James Atterholt

Mendenhall Postdoctoral Fellow, U.S. Geological Survey

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Education

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

Appointments

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

Awards and Honors

2024	**Mendenhall Postdoctoral Fellowship**, USGS $193,000 in support over 2 years

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

Journal Publications

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[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. (*in review*). Fine Scale Southern California Moho Structure Uncovered with Distributed Acoustic Sensing.

[11] Zhai, Q., Yin, J., Yang, Y., **Atterholt, J.**, Li, J., Husker, A., Zhan, Z. (*in review*). Comprehensive Evaluation of DAS Arrays 1 in California: Instrument Response, Noise Floor, and Amplitude Saturation.

[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. (*in review*). Evidence for low effective stress within the crust of the subducted Gorda plate from the 2022 December M_w 6.4 Ferndale Earthquake Sequence.

[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	**Caltech EQ Fellows Program**, Instructor/Mentor
2023	**Plate Tectonics**, Teaching Assistant, Caltech
2022	**Geophysical Data Analysis**, Teaching Assistant, Caltech
2021	**Seismology**, Teaching Assistant, Caltech

Service

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

Seminars

[4] **Indiana University Department of Earth and Atmospheric Sciences**, Invited Talk, 2024
Title: Top to Bottom Structure of the Garlock Fault with DAS

[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

[4] **Atterholt, J.**, Zhan, Z. (2023) Illuminating Moho Variability Across the Garlock Fault with Distributed Acoustic Sensing. AGU Fall Meeting, San Francisco.
[5] **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	**Nodal deployment in Los Angeles County**, Contributor, Caltech
2022	**Seismic survey across Garlock Fault**, Designer and organizer, Caltech
2019	**Seismic survey across Seattle Fault**, Contributor, USGS
2019	**Seismic survey in Wabash Valley Fault Zone**, Contributor, USGS
2018	**Field mapping in the Tobacco Root Mountains**, Student, IU