

# James Atterholt

Mendenhall Postdoctoral Fellow, U.S. Geological Survey

---

1711 Illinois Street  
Golden, CO 80401  
Email: [jatterholt@usgs.gov](mailto:jatterholt@usgs.gov)  
Website: [atterholt.github.io](https://atterholt.github.io)

## Education

---

- |           |                                                                                                                                                                                                                        |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2019-2024 | <b>PhD</b> , Geophysics<br>California Institute of Technology (Caltech)<br>Advised by Zhongwen Zhan & Zachary E. Ross<br>Thesis: Fault Zone Structure and Rupture Behavior with Fiber-Optic Sensing and Second Moments |
| 2015-2019 | <b>Bachelor of Science</b> , Mathematics & Geological Sciences<br>Indiana University (IU)<br>Advised by Gary L. Pavlis<br>Thesis: Measurements of P-wave anisotropy in the Homestake Mine                              |

## Appointments

---

- |              |                                                                       |
|--------------|-----------------------------------------------------------------------|
| 2024-present | <b>Mendenhall Postdoctoral Fellow</b> , U.S. Geological Survey (USGS) |
| 2024-present | <b>Visiting Faculty</b> , Colorado School of Mines                    |
| 2019-2024    | <b>Graduate Student Researcher</b> , Caltech Seismological Laboratory |
| 2019         | <b>NAGT Summer Intern</b> , USGS                                      |
| 2015-2019    | <b>STARS Research Assistant</b> , IU Geophysics Laboratory            |
| 2017         | <b>IRIS Intern</b> , Los Alamos National Laboratory                   |

## Awards and Honors

---

- |      |                                                                                       |
|------|---------------------------------------------------------------------------------------|
| 2024 | <b>Mendenhall Postdoctoral Fellowship</b> , USGS<br>\$193,000 in support over 2 years |
|------|---------------------------------------------------------------------------------------|

2024	<b>GPS Award for Academic Excellence in Research</b> , Caltech
2024	<b>AGU Annual Meeting Outstanding Student Presentation Award</b>
2023	<b>SSA Annual Meeting Student Presentation Award</b>
2020	<b>NSF Graduate Research Fellowship</b> \$138,000 in support over 3 years
2019	<b>Faculty Senior Award</b> , IU Geological Sciences
2019	<b>Cora B. Hennel Memorial Scholarship</b> , IU Mathematics
2019	<b>Margaret Russell Edmondson Award</b> , IU Phi Beta Kappa Chapter
2017	<b>Undergraduate Prize</b> , Mineralogical Society of America

## Journal Publications

---

- [14] Bird, E.J., **Atterholt, J.**, Li, J., Biondi, E., Zhai, Q., Yang, Y., Fang, J., Wei, X., Hjörleifsdóttir, V., Klesh, A., Kamalov, V., Gunnarsson, T., Zhan, Z. (*in review*). Constraining Dike Opening Models with Seismic Velocity Changes Associated with the 2023-2024 Eruption Sequence on the Reykjanes Peninsula.
- [13] **Atterholt, J.**, Wilding, J.D., Ross, Z.E. (*in review*). The Evolution of Fault Orientation in the 2019 Ridgecrest Earthquake Sequence with a New Long-Term Catalog of Seismicity and Moment Tensors.
- [12] **Atterholt, J.**, Zhan, Z. (*accepted*). Fine Scale Southern California Moho Structure Uncovered with Distributed Acoustic Sensing. *Science Advances*.
- [11] Zhai, Q., Yin, J., Yang, Y., **Atterholt, J.**, Li, J., Husker, A., Zhan, Z. (*in review*). Comprehensive Evaluation of DAS Amplitude and Its Implications for Earthquake Early Warning and Ambient Noise Interferometry.
- [10] Bird, E., **Atterholt, J.**, Biondi, E., Yang, Y., Zhan, Z. (*in review*). Imaging the North Bishop Block with Converted Phases Observed through Fiber-Optic Seismology.
- [9] **Atterholt, J.**, Zhan, Z., Yang, Y., Zhu, W. (2024). Imaging the Garlock Fault Zone with a Fiber: A Missing Damage Zone and Hidden Bimaterial Contrast. *Journal of Geophysical Research: Solid Earth*, doi: 10.1029/2024JB028900
- [8] Guo, H., **Atterholt, J.**, McGuire, J.J., Thurber, C. (*accepted*). Evidence for low effective stress within the crust of the subducted Gorda plate from the 2022 December  $M_w$  6.4 Ferndale Earthquake Sequence. *Seismological Research Letters*.
- [7] **Atterholt, J.**, Ross, Z.E. (2023). Finite Source Properties of Large Strike-Slip Earthquakes. *Geophysical Journal International*, doi: 10.1093/gji/ggad459
- [6] **Atterholt, J.**, Zhan, Z., and Yang, Y. (2022). Fault zone imaging with distributed acoustic sensing: body-to-surface wave scattering. *Journal of Geophysical Research: Solid Earth*, doi: 10.1029/2022JB025052

