

# Zachary D. Smith

Department of Earth and Planetary Science  
University of California Berkeley  
Berkeley, CA 94720

(435) 704-1633 (cell)  
zachary\_smith@berkeley.edu  
<https://zacharydsmith.weebly.com/>

## Education

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<b>University of California Berkeley</b>	Ph.D. Earth and Planetary Science (3.97 GPA)	Expected 2026
<b>The Ohio State University</b>	M.S. Earth Science (4.0 GPA)	2021
<b>Southern Utah University</b>	B.S. Geology (Summa cum Laude - 3.98 GPA)	2019
<b>Southern Utah University</b>	Certificate Geographic Information Systems	2019

## Appointments

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2023 – Present	<b>Graduate Student Instructor</b> , UC Berkeley
2023 – Present	<b>NASA FINESST Fellow</b> , UC Berkeley
2023	<b>INGENUITY Intern</b> , Lawrence Berkeley National Laboratory
2021 – 2023	<b>Berkeley Fellowship</b> , University of California Berkeley
2022 – 2023	<b>Graduate Student Researcher</b> , University of California Berkeley
2021	<b>Graduate Teaching Assistant</b> , The Ohio State University
2016 – 2021	<b>Geologic Mapping Consultant</b> , Utah Geologic Survey
2020	<b>Graduate Research Assistant</b> , The Ohio State University
2019 – 2020	<b>Graduate University Fellowship</b> , The Ohio State University
2019	<b>Research Associate</b> , The Ohio State University
2018 – 2019	<b>Geologic Mapper</b> , USGS EdMap/Southern Utah University
2018 – 2019	<b>Gibson Research Fellow</b> , Southern Utah University
2016 – 2019	<b>Hydrologic Technician</b> , U.S. Forest Service, Dixie National Forest
2017	<b>Hydrologic Technician BAER Team (Brian Head Fire)</b> , U.S. Forest Service, Dixie National Forest
2016	<b>Hydrologic Technician BAER Team (Saddle Fire)</b> , U.S. Forest Service, Dixie National Forest
2015 – 2016	<b>GIS Technician 2</b> , Southern Utah University/U.S. Forest Service
2015 – 2017	<b>GIS Intern</b> , Southern Utah University Outdoor Engagement Center

## Awards

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**2022 – Editors' Citation for Excellence in Refereeing - Geophysical Research Letters**, American Geophysical Union

**2020 – Estwing Award, Outstanding First Year Graduate**, School of Earth Sciences, The Ohio State University, (One awarded per year)

**2019 – AGU Outstanding Student Presentation Award**, American Geophysical Union

**2019 – Best Map 1<sup>st</sup> Place Award**, Center for Urban and Regional Analysis (One awarded per year)

**2019 – Outstanding Student**, Department of Physical Science, Southern Utah University (One awarded per year)

**2018-2019 – Walter Maxwell Gibson Scholarship**, Walter Maxwell Gibson College of Science and Engineering (One awarded per year – largest scholarship in Southern Utah University)

