

Josef Dufek

Gwen and Charles Lillis Chair
Professor, Department of Earth Sciences
Associate Member, Knight Campus for Accelerating Scientific Impact
University of Oregon
Eugene, OR 97403-1272, USA
jdufek@uoregon.edu

Appointments

2006-2008 Miller Postdoctoral Fellow, University of California, Berkeley
2008-2013 Assistant Professor, School of Earth and Atmospheric Science, Georgia Institute of Technology
2012-2014 Blanchard-Milliken Young Faculty Chair, Georgia Institute of Technology
2013-2016 Associate Professor, School of Earth and Atmospheric Science, Georgia Institute of Technology
2016 - 2018 Professor, School of Earth and Atmospheric Science, Georgia Institute of Technology
2014-2018 Associate Chair, School of Earth and Atmospheric Science, Georgia Institute of Technology
2018 – Gwen and Charles Lillis Chair, Director of the Center for Volcanology, Department of Earth Sciences, University of Oregon
2020 – Associate Member, Knight Campus for Accelerating Scientific Impact
2019 - 2022 Visiting Scientist, Lawrence Livermore National Laboratory, DOE

Education

University of Washington, Department of Earth and Space Sciences, Seattle, WA

Ph.D. in Earth and Space Sciences, 2006.

Thesis: *The Ascent and Eruption of Arc Magmas: A Physical Examination of the Genesis, Rates, and Dynamics of Silicic Volcanism.* (Advisor George Bergantz)

University of Washington, Department of Earth and Space Sciences, Seattle, WA

M.S. in Geology, 2004.

Thesis: *Lower Crustal Magma Genesis and Preservation: A Stochastic Framework for the Evaluation of Basalt-Crust Interaction* (Advisor George Bergantz)

University of Chicago, Department of Geophysical Sciences, Chicago, IL

B.S. with Honors in Geophysical Sciences, 2000.

Honors Thesis: *A Coupled Dynamic Glacier-Atmosphere Model of the Climate of Early Mars* (Advisor Raymond Pierrehumbert)

Research Interests

Turbulent multiphase flow, comparative planetology, natural hazards, physical petrology, explosive eruption dynamics, magma dynamics, mass and heat transfer in the crust and geochemical consequences, and planetary volcanism.

Honors and Recognition

2024	UO College of Arts and Sciences, Collegiate Faculty Award
2022	Kavli Institute of Theoretical Physics, Keynote Presentation on Multiphase Flows
2019	UO Leadership Academy
2018	Gwen and Charles Lillis Chair, University of Oregon
2014	Kavli Frontiers of Science Fellow (National Academy)
2012	AGU (American Geophysical Union) Fellow
2012	Macelwane Medal (AGU Union Award)
2012	Blanchard-Milliken College of Science Faculty Fellowship
2012	NSF CAREER Award
2011	George Walker Award (IAVCEI)
2010	H. Kuno Early Career Award (AGU,VGP Section)
2006	Miller Postdoctoral Fellowship
2004	AGU student paper award
2004	David Johnston Award for graduate research
2004	NASA Earth Systems Science Fellowship
2001	National Defense Science and Engineering Fellowship
2001	NSF Graduate Fellowship, declined to receive National Defense Fellowship
2001	Achievement Rewards for College Scientists (ARCS) Fellowship
1996-2000	University of Chicago Honors Scholarship
1996	United States Senate Youth Scholarship (program sponsored by the William Randolph Hearst Foundation and U.S. Senate)
1996	Robert C. Byrd Honors Scholarship

Grants

Pending proposals

- NRT-HDR: HAZard Data Analysis and Technology (HAZDAT) Training: Enabling Hazard Mitigation by Harnessing Emergent Technologies, Computational Approaches, and Data Science*
 Agency: NSF
 Role: PI
 Period: 3/1/2024 – 3/1/2029
 Amount: \$3,000,000
- MRI: Track 1 Physical Property Measurement System for diverse materials research and education*
 Agency: NSF
 Role: Co-PI (PI Matthias Agne)
 Amount: \$599,890

Funded proposals

- Collaborative Research: Transport Dynamics and Mobility of Large-Scale Submarine Volcaniclastic Density Currents at Hunga Volcano, Tonga*
 Agency: NSF
 Role: PI
 Amount: \$261,634

- *CC* Regional Computing: ORCA: Oregon Regional Computing Accelerator*
Agency: NSF
Role: Co-PI (PI Will Pazner, PSU)
Period: 4/1/2024 – 4/1/2026
Amount: \$993,210
- *Collaborative Research: Aggregation and Electrification in a Laboratory-scale Volcanic Plume*
Agency: NSF Geophysics
Role: PI
Period: July 1, 2023 – July 1, 2026
Amount Funded: \$392,230
- *Dynamics of crystal mush: Insight from 2D and 3D analysis of drill cores from Kilauea Iki lava lake, Hawaii*
Agency: NSF Geochemistry & Petrology
Role: Co-PI (Cashman, PI)
Period: Sept. 1, 2023 – Sept. 1, 2026
Amount Funded: \$669,806
- *Tracking volcanic gases from magma reservoir to the atmosphere: identifying precursors, and optimizing models and satellite observations for future major eruptions*
Agency: NASA (IDS)
Period: July 1, 2020 – June 30, 2023
Lead Institution: Michigan Tech (PI Simon Carn)
UO subcontract (\$380,247, Dufek Institutional PI)
- *Aeolean Microbiology in the Lab*
Agency: Keck Foundation
Period: Jan. 1, 2023 – Jan. 1, 2026
Lead Institution: Emory (PI Justin Burton)
UO Subcontract (\$300,000, Dufek Co-PI)
- *Atmospheric Electricity on Earth and Mars (subaward)*
Agency: NSF
Period: May 1, 2021 – April 30, 2026
Lead Institution: Florida Institute of Technology (PI Jeremy Rioussset)
UO subcontract: \$96,000
- *Determining the charging potential of carbon particles in compressible flows*
Agency: DOE
Period: August 1, 2020 – Sept. 15, 2022* (including supplement, processed as separate grants)
Lead Institution: University of Oregon (PI Josef Dufek)
Amount Funded: \$194,000
*(Currently negotiating a 5 year extension to this contract)
- *Collaborative Research: Integrating Petrochronology, Magma Dynamics, and Volcanic Unrest at the Three Sisters Volcanic Complex*

Agency: NSF
Role: PI
Amount Funded: \$338,403
Period: Jan. 1, 2020 – Dec. 31, 2022

- High Performance Computing Cluster for Research and Innovation
Murdock Foundation
Role: Co-PI
Amount Funded: \$500,000
Funded extension to the Talapas cluster
- *Constraining properties of pyroclastic density currents with remote infrasound and seismic observations*
Agency: NSF
Role: PI
Amount Funded: \$266,406
Period: Jan. 1, 2020 – Dec. 31, 2021
- *“Triboelectric charging of particles on Titan: Assessing the role of charging and aggregation on the geomorphology and atmosphere of Titan”*
Agency: NASA (ROSES 2017, Solar System Workings)
Role: PI
Amount Funded: \$398,169
Period: July 1, 2019 – July 1, 2024
- *“Collaborative research: Mapping bed forces to granular flow properties”*
Agency: NSF, GLD
Role: PI
Amount requested: \$240,280
Period: Aug. 15, 2019 – Aug. 14, 2022
- *Collaborative Research: Experimental and Numerical Constraints on Buoyancy Reversal in Pyroclastic Density Currents*
Agency: NSF, Geochemistry and Petrology
Role: PI
Amount requested: \$196,048
Period: Jan 1, 2019 – June 31, 2021
- *Computation approaches to mitigate volcanic eruption hazards: Enhancing detection of subsurface magma bodies.*
Internal UO Renee James Seed Grant Fund
Role: PI (with Co-PI Emilie Hooft)
Amount received: \$40,000
Period: July 2019-July 2020
- *“The interaction of Pyroclastic Density Currents with the Atmosphere and Landscapes”*
Agency: NSF, Geochemistry & Petrology
Role: PI
Amount Funded: \$292,404
Period: Jan 1: 2017 – Dec. 31 2020