- [5] Yang, Y., Zhan, Z., Shen, Z., and **Atterholt, J.** (2022). Fault zone imaging with distributed acoustic sensing: surface-to-surface wave scattering. *Journal of Geophysical Research: Solid Earth*, doi: 10.1029/2022JB024329.
- [4] **Atterholt, J.** and Ross, Z. E. (2022) Bayesian framework for inversion of second-order stress glut moments: application to the 2019 Ridgecrest sequence mainshock. *Journal of Geophysical Research: Solid Earth*, doi: 10.1029/2021JB023780
- [3] **Atterholt, J.**, Zhan, Z., Shen, Z., and Li, Z. (2021) A unified wavefield partitioning approach for distributed acoustic sensing. *Geophysical Journal International*, doi: 10.1093/gji/ggab407
- [2] Yang Y., **Atterholt, J.**, Shen, Z., Muir, J.B., Williams, W.F., Zhan, Z. (2021) Sub-kilometer correlation between near-surface structure and ground motion measured with distributed acoustic sensing. *Geophysical Research Letters*, doi: 10.1029/2021GL096503
- [1] **Atterholt, J.**, Brownlee, S.J., and Pavlis, G.L. (2021). Direct P-wave anisotropy measurements at Homestake Mine: implications for wave propagation in the continental crust. *Geophysical Journal International*, doi: 10.1093/gji/ggaa416

## Teaching Experience

---

2022-2023	<b>Caltech EQ Fellows Program</b> , Instructor/Mentor
2023	<b>Plate Tectonics</b> , Teaching Assistant, Caltech
2022	<b>Geophysical Data Analysis</b> , Teaching Assistant, Caltech
2021	<b>Seismology</b> , Teaching Assistant, Caltech

## Service

---

2022-present	<b>Manuscript Reviewer</b> , <i>Seismological Research Letters</i> , <i>Journal of Geophysical Research – Solid Earth</i> , <i>Communications Earth &amp; Environment</i> , <i>Scientific Reports</i> , <i>Seismica</i> , <i>Bulletin of the Seismological Society of America</i>
2023-2024	<b>Project Mentor</b> , High School Student Researchers, Caltech
2022-2023	<b>Curriculum Developer / Instructor</b> , Caltech EQ Fellows Program
2021-2022	<b>Organizer</b> , Caltech Seismological Laboratory Seminar
2016-2019	<b>Editorial Board Member</b> , <i>IU Journal of Undergraduate Research</i>

## Seminars

---

- [5] **Geologic Hazards Science Center (USGS)**, Weekly Seminar, 2024

- Title: The Top-to-Bottom Structure of the Garlock Fault with Fiber Seismology
- [4] **Indiana University Department of Earth and Atmospheric Sciences**, Invited Talk, 2024  
Title: Investigating Fault Structure and Moho Topography with a Fiber Array
- [3] **John Wesley Powell Center for Analysis and Synthesis**, Invited Talk, 2024  
Title: Fault Zone Imaging with DAS: A Case Study at the Garlock Fault
- [2] **California Institute of Technology**, Brown Bag Seminar, 2024  
Title: Exploring Fine-Scale Crustal Structure with Fiber Optic Seismology
- [1] **Lawrence Livermore National Laboratory**, GMP Guest Seminar, 2023  
Title: Illuminating the Multiscale Structure of the Garlock Fault Zone with Distributed Acoustic Sensing

