorado): <a href="https://blogs.uoregon.edu/staples2016/">https://blogs.uoregon.edu/staples2016/</a>	2016
University of Oregon, CURIOSITY Graduate Student seminar organizer Executive board organizer and guest speaker and for a graduate-student led interdisciplinary science seminar series: <a href="http://blogs.uoregon.edu/curiosity/">http://blogs.uoregon.edu/curiosity/</a>	2015 - 2017
Oregon State University’s Geology Club: Guest speaker on Volcanic Hazard Monitoring; mentor for school/career advice	2015
Oregon State University’s Louis Stokes Alliance for Minority Participation: Led geology presentations to a freshman group of this program in order to broaden student exposure to the fields of Science and Technology	2014
Pajarito Environmental Education Center (PEEC), Los Alamos, NM: Organized and led geology field trips for community members and local elementary school classes as a “resident geologist”	2011, 2012
Amherst College Emergency Medical Services (ACEMS), Amherst, MA Led First-Responder teams for medical crises on the Amherst College campus	2007 - 2010

## PUBLICATIONS

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ORCID iD: 0000-0001-7208-1493

Neal, C.A., Brantley, S.R., Antolik, L., Babb, J.L., Burgess, M., Calles, K., Cappos, M., Chang, J.C., Conway, S., Desmither, L., Dotray, P., Elias, T., Fukunaga, P., Fuke, S., Johanson, I.A., Kamibayashi, K., Kauahikaua, J., Lee, R.L., Pekalib, S., Miklius, A., Million, W., Moniz, C.J., Nadeau, P.A., Okubo, P., Parcheta, C., Patrick, M.R., Shiro, B., Swanson, D.A., Tollett, W., Trusdell, F., Younger, E.F., Zoeller, M.H., Montgomery-Brown, E.K., Anderson, K.R., Poland, M.P., Ball, J.L., Bard, J., Coombs, M., Dietterich, H.R., Kern, C., Thelen, W.A., Cervelli, P.F., Orr, T., Houghton, B.F., Gansecki, C., Hazlett, R., Lundgren, P., Diefenbach, A.K., **Lerner, A.H.**, Waite, G., Kelly, P., Clor, L., Werner, C., Mulliken, K., Fisher, G., Damby, D., (2019). The 2018 rift eruption and summit collapse of Kīlauea Volcano. *Science*. 363, 367–374. DOI: 10.1126/science.aav7046

**Lerner A.H.**, Crowley P.D., Nicolaysen K.P., Hazlett R.W. (2018). Stratigraphy, distribution, and evidence for mafic triggering of the ca. 8.5 ka Driftwood Pumice eruption, Makushin Volcano, Alaska, U.S.A. *Journal of Volcanology and Geothermal Research*. 357, 362-377. DOI: 10.1016/j.jvolgeores.2018.05.006

Damby D.E., Peek S., **Lerner A.H.**, and Elias T. (2018). Volcanic ash leachate chemistry from increased 2018 activity of Kīlauea Volcano, Hawaii: *U.S. Geological Survey data release*. DOI: 10.5066/P98A07DC

Primulyana S., Kern C., **Lerner A.**, Saing U.B., Kunrat S.L., Alfianti H., Marlia M. (*in press*). Gas and ash emissions associated with the 2010-present activity of Sinabung Volcano, Indonesia. *Journal of Volcanology and Geothermal Research*. DOI: 10.1016/j.jvolgeores.2017.11.018

**Lerner A.** (2015). MSc Thesis: Insights into the Geochemical Evolution of the Youngest Toba Tuff (Sumatra, Indonesia) Magma Chamber Through the Lens of Zircon-hosted Melt Inclusions. *Oregon State University, Scholar's Archives*. <http://ir.library.oregonstate.edu/xmlui/handle/1957/57500>

Cassidy M., Cole P.D., Hicks K.E., Varley N.R., Peters N., **Lerner A.H.** (2015). Rapid and slow: Varying magma ascent rates provide the mechanism for small Vulcanian eruptions. *Earth and Planetary Science Letters*. 460: 73-84. DOI: 10.1016/j.epsl.2015.03.025

Wang P., Hudak M.R., **Lerner A.H.**, Grubbs R.K., Wang S., Zhang Z., Karapetrova E., Hickmott D.D., Majewski J. (2014). X-ray scattering of calcite thin films deposited by atomic layer deposition: Studies in air and in calcite saturated water solution. *Thin Solid Films*. 565: 277-284. DOI: 10.1016/j.tsf.2014.06.032

Wang P., **Lerner A.H.**, Taylor M., Baldwin J.K., Grubbs R.K., Majewski J., Hickmott D.D. (2012). High-pressure and High-Temperature Neutron Reflectometry Cell for Solid-Fluid Interface Studies. *European Physics Journal Plus* 127: 76, 1-15. DOI: 10.1140/epjp/i2012-12076-0

## CONFERENCE CONTRIBUTIONS and INVITED TALKS

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**Lerner A.H.**, Lee R.L., Gansecki C., Nadeau P., Wallace P.J., Elias T., Kern C., Thornber C., Clor L., Kelly P., Werner C., Cappos M., Moore, L., (2018). Insights into magma mixing and sulfur degassing during the 2018 Kīlauea fissure eruption via mineral and melt inclusion geochemistry. 2018 AGU fall meeting, Washington D.C., (*poster, V43J-0281*)