- *“Collaborative Research: Constraining the flux of magma and magmatic CO₂ during early-stage rifting in East Africa”*
Agency: NSF, GeoPRISMS
Role: Co-PI
Amount requested: \$67,120
Period: July 1, 2017 – July 1, 2020
- *“Magma waves, magma wagging and volcanic oscillations”*
Agency: NSF, Geophysics
Role: Co-PI
Amount Funded: \$638,826 (Oregon subcontract: \$111,392)
Period: Jan 1: 2017 – Dec. 31 2020
- *“Dynamics of caldera-scale rhyolitic magma systems”*
Agency: NSF
Role: Institutional PI
Total Dollar Amount: \$2,593,026 (\$335K at Dufek’s Institution)
Collaborators: Singer (Wisconsin, Project Director, PI)
Period of Contract: 6/1/14 – 5/31/19
- *“Collaborative Research: ENH: Physical modeling of submarine volcanic eruption generated tsunamis”*
Agency: NSF
Role: Co-PI
Amount Funded: \$659,000
Period: July 1, 2016 – Feb. 1, 2019
- *“CAREER: The Role of Proximal Dynamics and Particle Aggregation in Ash Dispersal: An Educational, Numerical, Field and Laboratory Approach”*
Agency: NSF
Role: PI
Total Dollar Amount: \$470,000
Period of Contract: 1/1/12 – 1/1/17.
- *“Accomplishment Based Renewal: Multiscale Dynamics in Explosive Volcanic Eruptions”*
Agency: NSF
Role: PI
Total Dollar Amount: \$382,385
Period of Contract: 7/1/12 - 7/1/15
- *“Collaborative Research: Windows of Opportunity: Exploring the Controls on the Depths of Eruption-forming Silicic Magma Bodies Using Improved Thermodynamics and Dynamics Models”*
Agency: NSF
Role: Co-PI
Total Dollar Amount: \$218,228
Period of contract: 8/1/13 - 8/1/15

- *“Heterogeneous Bubble Dynamics in Volcanic Conduits”*
Agency: NSF
Total Dollar Amount: \$292,061
Role: Co-PI
Period of Contract: 1/1/13-1/1/15
- *“Plume Morphology on Europa: Assessment of the Driving Forces, Multiphase Plume Dynamics, and Plasma Environment”*
Agency: Jet Propulsion Laboratory
Role: Co-PI
Total Dollar Amount: \$78,829
Period of Contract: 7/21/2014-7/21/2015
- *“Multi-scale dynamics in explosive volcanic eruptions”*
Agency: NSF
Role: PI
Total Dollar Amount: \$344,964
Period of Contract: 9/1/08 – 9/1/11
- *“Boiling-over Pyroclastic Flows “*
Agency: NSF
Role: PI
Total Dollar Amount: \$311,596
Period of Contract: 1/1/09 – 1/1/12
- *“The Dynamics of Explosive Phreatomagmatic Events on Mars: The Role of Atmospheric Pressure in Determining Eruptive Style and Deposit Architecture”*
Agency: NASA
Role: PI
Total Dollar Amount: \$242,419
Period of Contract: 6/1/09 – 5/31/12
- *“Enceladus’ Plume: Coupling Eruptive Dynamics to Plasma Dynamics”*
Agency: NASA
Role: Co-PI
Total Dollar Amount: \$280,000
Period of Contract: 5/1/2011 – 4/30/2014
- *“A Closer Look at the May 18th, 1980 Pumice Plain Deposits: Implications for Assessing Eruptive Conditions and Pyroclastic Density Current Dynamics”*
Agency: NSF
Role: PI
Total Dollar Amount: \$369,400
Period of Contract: 1/1/10 – 12/31/12
- *“Eruptive Potential of Silicic Magmas: Thermodynamic and Fluid Dynamics Modeling, and Implications to the Evolution of Selected Natural Systems”*
Agency: NSF
Role: PI
Total Dollar Amount: \$413,224

Period of Contract: 6/1/10-5/31/13

- *“Development of Hands-on Fluid Dynamics Modules for EAS”*
Internal Georgia Tech Technology Fund
Total Dollar Amount: \$24,400
Role: PI
Period of contract: 2011
- *“The magmatic history of Tharsis: Insight from thermal, mechanical and magnetic field modeling”*
Agency: NASA
Total Dollar Amount: \$314,494
Role: Co-PI
Period of Contract: 6/1/09 – 5/31/12

Participation in Grants outside US (No direct funding, but helped with proposal formulation and these have resulted in useful collaboration and funded travel for this work):

- *“Turbulent killers - how do volcanic eruptions become ferocious?”*
2019 Marsden- New Zealand
Royal Society of New Zealand
Role: Associate Investigator, AI (PI Gert Lube)
- *“Emplacement to Extinction: can crustal carbon release from magmatic heating cause extinction-level environmental change?”*
2023 Marsden – New Zealand
Royal Society of New Zealand
Role: Associate Investigator, AI (PI James Muirhead)
- *“Fragmentation and flow of gas-particle mixtures in volcanic systems”*
2022 NERC – UK
Role: Project Partner (PI Thomas Jones)
- *“Unravelling the internal dynamics of pyroclastic density currents”*
International Exchange Grant
Royal Society – UK
Role: Project Partner (PI Thomas Jones)
- *“FIAMME: (An international collaboration for a) Framework for Ignimbrite Analysis Methodologies for Modelling and hazard Evaluations”*
2023 NERC – UK
Role: Project Partner (PI Rebecca Williams)

Publications (* denotes student/postdoc advisee).