### Select Oral Presentations

---

- [5] **Atterholt, J.**, Zhan, Z. (2023) Illuminating Moho Variability Across the Garlock Fault with Distributed Acoustic Sensing. AGU Fall Meeting, San Francisco.
- [4] **Atterholt, J.**, Zhan, Z., Yang, Y., Zhu, W. (2023) The Top-to-Bottom Structure of the Garlock Fault Zone Uncovered with Fiber Sensing. AGU Fall Meeting, San Francisco.
- [3] **Atterholt, J.**, Zhan, Z., Yang, Y., and Zhu, W. (2023) High-Resolution Fault Zone Imaging with Distributed Acoustic Sensing. SSA Annual Meeting, Puerto Rico. **Invited.**
- [2] **Atterholt, J.**, Zhan, Z., Yang, Y., and Zhu, W. (2022) Imaging the Garlock Fault Zone using distributed acoustic sensing. AGU Fall Meeting, Chicago.
- [1] **Atterholt, J.** and Ross, Z.E. (2022). Global evaluation of large strike-slip ruptures using a Bayesian estimation of stress glut second moments. AGU Fall Meeting, Chicago.

### Select Poster Presentations

---

- [10] Bird, E., **Atterholt, J.**, Yang, Y., Biondi E., and Zhan, Z. (2023). Joint Inversion for Shallow Subsurface Velocity Structure near Bishop, CA. AGU Fall Meeting, San Francisco.
- [9] Barbour, A., McGuire, J., and **Atterholt, J.** (2023) Site effects at the meter scale from fiber optic and nodal seismic sensing. AGU Fall Meeting, San Francisco.
- [8] **Atterholt, J.** and Ross, Z.E. (2023). Finite Source Properties of Large Strike-Slip Earthquakes. SSA Annual Meeting, Puerto Rico.
- [7] **Atterholt, J.** and Ross, Z.E. (2021). Bayesian framework for inversion of second-order stress glut moments: application to the 2019 Ridgecrest sequence mainshock. AGU Fall Meeting, New Orleans.

- [6] **Atterholt, J.**, and Zhan, Z. (2021). Fault zone mapping at intermediate scales using scattered waves recorded by distributed acoustic sensing. AGU Fall Meeting, New Orleans.
- [5] Yang, Y., **Atterholt, J.**, Shen, Z., Muir, J.B., Williams, E.F., and Zhan, Z. (2021). Urban seismic hazard mapping with distributed acoustic sensing. AGU Fall Meeting, New Orleans.
- [4] **Atterholt, J.**, Zhan, Z., Shen, Z., and Li, Z. (2020). A unified wavefield partitioning approach for distributed acoustic sensing. AGU Fall Meeting, Online.
- [3] Williams, E.F., Martins, H.F., Fernandez-Ruiz, M.R., **Atterholt, J.**, Shen, Z., Martin-Lopez, S., Gonzalez-Herraez, M., Callies, J., and Zhan, Z. (2020). Ocean surface gravity wave interferometry with seafloor DAS. AGU Fall Meeting, Online.
- [2] **Atterholt, J.** and Pavlis, G.L. (2018). Measurements of P wave anisotropy using active source seismic data in the Homestake Mine. GSA Annual Meeting, Indianapolis.
- [1] **Atterholt, J.**, Chen, T., Snelson, and C.M., Mellors, R.J. (2017). Attenuation model using the large-N array from the Source Physics Experiment. AGU Fall Meeting, New Orleans.

## Field Experience

---

2023	<b>Nodal deployment in Los Angeles County</b> , Contributor, Caltech
2022	<b>Seismic survey across Garlock Fault</b> , Designer and organizer, Caltech
2019	<b>Seismic survey across Seattle Fault</b> , Contributor, USGS
2019	<b>Seismic survey in Wabash Valley Fault Zone</b> , Contributor, USGS
2018	<b>Field mapping in the Tobacco Root Mountains</b> , Student, IU