- Lerner A.H.**, Wallace P.J., Thornber C., Kelly P., Coombs M., Mandeville C. (2018). Sulfur degassing and magma oxidation state at Mount St. Helens (WA) and Augustine (AK) Volcanoes. Presented at 2018 Goldschmidt conference, Boston, MA (*poster, 04J-105*)
- Lerner A.H.**, Wallace P.J., Karlstrom L. (2017) Investigating the connection between sulfur degassing and the oxidation state of melt at Mount St. Helens and Augustine volcanoes + The Occurrence of Offset Magma Reservoirs at Holocene Volcanoes. Presented at USGS Cascade Volcano Observatory, Vancouver, WA (*invited talk*)
- Lerner A.H.**, Kern C. (2017) Mapping volcanic unrest: Gas monitoring with the NOVAC network. Presented at 2017 ASPRS Columbia River Regional tech exchange, Vancouver, WA (*oral presentation*)
- Lerner A.H.**, Wallace P.J. (2017) Investigating the connection between sulfur degassing and the oxidation state of melt at Mount St. Helens and Augustine volcanoes (USA) via XANES. Presented at 2017 IAVCEI-CCVG meeting, Baños, Ecuador (*oral presentation*)
- Lerner A.H.**, Wallace P.J., Thornber C., Kelly P., Coombs M., Mandeville C. (2017). Investigating the connection between sulfur degassing and the oxidation state of melt at Mount St. Helens, Washington, and Augustine Volcano, Alaska. Presented at 2017 IAVCEI meeting, Portland, OR (*poster, VO13A-160*)
- Kelly P., Saing U., Primulyana S., Suparjan, Purwanto H.B., Setiono S., Gunawan H., Rinehart A., **Lerner A.**, Kern C., Paskievitch J. (2017). Continuous Multi-GAS monitoring yields new insights into gas emissions from Kawah Ijen volcano, Indonesia. Presented at 2017 IAVCEI meeting, Portland, OR (*oral presentation, PE42C-6*)
- Primulyana S., Kern C., **Lerner A.**, Saing U., Kunrat S., Alfianti H., Marlia M. (2017) Gas and ash emissions associated with the 2010 – present activity of Sinabung Volcano, Indonesia. Presented at 2017 IAVCEI meeting, Portland, OR (*poster, PE43A-094*)
- Lerner A.H.**, Karlstrom L., Hurwitz S., Anderson K., and Ebmeier S. (2016). Rethinking Volcanic Plumbing Systems: The Prevalence of Offset Magma Reservoirs at Holocene Volcanoes. Presented at 2016 AGU Fall meeting, San Francisco, CA (*poster, V53C-3096*)
- Lerner A.H.**, and Kent A.J.R. (2015). Insights into the Geochemical Evolution of the Youngest Toba Tuff Magma Chamber using Zircon-hosted Melt Inclusions. Presented at 2015 AGU Fall meeting, San Francisco, CA (*poster, V13B-3120*)
- Lerner A.H.**, and Kent A.J.R. (2014). Using Zircon-hosted Melt Inclusions to Track the Late Volatile Evolution of the 74 ka Youngest Toba Tuff, Sumatra. Presented at:  
2014 AGU Fall meeting, San Francisco, CA (*poster, V51A-4722*)  
2014 GSA National Meeting, Vancouver, BC (*poster, 250586*)
- Hickmott D.D., **Lerner A.H.**, Wang P., Majewski J., Taylor M., Grubbs R.K. (2011). Neutron Reflectometry at Elevated Pressures and Temperatures - Novel P-T Cell and Preliminary Experiments. Presented at 2011 AGU Fall Meeting, San Francisco, CA (*poster, V21A-2473*)
- Lerner A.H.**, Wang P., Hickmott D.D., Majewski J., Taylor M. (2011). Determination of Calcite-Fluid Interfaces at High P/T via Neutron Reflectometry. Presented at 2011 Los Alamos National Laboratory (LANL) Student Symposium (*poster*)
- Lerner A.H.**, Crowley P.D., Hazlett R.W., Nicolaysen K.P. (2010). Eruption Dynamics of the 7.7 ka Driftwood-Pumice Fall, Makushin Volcano, AK. Presented at:

2011 Los Alamos Geological Society (LAGS), May Meeting, Los Alamos, NM (*invited talk*)  
2010 AGU Fall Meeting, San Francisco, CA, 13-17 Dec (*poster, V11D-2335*)  
2010 Northeast ArcGIS (NEarc) Users Group Spring Meeting, Smith College, MA, 11 May (*poster*)  
2010 KECK Geology Undergraduate Research Symposium, Houston, TX, 15-18 April (*talk and poster*)  
2010 GSA Northeast/Southeast Joint Regional Meeting, Baltimore, MD 13-16 March (*poster, 52-3*)

#### **PERSONAL INFO and MISCELLANEOUS SKILLS**

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Former Emergency Medical Technician (EMT-Basic) in NY and MA from 2007 - 2011

Mountain bike enthusiast and former vice-president/coach of the Amherst College Biking Intercollegiate Racing Team (AMBIR) from 2008 - 2010

Intermediate-Advanced Spanish proficiency

Knowledge of industrial welding, micro-welding, and machine shop equipment operation

Open-Water SCUBA certification (and the desire to do more!)