Google Scholar: <https://scholar.google.com/citations?user=On7D-6MAAAAJ&hl=en>

Peer-reviewed publications

100. Dechert, A.* E., Andersen, N. L., **Dufek, J.**, & Jilly, C. E. (2024). *Zircon constraints on the eruptive sequence and magma evolution of rhyolites at South Sister volcano, Oregon.* **Geochemistry, Geophysics, Geosystems**, 25(8), e2024GC011680.
99. O'Donnell, S. B., Johnson, B. A., Breard, E. C., Buttles, J. L., Gardner, J. E., Mohrig, D., & **Dufek, J.** (2024). Density Stratification and Buoyancy Evolution in Pyroclastic Density Currents. **Journal of Geophysical Research: Solid Earth**, 129(6), e2024JB029208.
98. Crozier, J., **Dufek, J.**, Karlsrom, L., Anderson, K., Cahalan, R., Thelen, W., Benage, M., Liang, C. (2024) *A collapse-induced stomp-rocket mechanism from explosive eruptions at Kilauea Volcano.* **Nature Geoscience**, 1-7.
97. Jones, T. J., Shetty, A., Chalk, C., **Dufek, J.**, Gonnermann, H. (2024) *Identifying shear-thickening and shear-thinning rheological regimes within concentrated pyroclastic density currents,* **Nature Communications**, 15(1), 4401.
96. Uhle, D. H., Lube, G., Breard, E.C.P., Meiburg, E., **Dufek, J.** Ardo, J., Jones, J.R., Brosch, E., Corna, L. R. B., Jenkins, S. (2024) *Turbulent particle-gas feedback exacerbates the hazard impacts of pyroclastic density currents,* **Nature Communications Earth and Environment**, 5 (1), 245.
95. Breard, E. C., Fullard, L., & Dufek, J. (2024). Rheology of granular mixtures with varying size, density, particle friction, and flow geometry. *Physical Review Fluids*, 9(5), 054303.
94. Rioussset, J. A., Mendez Harper, **Dufek, J.** J. Engle, J. A., Nelson, J. P., Esparza, A.B. (2024) *A generalize Townsend's theory for Paschen curves in planar cylindrical and spherical geometries,* **Journal of Geophysical Research**, Atmospheres, 129(7) e2022JD038427.
93. Mendez Harper, J., McDonald, C.S., Rheingold, E.J., When, L.C., Bumbaugh, R., Cope, E. J., Lindberg, L. E., Pham, J., Kim, Y., **Dufek, J.** Hendon, C.H. (2024) *Moisture Controlled Triboelectrification During Coffee Grinding,* **Matter**, 7 (1) 266-283.
92. Zrelak*, P.J., Breard, E.C.P., **Dufek, J.** (2024) *Basal force fluctuations and granular rheology: Linking macroscopic descriptions of granular flows to bed forces with implications for monitoring signals,* (2024) **Journal of Geophysical Research-Earth Surface**, 129 (7) e2024JF007760.
91. Breard, E.C.P, Cerminara, M., **Dufek, J.**, O'Donnell, S., *Transient Dynamics in Particle-Laden Density Currents: Insights into Dilute Pyroclastic Density Current Runout,* (2024) **AGU Monograph- Submarine Landslides**, in Review.
90. Mendez Harper, J., **Dufek, J.**, Hartman, L. *Electrified fallout from a wildfire plume,* (2024) **Journal of Geophysical Research-Atmospheres**, In Review.
89. Jones TJ, Beckett F, Bernard B, Breard ECP, Dioguardi F, **Dufek J**, Engwell S and Eychenne J (2023) Physical properties of pyroclastic density currents: relevance, challenges and future directions. *Front. Earth Sci.* 11:1218645. doi: 10.3389/feart.2023.1218645

88. Breard, E.*, **Dufek, J.** Charbonnier, S., Gueugneau, V., Giachetti, T. Walsh, B. (2023) *The fragmentation-induced fluidization of pyroclastic density currents*, **Nature Communications**, 14(1), 2079.
87. Cahalan, R., Mastin, L. G., Van Eaton, A. R., Hurwitz, S., Smith, A. B, **Dufek, J.** , Solovitz, S., Patrick, M., Schmith, J., Parcheta, C., Thelen, W., Downs, D.T. (2023) *Dynamics of the December 2020 ash-poor plume formed by lava-water interaction at the summit of Kīlauea Volcano, Hawai‘i*, **Geochemistry, Geophysics, Geosystems** 24, no. 3: e2022GC010718.
86. Kent, A. and **Dufek, J.** (2022) *The Cascadia Subduction zone: Subduction and People, 2023***Elements: An International Magazine of Mineralogy, Geochemistry, and Petrology**, 18(4), 221-225.
85. **Dufek, J.**, Cashman, K., Hooft, E. and Bedrosian, P. (2022) *The nature of active magma reservoirs and storage underneath Cascade volcanoes*, **Elements: An International Magazine of Mineralogy, Geochemistry, and Petrology**,18(4), 239-245.
84. McDonald, G. D.*, Méndez Harper, J., Ojha, L., Corlies, P., **Dufek, J.**, Ewing, R. C., & Kerber, L. (2022). Aeolian sediment transport on Io from lava–frost interactions. **Nature communications**, 13(1), 1-9.
83. Breard, E.,* Fullard, L., **Dufek, J.**, Tennenbaum, M., Fernandez-Nieves, A., and Dietiker, J. (2022), *Investigating the rheology of fluidized and non-fluidized beds – implications for geophysical flows with excess pore pressure*. **Granular Matter**. 24 (1), 1-25.
82. Brosch, E., Lube, G., Cerminara, M., Esposti-Ongaro, T., Breard, E.C., **Dufek, J.**, Sovilla, B. and Fullard, L. (2021). *Destructiveness of pyroclastic surges controlled by turbulent fluctuations*. **Nature communications**, 12(1), pp.1-12.
81. Kubo Hutchison, A.* , & **Dufek, J.** (2021). *Generation of Overspill Pyroclastic Density Currents in Sinuous Channels*. **Journal of Geophysical Research: Solid Earth**, 126(10), e2021JB022442.
80. Carn, S., Newman, P., **Dufek, J.** Aquila, V., Gonnermann, H. *Anticipating Climate Impacts of Major Volcanic Eruptions* (2021). **EOS**.
79. Mendez Harper, J., Cimarelli, C., Cigala, V., Kueppers, U., **Dufek, J.** (2021) *Charge injection into the atmosphere by explosive volcanic eruptions: triboelectrification and fragmentation charging*. **Earth and Planetary Science Letters**.
78. Schaen, A.J., Schoene, B., **Dufek, J.**, Singer, B.S., Eddy, M.P., Jicha, B.R., and Cottle, J.M. (2021) *Transient rhyolite melt extraction to produce a shallow granitic pluton.*, **Science Advances**.7, no. 21: eabf0604.
77. Eggers, G.* , Wray, J., and **Dufek, J.** (2021) *Compositional Mapping of the Nili Patera Feldspathic Unit: Extent and Implications for Formation*. **Journal of Geophysical Research: Planets**. 126, no. 2: e2020JE006383.

76. Mendez-Harper, J., **Dufek, J.**, and McDonald, G. D. (2021) *Detection of spark discharges in an agitated Mars dust simulant isolated from foreign surfaces*. **Icarus**. *Icarus* 357 (2021): 114268.
75. Cahalan, R.* and **Dufek, J.** (2021) *Explosive Submarine Eruptions: The Role of Condensable Gas Jets in Underwater Eruptions*, **Journal of Geophysical Research: Solid Earth**, 126 (2), e2020JB020969
75. Cliff, A., L. A. Fullard, E. C. P. Breard, **J. Dufek**, and C. E. Davies. (2021) "Granular size segregation in silos with and without inserts." **Proceedings of the Royal Society A** 477, no. 2245: 20200242.
74. Breard, E.* , **Dufek, J.**, Fullard, L, and Carrara, A. (2020) *The basal friction coefficient of granular flows with and without excess pore pressure: implications for pyroclastic density currents, water-rich debris flows, rock and submarine avalanches*. **Journal of Geophysical Research: Solid Earth**, e2020JB020203.
73. Mendez-Harper, J.* , Courtland, L.* , **Dufek, J.**, McAdams, J.* (2020) *Microphysical effects of water content and temperature on the triboelectrification of volcanic ash on long time scales*. **Journal of Geophysical Research: Atmospheres**, 125 (14).
72. Muirhead, J.D., Fischer, T., Oliva, S., Laizer, A., van Wijk, J., Currie, C., Lee, H., Judd, E.J., Kazimoto, E., Sano, Y., Naoto, T., Tiberi, C., Foley, S.F., **Dufek, J.**, Reiss, M.C., Ebinger, C.J., (2020) *Displaced cratonic mantle concentrates deep carbon during continental rifting*, **Nature**, 582, 67-72.
71. Lube., G. Breard, E.C.P.* , Eposti-Ongaro, T., **Dufek, J.** and Brand. B. (2020) *Multiphase flow behavior and hazard prediction of pyroclastic density currents*. **Nature Reviews Earth and Environment** 1, 348-365.
70. Breard, E.C.P.* , **Dufek, J.** and Roche, O. (2019) *Continuum modeling of pressure-balanced and fluidized granular flows in 2D: Comparison with glass bead experiments and implications for concentrated pyroclastic density currents*. **Journal of Geophysical Research: Solid Earth** 124 (6), 5557-5583.
69. Lube, G., Breard, E.C.P.* , Jones, J. Fullard, L., **Dufek, J.**, Cronin, S.J., and Wang, T. (2019) *Generation of air lubrication within pyroclastic density currents*. **Nature Geoscience** 12 (5) 381.
68. Qiao, L., Head, J.W., Zing, Z., Wilson, L., Xiao, L. **Dufek, J.**, Yan, J. (2019) *Geological characterization of the Ina Shield Volcano summit pit crater on the Moon: Evidence for extrusion of waning-stage lava lake magmatic foams and anomalously young crater retention ages*. **Journal of Geophysical Research: Planets** 124 (4) 1100-1140.
67. Harper, J.M.* , Steffes, P., **Dufek, J.**, Akins, A. (2019) *The effect of electrostatic charge on the propagation of GPS (L-band) signals through volcanic plumes*. **Journal of Geophysical Research: Atmospheres** 124 (4), 2260-2275.
66. Breard, E.C.P.* , Jones, J.R., Fullard, L., Lube, G., Davies, C., and **Dufek, J.** (2019) *The permeability of volcanic mixtures – Implications for pyroclastic currents*. **Journal of Geophysical Research: Solid Earth** 124 (2) 1243-1360.