**2018 – Outstanding Researcher**, Physical Science Department, Southern Utah University (one awarded per year)

**2017 – Outstanding Researcher**, Physical Science Department, Southern Utah University (one awarded per year)

**2017 – EDGE Outstanding Research Project Award**, Southern Utah University

**2016 – Outstanding Underclassmen**, Physical Science Department, Southern Utah University (one awarded per year)

### **\*Funded Research**

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- 1) Southern California Earthquake Center, \$150,000, 2023-2026, “Deciphering Signals of Off-Fault Inelastic Deformation in Space Geodetic Observations”
- 2) Southern California Earthquake Center, \$29,392, 2023-2024, “Bridging field, experimental, and geodetic observations to quantify co- and postseismic evolution of fault damage zones of the Ridgecrest earthquake sequence”
- 3) Pix4D, Equipment Grant, 2023-2024, “Mapping Distributed Faulting with High Resolution LiDAR and Photogrammetry to Understand Earthquake Hazards”
- 4) Geological Society of America, \$1,800, 2023-2024, “Placing Constraints on the Duration and Mechanism of Ongoing Subsidence in the Mono Lake Volcanic Field, Eastern California”
- 5) National Center for Airborne Laser Mapping (NCALM) Seed Grant, 2022-2023, “Volcanic and climate controls on the growth and collapse of Paoha Island, Mono Lake, Eastern California”
- 6) Ohio State University Fellowship, \$66,754.00, 8/2019-8/2020, “Loading and Material Constraints on the Strain Rate Dependence of Brittle Damage Fabrics”
- 7) Ohio Division of Natural Resources Student Research Grant, \$2,500, 01/2020 – 01/2021 “Experimental constraints on dynamic deformation band formation”
- 8) Friends of Orton Hall, \$841.50, 9/2019, “Drone based mapping and statistical analysis of the Marysvale volcanic field, southwest Utah”
- 9) U.S. Geological Survey EdMap, \$20,054.00, 04/2018 – 04/2019 “Geologic Mapping of the Western Half of the Fivemile Ridge 7.5-Minute Quadrangle, Garfield and Iron Counties, Utah.”
- 10) Walter Maxwell Gibson Fellowship, \$4,831.70, 07/2018 – 04/2019 “Classification of lahar-eruptive sequences in the Marysvale Volcanic Field and comparison of modern analogs in southern Iceland.”
- 11) L.S. and Alaine W. Skaggs Research Grant, \$2,394.00, 07/2018 – 12/2018, “Geochronological constraints on the emplacement of the Markagunt gravity slide, southwest Utah.”
- 12) L.S. and Alaine W. Skaggs Research Grant, \$1,566.00, 01/2018 – 06/2018, “Structural and geochronological analysis of Markagunt gravity slide emplacement, southwest Utah.”

**\*All research grants self-written**

### **Refereed Publications**

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- Braunagel, M. J., Griffith, W. A., Biek, R. F., Hacker, D. B., Rowley, P. D., Malone, D. H., Maybeck, D., Rivera, T.A., Loffer, Z., **Smith, Z.D.** (2023). Structural relationships across the Sevier gravity slide of southwest Utah and implications for catastrophic translation and emplacement processes of long runout landslides. *Geochemistry, Geophysics, Geosystems*, 24, e2022GC010783.  
<https://doi.org/10.1029/2022GC010783>
- Smith, Z. D.**, & Griffith, W. A. (2022). Evolution of Pulverized Fault Zone Rocks by Dynamic Tensile Loading During Successive Earthquakes. *Geophysical Research Letters*, 49(19).  
<https://doi.org/10.1029/2022GL099971>
- Smith, Z.D.**, Griffith, W.A., (2022). Lithological controls on fault damage zone development by coseismic tensile loading. *Tectonophysics* 838, 229471.  
<https://doi.org/10.1016/j.tecto.2022.229471>
- Smith, Z.D.**, and Maxwell, D.J., (2020). Constructing vertical measurement logs using UAV-based photogrammetry: Applications for multiscale high-resolution analysis of coarse-grained volcanoclastic stratigraphy: *Journal of Volcanology and Geothermal Research*, p. 107122  
<https://www.sciencedirect.com/science/article/abs/pii/S0377027320303449>

## Other Publications

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- Smith, Z.D.**, Anderson, J.J., Rowley, P.D., Biek, R.F., Kaiser, J.F., Maxwell, D.J., Hacker, D.B., and Filkorn, H.F., 2019, Geologic Map of the West Half of the Fivemile Ridge Quadrangle, Iron and Garfield Counties, Utah: Contract deliverable report U.S. Geological Survey EdMap award number G18AC00100, 2 plates, scale 1:12,000.
- Rowley, P.D., Biek, R.F., Hacker, D.B., Vice, G.S., McDonald, R.E., Maxwell, D.J., **Smith, Z.D.**, Cunningham, C.G., Steven, T.A., Anderson, J.J., Ekren, E.B., Machette, M.N., and Wardlaw, B.R., in press, Interim geologic map of the northwest quarter of the Beaver 30' x 60' quadrangle, Beaver, Iron, and Garfield Counties, Utah: Utah Geological Survey Open-File Report xx, scale 1:100,000.
- Rowley, P.D., Biek, R.F., Hacker, D.B., Vice, G.S., McDonald, R.E., Maxwell, D.J., **Smith, Z.D.**, Cunningham, C.G., Steven, T.A., Anderson, J.J., Ekren, E.B., Machette, M.N., and Wardlaw, B.R., 2019, Interim geologic map of the southwest quarter of the Beaver 30' x 60' quadrangle, Beaver, Iron, and Garfield Counties, Utah: Utah Geological Survey Open-File Report OFR 686DM, scale 1:100,000. <https://geology.utah.gov/map-pub/maps/geologic-maps/>

## Publications in Progress

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- Smith, Z.D.**, Hornbach, M., and Manga, M., (in preparation), Shallow Heat and Fluid Flow around Lava Domes and Faults in Mono Lake, California. For submission to *Geochemistry, Geophysics, Geosystems*.