65. Fullard, L.A., Breard, E.C.P.*, Davies, C.E, Godfrey, A.J.R., Fukuoka, M., Wade, A., **Dufek, J.** and Lube, G. (2019) *The dynamics of granular flow from a silo with two symmetric openings*. **Proceedings of Royal Society A**, 475.
64. Gregg, P.M., Le Mevel, H., Zhan, Y., **Dufek, J.** Geist, D., and Chadwick, W.W. (2018), Stress triggering of the 2005 Sierra Negra volcano, Galapagos, **Geophysical Research Letters**, 45. <https://doi.org/10.1029/2018GL080393>
63. Mendez Harper, J.*, Helling, C., and **Dufek, J.** (2018). *Triboelectrification of KCl and ZnS particles in approximated exoplanet environments*. **The Astrophysical Journal**, 867 (2), 123
62. Breard, E.C.P. *, **Dufek, J.** and Lube, G. (2018) *Enhanced mobility in concentrated pyroclastic density currents: An examination of a self-fluidization mechanism*. **Geophysical Research Letters**, 45 (2), 654-664
61. Qiao, L., Head, J.W., Xiao, L., Wilson, L. and **Dufek, J.** (2018) *The role of substrate characteristics in producing anomalously young crater retention ages in volcanic deposits on the Moon*. **Meteoritics and Planetary Science**, 53 (4) 778-812.
60. Mendez Harper, J.*, Cimarelli, C., **Dufek, J.** Gaudin, D., and Thomas, R.J. (2018) *Inferring compressible fluid dynamics from vent discharges during volcanic eruptions*. **Geophysical Research Letters**, 45, 7226-7235.
59. Andrews, B.J., **Dufek, J.** and Ponomareva, V. (2018) *Eruption dynamics and explosive-effusive transitions during the 1400 BP eruption of Opala volcano, Kamchatka, Russia*, **Journal of Volcanology and Geothermal Research**, 356, 316-330.
58. Brand, B. D., Pollock, N., Sarocchi, D., **Dufek, J.** & Clynne, M. A. (2017). *Field-trip guide for exploring pyroclastic density current deposits from the May 18, 1980, eruption of Mount St. Helens, Washington*. **U.S. Geological Survey Scientific Investigations Report**, 2017-5022-C, 34p.
57. *Karakas, O., Degruyter, W., Bachmann, O. and **Dufek, J.** (2017) *Crustal-scale magmatism and its impact on growth and longevity of reservoirs*, **Nature Geoscience**, 10, 446-450
56. *Karakas, O., **Dufek, J.**, Mangan, M.T., Wright, H. and Bachmann, O. (2017) *Thermal and petrologic constraints on lower crustal melt accumulation under the Salton Sea Geothermal Field*, **Earth and Planetary Science Letters**, 467, 10-17.
55. Qiao, L., Head, J. W., Wilson, L., Xiao, L., and **Dufek, J.** (2017) *Ina Pit Crater on the Moon: Origin as a Drained Summit Lava Lake Modified by Seismic Sieving*, **Geology**, 45, 455-458 .
54. *Mendez-Harper, J, McDonald, G., **Dufek, J.** Malaska, M.J., Burr, D.M., Hayes, A.G., McAdams, J. , Wray, J. (2017) *Electrification of sand on Titan and its influence on sediment transport*. **Nature Geoscience**, 10 (4), 260-265.
53. *Breard, E., Lube, G., Jones, J., **Dufek, J.**, Cronin, S., Valentine, G., Moebis, A. (2016), *Revealing the internal structure of pyroclastic flows*, **Nature Geosciences**, 9, 767-771.

52. *Mendez-Harper, J. and **Dufek, J.** (2016) *The effects of granular dynamics on ash tribocharging.* **Journal of Geophysical Research.** DOI:10.1002/2015JD024275.
- 51.* Benage, M., **Dufek, J.**, Mothes, P.A. (2016) *Quantifying entrainment in pyroclastic density currents from the Tungurahua eruption, Ecuador: Integrating field proxies with numerical simulations,* **Geophysical Research Letters,** DOI:10.1002/2016GL069527.
50. **Dufek, J.** (2016) *The Fluid Dynamics of Pyroclastic Density Currents.* **Annual Reviews of Fluid Mechanics,** Invited Contribution, 48, 459-489.
- 49.Sliwinski, J., Bachmann, O., Ellis, B., Pablo, D.H., Nelson, B. and **Dufek, J.** (2015) *Eruption of shallow crystal cumulates during caldera-forming events on Tenerife, Canary Islands.* **Journal of Petrology,** doi: 10.1093/petrology/egv068.
48. Lillis, R., **Dufek, J.**, Kiefer, W., Black, B., Manga, M., Richardson, J. and Bleacher, J. (2015). *The Syrtis Major volcano, Mars: a multidisciplinary approach to interpreting its magmatic evolution and structural development.* **Journal of Geophysical Research,** 120, 1476-1496.
47. *Karakas, O. and **Dufek, J.** (2015) *Melt generation and residence in extensional environments: Modeling the thermal evolution of crustal magmas.* **Earth and Planetary Science Letters,** 425, 131-144.
46. **Dufek, J.**, O. Roche, and T. Ongaro, (2015) *Pyroclastic density currents: processes and models in* **Encyclopedia of Volcanoes.** (Academic Press).
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5. **Dufek, J.** and Bergantz, G.W., (2005). *Transient two-dimensional dynamics in the upper conduit of a rhyolitic eruption: A comparison of closure models for the granular stress.* *Journal of Volcanology and Geothermal Research*, 143, 113-132.
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Selected Invited Talks and Seminars

- (88) *Enigmatic Processes in Volcanic Eruptions: Uncovering the Dynamics of Large Explosions using Sensors, Deposits and Simulations*, University of Wyoming Distinguished Lecture Series, 2024.
- (87) *Frontiers and Challenges in Computational Volcanology*, Keynote Talk at VICTOR Volcanology workshop, 2023.
- (86) *Granular and Fluid Instabilities in Explosive Volcanic Eruptions*, Multiphase Flow Workshop, DOE, 2023.
- (85) *Fluid Entrainment and Flow Mobility in Pyroclastic Density Currents*, IAVCEI meeting, New Zealand, 2023.
- 84) *Granular and fluid instabilities in explosive volcanic eruptions: Consequences of clustering and collisions in compressible flows*, Kavli Institute of Theoretical Physics, 2022.
- 83) *Benchmarking High Performance Computing Approaches to Multiphase Flow*, Martinique NSF Workshop, 2022
- 82) *Oregon Volcanology: Harnessing Technology to Advance our Understanding of the Earth*, GeoFEST outreach group Portland, August, 2021.
- 81) *Transcrustal Magma Dynamics: Perspectives on Process-Based Numerical Models and Integration with Geochemical and Geophysical Measurements*, Invited AGU presentation and Panel Discussion, Dec. 2020.
- 80) *Oregon Center For Volcanology: Harnessing Technology to Advance our Understanding of the Earth*, Presentation to UO Foundation Board of Trustees, Palm Springs, 2020.
- 79) *Eruption Dynamics of Mount St. Helens*, MSH 40th Anniversary Webinar, UW PNSN Webinar Event, May, 2020.
- 78) *The Fluid Dynamics of Volcanic Plumes*, **Modeling Collaboratory for Subduction Webinar**, September, 2020.
- 77) *Compressible Gas Dynamics and Electrical Signals at Volcanoes*, **DOE, Lawrence Livermore Seminar**, 2019
- 76) *Pyroclastic Density Currents*, **Lecture, Center for Integrative Dynamic Earth**, 2019
- 75) *The Assembly and Eruption of Supervolcanoes*, **University of California, Davis, Seminar** 2019
- 74) *Critical Fluid Transitions in Explosive Volcanic Eruptions*, **Oregon State University Seminar**, 2019
- 73) *Critical Fluid Transitions in Explosive Volcanic Eruptions*, **Portland State University Seminar**, 2019.
- 72) *The Fluid Dynamics of Explosive Volcanic Eruptions*, **University of Minnesota Department of Mechanical Engineering Seminar**, 2018.

- 71) *Volcanology at the Tipping Point: An Exploration of the Dynamics that Determine the Fate of Explosive Eruptions*, **Seminar at Michigan Tech University**, 2017.
- 70) *Multiscale Approaches to Geophysical Flows: Deciphering Emergent Order in High Energy Volcanic Eruptions*, **Stanford Geophysics Seminar**, 2016.
- 69) *Multiscale Approaches to Geophysical Flows: Deciphering Emergent Order in High Energy Volcanic Eruptions*, **University of Arizona Seminar**, 2016.
- 68) *The Fluid Dynamics of Pyroclastic Density Currents*, **Keynote talk at International Meeting of Multiphase Flow**, Florence Italy, May 2016.
- 67) *The Fluid Dynamics of Explosive Volcanic Eruptions*, **University of Oregon Fluid Dynamics Seminar**. April 2016.
- 66) *Multiphase Flow in Crustal Magmatic Processes*, **Cambridge University, Newton Institute**, Feb., 2016.
- 65) *The generation and eruption of large silicic magma bodies*, **University of Illinois Department Seminar**, Oct. 2015
- 64) *The production and residence time of magmas in the crust*, **Keynote Gordon Conference**, June 2015.
- 63) *The fluid mechanics of pyroclastic density currents*, **Canterbury University, New Zealand**, April 2015.
- 62) *Supereruptions and crustal growth*, **University of Utah Geological Sciences Department Seminar**, April 2015.
- 61) *Multiscale Approaches to Geophysical Flows: Deciphering Emergent Order in High Energy Volcanic Eruptions*. **Brown University Department Seminar**, Fall 2015.
- 60) *The Distribution and Separation of Crystals from Melt During Magmatic Evolution*, **American Geophysical Union, Invited Talk**. Dec. 2014
- 59) *The Assembly and Dynamics of Explosive Volcanic Eruptions*, **American Museum of Natural History, NY**, March 2014.
- 58) *Multiphase Dynamics in Geophysical Flows*, **University of Colorado Physics Department Seminar**, 2014.
- 57) *Tying Textures of Breadcrust Bombs to their Transport Regime and Cooling History*, **American Geophysical Union, Invited Talk**, December 2013.
- 56) *Multiscale Approaches to Geophysical Flows: Deciphering Emergent Order in High Energy Volcanic Eruptions*. **Department Seminar in Geology and Geophysics, Yale University**, October 2013.

- 55) *The Physics of Volcanic Eruptions*, **Department Seminar in Physics, Emory University**, September 2013.
- 54) *Multiphase Magmatism: From Crustal Construction to Eruptive Dynamics*, **University of Florida Seminar Series**, April 2013.
- 53) *Multiphase Magmatism: From Crustal Construction to Eruptive Dynamics*, **University of Chicago Geophysical Sciences Seminar Series**, April 2013.
- 52) *Multiphase Magmatism: From Crustal Construction to Eruptive Dynamics*, **University of South Florida Seminar Series**, Feb. 2013.
- 51) *Multiphase Magmatism: From Crustal Construction to Eruptive Dynamics*, **Harvard Solid Earth Seminar Series**, Feb. 2013).
- 50) *Multidisciplinary Approaches to Magma Dynamics*, **University of Wisconsin Department Seminar Series**, Feb. 2013
- 49) *Multiphase Magmatism: From Crustal Construction to Eruptive Dynamics*, **Cornell Earth and Atmospheric Science Seminar Series**, Jan. 2013).
- 48) *Granular Dynamics in Geologic Processes*, **University of Texas Institute of Geophysics Seminar Series**, November, 2012.
- 47) *Controls on the evolving grain size distribution of ash in explosive eruptions and feedback in vent proximal dynamics*, **AGU Invited Talk**, December, 2012.
- 46) *A Multiphase Assessment of Melt Segregation, Residence Time and Compositional Evolution in Crustal Magmatic Systems*, **AGU Invited Talk**, Scheduled December, 2012.
- 45) *Multiphase Magmatism: Integrating Geophysical and Geochemical Perspectives*, **University of Washington Seminar**, March, 2012.
- 44) *Multiscale Approaches to Geophysical Flows: Deciphering Emergent Order in High Energy Volcanic Eruptions*, **Princeton University Seminar**, February, 2012.
- 43) *Understanding the generation and emplacement of batholiths in space and time*, **4D Adamello Conference, Keynote Speaker, Bagolino, Italy, 2012.**
- 42) *Multiphase Magmatism: From Crustal Construction to Eruptive Dynamics*, **USC Department Seminar Series**, April, 2012.
- 41) *Emergent Dynamics in Multiphase Geophysical Flows: From Magma Chambers to Atmospheric Dynamics*, **Caltech Department Seminar**, October 2011.
- 40) *Melt Segregation in Crustal Magmatic Systems: A Coupled Dynamics and Thermodynamics Approach*. **Invited Presentation. Fall AGU**, Dec. 2011.
- 39) *Granular Disruption During Explosive Volcanic Eruptions*. **Invited Presentation. Fall AGU**. Dec. 2011.