## Invited Presentations

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- Smith, Z.D.**, and Griffith, W.A., 2020, Decoding the rock record of near-surface fragmentation processes: Experimental constraints on the strain rate dependence of tensile rock fragmentation (Invited), Abstract U005-08 presented at 2020 AGU Fall Meeting, 1-17 Dec.

## Conference Presentations and Abstracts

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- Smith, Z.D.**, Hornbach M., Manga, M., Adourian, S., Barth, A., Hurwitz, S., Miller, B., Magnani, M.B., 2022, Shallow Heat and Fluid Flow around Lava Domes and Faults in Mono Lake, California, Abstract V11C-11 presented at 2022 AGU Fall Meeting, 12-16 Dec.
- Smith, Z.D.**, & Griffith, W.A., 2021, Coseismic Fault Damage Zone Development by Dynamic Tensile Loading, Abstract S43B-03 presented at 2021 AGU Fall Meeting, 13-17 Dec.
- Smith, Z.D.**, Griffith, W.A., Kaiser, J., Biek, R.F., Webb, C., Maxwell, D., 2021, Structural and Geochemical Constraints on Regional and Local Stress Fields During Growth and Collapse of the Marysvale Volcanic Field, Southwest Utah, Abstract V15D-0115 presented at 2021 AGU Fall Meeting, 13-17 Dec.
- Smith, Z.D.**, Griffith, W.A., and Braunagel, M.J., 2020, An experimental perspective on brittle tensile fragmentation during subshear rupture on bimaterial fault interfaces, Abstract MR010-0003 presented at 2020 AGU Fall Meeting, 1-17 Dec.
- Smith, Z.D.**, and Griffith, W.A., 2020, Brittle damage formed in sandstone during hypervelocity impacts: Field and experimental observations from the Serpent Mound Impact Structure, south-central Ohio, *Geological Society of America* 2020, abstracts with programs, v. 52, no. 6, doi: 10.1130/abs/2020AM-356698.
- Smith, Z.D.**, and Griffith, W.A., 2020, The influence of lithology and preexisting damage on brittle fragmentation during dynamic tensile loading, Presentation at 2020 SCEC Annual Meeting 14-17 Sep.

- Smith, Z.D.**, Griffith, W.A., Marren, T., Larocque, S., and Braunagel, M.J., 2019, Damage fabrics in crystalline vs. granular rocks formed in response to isotropic tension: Implications for coseismic off-fault pulverization, Abstract MR23G-0179 presented at 2019 AGU Fall Meeting, San Francisco, CA, 7-11 Dec.
- Griffith, W.A., Braunagel, M.J., and **Smith, Z.D.**, 2019, Recent experimental insights into dynamic fracture and fragmentation in fault damage zones, Abstract S42B-01 presented at 2019 AGU Fall Meeting, San Francisco, CA, 7-11 Dec.
- Smith, Z.D.**, Maxwell, D.J., Smith, D.C., and Kaiser, J.F., 2019, Drone based mapping and statistical analysis of the Marysvale volcanic field, southwest Utah, Geological Society of America 2017, abstracts with programs, v. 51, no. 5. doi: 10.1130/abs/2019AM-338311.
- Smith, Z.D.**, Kaiser, J.F., Rowley, P.D., Biek, R.F., and Maxwell, D.J., 2018, Geologic Mapping of the Fivemile Ridge 7.5-Minute Quadrangle, Southwest Utah: Structural Characterization and Geochronological Constraints of Oligocene-Miocene Gravity Slides of the Marysvale Volcanic Field, Abstract V31F-0182 presented at 2018 AGU Fall Meeting, Washington D.C. 10-14 Dec.
- Smith, Z.D.**, Rowley, P.D., Butler, C., Maxwell, D.J. and MacLean, J.S., 2017, Groundwater flow interactions between Basin and Range faults and the Markagunt gravity slide: implications for the Panguitch Municipal Watershed, southwest Utah: Geological Society of America 2017, abstracts with programs, v. 49, no. 6, doi: 10.1130/abs/2017AM-302215.
- Smith, Z.D.**, Rowley, P.D., Butler, C., and Maxwell, D.J., 2017, Markagunt gravity slide deformational constraints on groundwater flow within the Panguitch Municipal Watershed, southwest Utah: Geological Society of America Thompson Field Forum—Catastrophic mega-scale landslide failure of large volcanic fields, abstracts with programs.
- Smith, Z.D.**, Kaiser, J.F., 2016, Petrographic and geospatial analysis of leucogranites in the Beaver Dam Mountains, southwest Utah: Geological Society of America, abstracts with programs, v. 48, no. 7, doi: 10.1130/abs/2016AM-282055