- 38) *Instabilities in Eruptive Columns, Insight from Mt. St. Helens and Eyjafjallajokull Eruptions.* **DTM, Carnegie Institution of Washington Seminar Series**, May, 2011.
- 37) *Microphysical processes in magma chambers and explosive eruptions,* **Stanford Department of Geology Seminar Series**, January, 2011.
- 36) *Multiphase Explosions on Mars: Numerical Studies of Phreatomagmatic Blast Dynamics.* Invited Presentation. Fall AGU, Dec. 2010.
- 35) *The Production and Detection of Magmatic Compositional Gaps: A Consideration of Nested Probabilities in Crustal Evolution.* Invited Presentation. Fall AGU, Dec. 2010.
- 34) *Geophysical Fluid Dynamics – Volcanoes,* **Keynote Talk**, Mathematical Geophysics, Pisa, Italy, Scheduled June 2010.
- 33) *Quantum magmatism: The Probability of Magma Chamber Melt Extraction From a Dynamics Perspective,* **Invited Presentation.** Fall American Geophysical Union Meeting, December 2009.
- 32) *Emergent Flow Dynamics in Volcanic Flows: Insight From Multiphase Modeling,* **Invited Presentation.** Fall American Geophysical Union Meeting, December 2009.
- 31) *Multiscale Eruption Dynamics,* **Virginia Tech Department Seminar**, November 2009.
- 30) *Multiscale Dynamics in Explosive Volcanic Eruptions,* **Scripps Institution of Oceanography Department Seminar**, January 2010.
- 29) *Integrating Experiments and Numerical Models of Geophysical Multiphase Flow.* ASME Forum on Multiphase Processes in Geophysical and Environmental Flows. **Invited Meeting Presentation.** August 2009.
- 28) *Melt Extraction and Accumulation in the Deep Mantle,* Cooperative Institute for Deep Earth Research, **Keynote Presentation.** May 2009.
- 27) *Timescales and Dynamics of Caldera Forming Eruptions.* **Portland State University Department of Geology Seminar**, April 2009.
- 26) *Multi-scale Dynamics during Volcanic Eruptions.* **University of Georgia Department of Geology Seminar**, January 2009.
- 25) *Multi-scale Dynamics during Volcanic Eruptions.* **Georgia Institute of Technology Department of Physics Seminar**, October 2008.
- 24) *Microphysical Processes in Volcanic Flows.* **Cascades Volcano Observatory (USGS), Hazards Seminar**, April 2008.
- 23) *Transitional dynamics in pyroclastic density currents: Integrating multi-scale observations with macroscopic models of explosive volcanic activity,* Natural Disasters in Small Communities Conference, **Keynote Presentation**, March 2008.

- 22) *Self-organization in geophysical transport processes: Integrating multi-scale observations with macroscopic models of explosive volcanic activity.* **USGS Volcanoes Hazards Seminar Series, Menlo Park, CA, March 2008.**
- 21) *Thermal and Dynamic Constraints on Crustal Growth and Preservation.* Vanderbilt University, **Department of Earth and Environmental Sciences Seminar**, February 2008.
- 20) *From Vent to Deposit: Self-organization in granular and turbulent multiphase flows.* **University of California, Davis, Department of Geology Seminar.** January 2008.
- 19) *Multi-scale dynamics near the Moho: The role of mass and energy exchange between the crust, sub-continental lithosphere and asthenosphere in crustal development.* **Invited Presentation.** Fall American Geophysical Union Meeting, December 2007.
- 18) *Self-Organization in Geophysical Multiphase Flows,* **MIT Department of Earth and Planetary Science Seminar**, March 2007.
- 17) *High-Energy Multiphase Flows: The Transport and Deposition of Volcanically Initiated Gravity Currents.* **Princeton University Department of Geological Sciences Seminar.** April 2007.
- 16) *The Dynamics of Explosive Volcanic Eruptions: Linking computational, experimental and field approaches.* **University of Oregon Department of Geology Seminar.** May 2007.
- 15) *Microphysical Processes in Pyroclastic Flows.* **University of California, Santa Cruz, Department of Geology Seminar.** October 2007.
- 14) *Linking Deposits to Dynamics in Explosive Volcanic Eruptions: Advances and Open Questions in Geophysical Multiphase Flow.* **University of British Columbia, Complex Fluids Seminar.** March 2007.
- 13) *Dynamical Constraints on the Life Cycle of Voluminous Silicic Systems: How to Build, Maintain, and Destroy Shallow Silicic Magma Bodies.* **Invited Presentation.** Fall American Geophysical Union Meeting, December 2007.
- 12) *Modeling the dynamics of turbulent multiphase gravity currents: the importance of geologically diverse boundary conditions.* **Invited Presentation.** International Union of Geodesy and Geophysics, Perugia Italy. July 2007.
- 11) *Progress in Linking the Dynamics of Volcanic Eruptions with Geophysical and Depositional Observations.* **University of California, Berkeley, Seismology Seminar.** October 2006.
- 10) *Accessing the dynamics and timescales of large, caldera-forming eruptions.* **Caltech Department of Geological and Planetary Sciences Seminar.** November, 2006.
- 9) *Self-organization in geophysical transport processes: Integrating multi-scale observations with macroscopic models of explosive volcanic eruption.* **University of Maryland, Department of Geology Seminar,** February 2006.

- 8) *Self-organization in geophysical transport processes: Integrating multi-scale observations with macroscopic models of explosive volcanic eruption.* **Georgia Institute of Technology**, School of Earth and Atmospheric Sciences Seminar, February 2006.
- 7) *The dynamics of explosive volcanic eruption: Insight from field and numerical studies.* **Rice University**, Department of Earth Science Seminar, April 2006.
- 6) *Using Natural Boundary Conditions to Probe the Internal Dynamics of Pyroclastic Flows: Mass, Enthalpy and Momentum Transfer at the Flow-Bed Interface.* **Invited Presentation.** Fall American Geophysical Union Meeting, December 2006.
- 5) *Multiphase Geophysical Flows.* **University of British Columbia, Seminar in the Department of Earth and Ocean Sciences**, February, 2005.
- 4) *The Multiphase Characterization of Volcanic Phenomena: A Comparison of Numerical and Experimental Approaches.* **Invited Presentation**, American Geophysical Union (AGU) Meeting, December 2005.
- 3) *The Over-water Mobility of Pyroclastic Flows: Linking the Physics at the Flow-Sea Interface with the Depositional Record.* **Arizona State University, Seminar in the Department of Geological Sciences**, November 2004.
- 2) *The Over-Water Transport of Pyroclastic Flows: A Coupled Grain Size Distribution and Multi-fluid Numerical Approach.* **Keynote Talk.** International Association of Volcanology and Chemistry of the Earth's Interior Meeting (IAVCEI), November 2004.
- 1) *Physical and Temporal Controls on Lower Crustal Melting and Mixing: Mass and Enthalpy Transport in Actively Growing Arcs.* Invited Talk. American Geophysical Union Meeting (AGU), December 2004.

Teaching

Courses Taught (Oregon):

- **Building an Atmosphere (ERTH 399, 2022S, 2024W):** In this class students use planetary observations and the climate record to understand atmospheric structure and dynamics in an exercise in comparative planetology. In the process they develop the tools to calculate energy balance in the atmosphere and understand heat transfer arguments, feedback mechanisms, the connection of the atmosphere with the degassing history of a planet, stellar evolution's impact on atmospheric conditions, and the evolving composition and temperature of our present atmosphere. (New course developed at UO)
- **Geophysical and Environmental Sensors: Sensor Theory, Integration and Computation (ERTH 416/516, 2021W, 2021F, 2023S):** Advanced class for undergraduate and graduate students that provide students an introduction to sensors, microcontrollers, automation, data collection and scripting from the perspective of sensing the Earth and the environment. The course particular focuses on material and electrical properties of materials that make them good candidates for either active or passive sensors and using these properties to detect quantifiable changes in the environment and combines theory, microcontroller programming, and sensor design and

testing. (New course developed at UO, submitted and approved by UOCC process, previously 410/510)

- **Advanced Volcanology (ERTH 692, 2019W, 2020S, 2023S):** Advanced class for undergraduate and graduate students that examines the physics of magma transport, the eruptive process and modern techniques of real-time observation. This class also examines in a broader sense the role of magma production, volatile budgets and large scale heat transfer. (Course redesigned after arrival to UO, new course has been submitted and approved by UOCC process)
- **Field Methods in Volcanology (ERTH 410/510, 2019S, 2019F, 2023W, 2023F):** Project based class for advanced undergraduate and graduate students. Students work on developing writing skills, learn field skills, and develop proposals. The course involves a field component where students complete their projects and also learn about modern techniques used in volcanology. (New Course at UO)
- **Finite Volume Methods (ERTH 607, 2019W):** This class focused on developing the modelling skills of graduate students, and focused on developing a deep understanding of the finite volume approach to discretizing conservation equations. The course focused on hands-on programming and students worked on several projects and became familiar with the Talapas cluster.
- **International Volcanology Seminar (ERTH 607, 2019S, 2020F, 2023S):** This course is designed to promote the science of early career researchers in volcano science, foster community in this field, enhance professional development of graduate and postdoctoral researchers, and promote equity and representation in volcanology. Each week (on Tuesday) global participants will participate in a seminar that features the work of an early career scientist, panels on professional development, or a webinar related to advances in volcanology, particularly those related to the SZ4D initiative. Every week we also discuss papers related to the upcoming seminar. These sessions also involve exercises in communicating science to broad audiences including developing websites and video abstracts. (The terms listed above were terms when this seminar was offered for credit, but I have run this seminar as a weekly seminar series for all but 2 quarters since 2019).
- **New Graduate Student Survival Skills (ERTH 607, 2023F, 2024F):** Cohort building seminar that introduces new graduate students to research and communication tools and focuses on individual development plans.

Courses taught (Georgia Tech)

- **Geofluids (2010, 2011, 2013, 2015, 2017)** – Intermediate class for undergraduate and graduate students that examines fluid dynamics of geologic and atmospheric processes, from low Reynolds number to high Reynolds number, compressible flows.
- **Natural Hazards (2011, 2012)** Introductory class that examines the conceptual physics behind different natural hazards, the history of their study, and introduces hazard mitigation concepts. I have taught this class as a joint public policy class where we read primary literature from the time of the hazard and also examine the public perception compared to on-going scientific analysis.

- **Physical Sedimentology (2014)** Intermediate class examining the fluid-particle and particle-particle interactions that occur in the atmosphere, land surfaces and surface waters that redistribute sediment. Course would emphasize how local interactions lead to large-scale phenomena and would review the history of study of particle-suspension and bed-load theory.
- **Physical Volcanology (2009, 2012, 2014, 2016)** Advanced class for undergraduate and graduate students that examines the physics of magma transport, the eruptive process and modern techniques of real-time observation. This class also examines in a broader sense the role of magma production, volatile budgets and large scale heat transfer.
- **Environmental Field Methods (2014)** Undergraduate capstone class involving geochemistry and geophysics of the coastal/marine environment (activities based out of Atlanta and Savannah).
- **Volcanic Field Methods (2013, 2014, 2016)** Project based class for advanced undergraduate and graduate students. Students work on developing writing skills, learn field skills, and develop proposals. The course involves a field component where students complete their projects and also learn about modern techniques used in volcanology.
- **Multiphase Flow (2015)** Advanced undergraduate and graduate class on turbulent flow and modern theoretical, computational and experimental techniques that can be used to understand two-way feedback in particle-fluid systems.

Student mentoring and collaboration

PhD Students

1. Jennifer Telling (PhD, 2013), Microphysics of ash aggregation and base surge dynamics
Undergraduate Institution: Colgate University
Currently an Senior Financial Analyst at Amazon.
2. Cindy Young (PhD 2014), Remote sensing of eruptions using A-Train Satellites
Undergraduate Institution: Georgia Tech
Currently a research scientist at NASA Goddard.
3. Joe Estep, (PhD, 2014) Granular flows and force chain dynamics
Undergraduate Institution: Georgia Tech
AGU Student Paper Award Winner.
Currently a geophysicist at Chevron.
4. Mary Benage (PhD, 2015), Boiling-over eruption dynamics at Tungurahua, Ecuador
Undergraduate Institution: Colorado Mesa University
DOE Computational Sciences Graduate Fellowship
NSF Graduate Fellowship
Currently a staff scientist at USGS
5. Ozge Karakas (PhD, 2015), Tectonic forcing and melt production
Undergraduate Institution: Middle East Technical University
Currently a researcher at ETH, Switzerland.
6. Josh Mendez (PhD, 2017), Microphysical processes, charging, and instrument design
Undergraduate Institution: Boston University
Georgia Tech Presidential Fellowship
NSF Graduate Fellowship
AGU Student Paper Award

Blue Waters Computational Fellowship
Currently an Assistant Professor, PSU.

7. Ryan Cahalan (PhD, 2020 – University of Oregon), Submarine eruptions, entrainment
Undergraduate Institution: University of Texas
AGU Student Paper Award
NSF Graduate Fellowship
Currently a Mendenhall postdoc, USGS
8. Gabe Eggers (PhD, 2021, Co-advised), Mars magma/crustal evolution
Undergraduate Institution: Princeton University
Georgia Tech Presidential Fellowship
Currently a postdoc. Lunar and Planetary Institute
9. Amelia Winner (PhD, 2021 – University of Oregon), Granular Dynamics
Undergraduate Institution: Penn State
Currently a postdoc, University of Nevada, Reno
10. Allison Kubo (PhD 2024, co-advised), Gravity Currents
Undergraduate Institution: University of California, San Diego
11. Chris Harper (PhD Candidate), Fracture mechanics and network analysis
Undergraduate Institution: Georgia Tech
12. Paul Regensburger (PhD Candidate, co-advised), Icy Moons
NASA FINNEST Fellowship
Undergraduate Institution: North Carolina State University
13. Annika Dechert (PhD Candidate), Magma dynamics – South Sister
Undergraduate Institution: Occidental University
14. PJ Zrelak (PhD Candidate) Granular Flow Seismicity
Undergraduate Institution: Boise State
15. Becca Bussard (PhD 2024, co-advised) Deformation of volcanic edifices
Undergraduate Institution: Penn State
16. Zack Martin (PhD Student) Particle microphysics
Undergraduate Institution: University of Oregon
17. Jonathan Gitzendanner (PhD Student) Turbulent multiphase plumes
Undergraduate Institution: University of Central Florida

Masters Students

1. Molly Lindle (Masters, 2011) Contact electrification and charge separation in volcanic plumes.
2. Taryn Black (Masters, 2016), Eruption dynamics, granular instabilities
3. Sage Kemmerlin (Masters, University of Oregon, 2021), PDC transport
4. Rudi Lien (Master's Degree 2024) Planetary processes
5. MaKayla Etheredge (Master's Degree 2024), magma/granular interaction

Undergraduate Students

1. Dan Arrington (graduated)
2. Afshan Shaikh (graduated)
3. Kathleen Warrell (graduated)
4. Cindi Jackson (graduated)
5. Andrew Gase (graduated)
6. Chris Harper (graduated)
7. Jacob Anderson (graduated)
8. Blake Nash-Laboe (graduated)
9. Rheanne Cruz (graduated)
10. Zack Martin (graduated)
11. David Wilcox (current)
12. Alexandre Smith (current)