## **Service and Outreach**

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- 2022 – Present Coordinator – Physical Sciences Opportunities for Women in Education & Research, UC Berkeley
- 2023 – Present Steering Committee Member – IAVCEI Commission on Volcanic Lakes
- 2021 – Present Reviewer: Geophysical Research Letters, Rock Mechanics and Rock Engineering
- 2021 Southern Utah University Guest Course Instructor, Cedar City, Utah
- 2019 UAV workshop at Gateway Preparatory Academy (middle school), Cedar City, Utah
- 2018-2019 Treasurer, Sigma Gamma Epsilon Geoscience Honor Society, SUU Chapter
- 2016-2019 Judge and Coordinator, Southern Utah Science and Engineering Fair
- 2017-2018 Geology Club President, SUU
- 2018 Geology workshop at SUU for school groups
- 2015-2017 Color Country Natural Resource Camp, Outreach Program Volunteer
- 2016 Canyon View Middle School volunteer: Minerals lab assistance
- 2013-2015 Teaching in Liberia and Ghana: Life skills, Ebola education, humanitarian work

## **Professional and Honor Society Memberships**

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- American Geophysical Union (AGU)
- International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI)
- Geological Society of America (GSA)
- Southern California Earthquake Center (SCEC)

## **Field Experience**

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7 days, 10/2023 Mono Lake & Ridgecrest, California, Field Research  
10 days, 8/2023 IAVCEI Workshop on Volcanic Lakes, São Miguel Island, Azores, Portugal, Workshop  
8 days, 8/2023 Mono Lake, California, Field Research  
7 days, 7/2023 Marysvale Volcanic Field, Utah, Field Research  
7 days, 5/2023 Mono Lake & Ridgecrest, California, Field Research  
4 days, 9/2022 Mono Lake & Ridgecrest, California, Field Research  
6 days, 8/2022 Mono Lake and Long Valley Caldera, California, Field Research (USGS)  
7 days, 4/2022 Mono Lake, California, Field Research (USGS)  
7 days, 3/2022 Mono Lake, California, Field Research  
5 days, 8/2021 Mono Lake, California, Field Research  
2 days, 7/2020 Serpent Mound Impact Structure, Ohio, Field Research  
4 days, 12/2019 Marysvale Volcanic Field, Utah, Field Research  
1 month, 5/2019 Marysvale Volcanic Field, Utah, Field Research  
>4 months, 5/2018 Markagunt Plateau, Utah, Geologic Mapping (USGS)  
2 days, 4/2018 Goldstrike, Utah, Field Course  
3 days, 8/2017 Parowan Gap, Utah, Field Research  
7 days, 9/2017 GSA Thompson Field Forum, southwest Utah  
5 days, 8/2017 Parowan Gap, Utah, Field Research  
>4 months, 5/2017 Dixie National Forest, Field Hydrology and Wildland Fire  
>4 months, 5/2016 Dixie National Forest, Field Hydrology and Wildland Fire  
3 days, 5/2016 Beaver Dam Mountains, Field Research  
3 days, 8/2015 Indian Peak Caliente Caldera Complex, Nevada, Field Research  
2 days, 3/2012 Swaziland Tin Mines, Field work with Swaziland Geologic Survey and Mines Department  
2 days, 2/2012 Mpaka Coal Mine, Field work with Swaziland Geologic Survey and Mines Department

## Technical Skills

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**Computational:** Python, MATLAB, Julia, ArcGIS (ArcGIS Pro, ArcGIS Online, ArcMap, ArcScene), QGIS, Agisoft Metashape, Pix4D, numerical modeling (finite difference, finite volume, and finite element methods), TOUGH2, 3DEC, FLAC3D, Kingdom Suite, Microsoft Office, Adobe Illustrator and Photoshop

**Field:** Geologic mapping, GPS (Collector for ArcGIS, Garmin products, Trimble products), smartphone based-LiDAR, vertical and horizontal UAV-based surveys, water quality sampling, E.coli contamination monitoring, hydraulic stream discharge measurements, and channel surveying (cross section and longitudinal profiles)

**Laboratory:** Split Hopkinson Pressure Bar, GCTS Triaxial apparatus, computed tomography (CT) scanning, P- and S-wave velocity measurements on Proceq Pundit Lab+ Ultrasonic Instrument, U/Pb zircon geochronology (sample prep, analysis on LA-ICP-MS), bulk rock geochemistry