Postdoctoral Researchers

1. Chris Huber, Numerical investigations of pore-scale processes (2009-2011)
2. Domenico Doronzo, Pyroclastic Flow Dynamics (2011 - 2012)
3. Wim Degruyter, Conduit Dynamics (2013 - 2015)
4. Leah Courtland, Microphysics (2013 - 2015)
5. James Cowlyn, Pyroclastic Flow-Ice Interaction (2017 - 2018)
6. Eric Breard, Multiphase Experiments and Simulations (2017 - 2021)
7. Nathan Andersen, Magma Chamber Evolution, Laguna del Maule (2017 - 2019)
8. Leighton Watson, Infrasound signals (2020 - 2022)
9. Erin Fitch, Magma-water interaction (2020 -)
10. George McDonald, Planetary Atmospheres and Surfaces (2022-)
11. Johan Gilchrist, Volcanic Plumes (2024 -)

Comprehensive Exams and PhD committees (@Oregon):

- Joe Caggiano, 2019
Sage Kemmerlin, 2019
Allison Kubo, 2019
Gabe Ferragut, 2019
Monse Cascante, 2019
Ryan Seward, 2019
Paul Regensburger, 2019
Chris Harper, 2019
PJ Zrelak, 2020
Annika Dechert, 2020
Angela Olsen, 2020
Monse Cascante, 2020
Becca Bussard, 2021
Avery Conner, 2021
Christiana Cauley, 2021
Josh Wiejackzka (PhD committee, 2023)
Anni Xiong, 2022 (Physics)
Larry Hartman, 2022
Roey Shimony, 2022
Rudy Lien, 2022

Maryn Sanders, 2023
John Sheppard, 2023
Kaisa Autumn, 2024
Keel Wilde, 2024

PhD Committees Outside UO (2018-2023):
Sean O'Donnell, Geological Sciences: (UT, 2019-2022)
Yibin Liu, Civil Engineering: (GT, 2018-2022)
Colin Rowell, Earth Sciences: (UBC, 2020-2023)
Johann Gilchrist, Earth Sciences: (UBC, 2020-2022)

Service

Institute Contributions

At Oregon (starting 2018) – current appointments bolded:

- **Director of Graduate Studies, Earth Sciences (2023 -)** Interfaces with graduate students and facilitates their path through research and academic work of their degree. Includes weekly seminars for first year students, overseeing committee assignments and progress, meeting with students about their degree path, helping recruit and interface with new students, facilitates grad. Funding awards for new students, and promotes inclusive environment for graduate studies.
- **Director, Center for Volcanology (2019 -)** Organizes research and outreach events, seminars, academic visitors, strategic planning, outreach, funding for graduate student events, communications/web presence, and organizes efforts around large collaborative proposals.
- **ERTH Executive Committee, (2022 -)** Advises the department head on governance documents and department management.
- **ERTH Admissions Committee, (2023 -)** Recruits and admits graduate students.
- **UO Chair, Faculty Advisory Committee for Technical Science Administration (TSA), (2019 -)** - Primarily working on expansion of fabrication/machining technologies with the Knight Campus expansion, and restructuring personnel (has involved multiple searches).
- **UO Faculty Chair, Faculty Advisory Committee (FAC) Research Advanced Computing Services (2022 -)** - Advising on expansion of the high performance resources at the University of Oregon, and hiring committee to hire new director. In this capacity I have also written a component of Murdock grant, an MRI grant proposal and CC* grant proposal.
- **UO Steering Committee for Data Science Initiative, 2022** - Developing strategic plan for initiative, meets every 2 weeks for ~2 hrs and prepared a planning document
- **UO Dean's Advisory Committee (DAC), (2021 – 2023)**
Primarily Advises Dean on College P&T Cases – Weekly meetings/and case reviews typically Fall and Winter Quarter

- Search Committee for Faculty Hire In Earth Sciences – Environmental Initiative (2022-2023)
- University of Oregon Information Technology Steering committee (ITSC) (2019 -2022) - Advises Provost on IT priorities/initiatives/funding – quarterly meetings.
- Adhoc Review of Personnel Files in EARTH, 2023
- UO Search Committee for 3D printing and fabrication Specialist (TSA/Knight Campus)
- EARTH Computing Committee (2021 -2022)
- Renee James Research Awards, Panel, 2021
- Search Committee for Director of RACS, Summer 2021
- Search Committee Additive Manufacturing (TSA/Knight Campus), 2021
- Murdock Proposal for HPC, Core User Representative (Site Visit September, 2021)
- Faculty Advisory Committee for the Research Advanced Computing Services (RACS) (2018- 2020)
- Provost Leadership Academy (2019)
- Meierjurgan committee (2018 -2020)

At GT:

Associate Chair, Earth and Atmospheric Science, 2014 – 2018
EAS Promotion and Tenure (Co-Chair, 2014- 2018)
EAS Faculty Search Committee: 2008-2009, 2012-2013 (Planetary and Solid Earth)
EAS Chair Search Committee: 2012-2014.
Physics Chair Search Committee: 2013
EAS Graduate Admissions Committee: 2008- Present.
EAS Graduate Admissions Committee, Chair, 2013 – 2018.
EAS Awards Committee: 2009-2011.
EAS Postdoctoral Committee (Chair): 2010-2018
EAS Chair Advisory Committee. 2011 – 2014
EAS Computing Committee, 2014 – 2018

Professional Activities

Organized the Cascades2024 Meeting, Bend, OR 2024
Organized the PDC 2024 Meeting, Eugene, OR 2024
AGU Fellows Committee (VGP), 2023 –
AGU Society of Fellows
Collective Impact Committee, Subduction Zone 4D initiative, integrating science teams, 2022 - .
External Evaluator, Denison College Geology Department, 2022-2023.
Elements Special Volume Editor on Cascade Subduction, 2021-2022
Lead Organizer and Science Committee Chair for Cascades Meeting, 2023-2024
Organized International Volcanology Seminar Series (2020 -)
Associate Editor, Bulletin of Volcanology, 2016 – Present

Associate Editor, Journal of Geophysical Research, 2018 - Present
AGU VGP Macelwane Committee Chair, 2014 - 2019
Center Interdisciplinary Deep Earth Research (CIDER) Instructor of 2 week course in Berkeley, CA Summer 2013, 2019
AGU VGP Education and Outreach Committee: 2010 – 2014.
AGU VGP Macelwane Committee: 2013 – 2019.
AGU Ambassador Award Committee: 2013 – 2014.
Computational Infrastructure for Geodynamics Representative: 2011 – 2018
VHUB (Community wide cyber-infrastructure project) Steering Committee: 2009 – 2016.

Journal Reviewer

Earth and Planetary Science Letters, Journal of Geophysical Research, Journal of Volcanology and Geothermal Research, Bulletin of Volcanology, Journal of Theoretical and Computational Fluid Dynamics, Journal of Geology, Journal of Petrology, Tectonophysics, Geophysical Research Letters, Journal of Applied Mathematics, Nature, Nature Geoscience, Icarus, Science, G3.

Proposal Reviewer:

- *National Science Foundation, Geochemistry and Petrology Program and panel member*
- *National Science Foundation, Geophysics Program.*
- *National Science Foundation, GeoPRISMS*
- *National Science Foundation, CSEDI*
- *NASA Mars Fundamental Research Program*
- *NASA Outer Planets*
- *NASA Solar System Workings and panel member*

Membership in Professional Societies

American Geophysical Union (Fellow), 2000- Present.
Geological Society of America, 2000- Present.