

# Alysha Armstrong

4<sup>th</sup> year Ph.D. Candidate, Department of Geology and Geophysics  
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## Education

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### University of Utah

*Doctor of Philosophy in Geophysics*

Graduate Certificate in Data Science—Awarded Dec. 2021

Advisor: Dr. Keith Koper

Cumulative GPA: 3.99/4.0

Salt Lake City, UT  
Expected May 2025

### University of Utah

*Bachelor of Science in Geoscience, Geophysics emphasis*

Minor in Computer Science

Cumulative GPA: 3.87/4.0 (Cum Laude)

Salt Lake City, UT  
Aug. 2016 – May 2020

## Relevant Experience

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### University of Utah Seismograph Stations (UUSS)

July 2020 – Jan. 2023, Aug. 2023 – Present

*Graduate Research Assistant*

Salt Lake City, UT

- Apply machine learning-based methods to network seismology tasks (e.g., detection, phase picking, magnitudes), with an emphasis on Yellowstone seismicity

### U. S. Geological Survey

May 2023 – Aug. 2023

*Summer Intern, National Earthquake Information Center*

Golden, CO

- Develop a deep-learning phase re-picker with calibrated uncertainties for global seismicity

### University of Utah Department of Geology and Geophysics

Jan. 2023 – May 2023

*Teaching Assistant*

Salt Lake City, UT

- Grade and assist undergraduate students with assignments and labs in Geophysics (GEO 3010)

### Los Alamos National Laboratory

July 2019 – Aug. 2019, June 2020 – Aug. 2020

*Summer Intern, Earth and Environmental Sciences-Geophysics Group*

Los Alamos, NM

- Discriminate quarry blasts and local earthquakes in Utah using properties of their source spectra

### University of Utah Seismograph Stations

May 2018 – July 2020

*Undergraduate Research Assistant*

Salt Lake City, UT

- Perform detection and high-precision relative relocation of mining-induced seismicity using template matching and GrowClust

### University Research Opportunities Program

May 2018 – Aug. 2018

*Undergraduate Researcher*

Salt Lake City, UT

- Create and analyze 3-dimensional models of precariously balanced rocks near the Wasatch Fault

## Publications

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- **Armstrong, A. D.**, Z. Claerhout, B. Baker, and K. D. Koper (2023). A deep-learning phase picker with calibrated Bayesian-derived uncertainties for earthquakes in the Yellowstone Volcanic Region, *Bull. Seismol. Soc. Am.* **113**, 2323–2344. doi: [10.1785/0120230068](https://doi.org/10.1785/0120230068)

## Synergistic Activities

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- **President**, Inclusive Earth student organization Aug. 2022 – Jan. 2024
- **Duty Seismologist**, UUSS July 2021 – Jan. 2024
- **Student Rep.**, College of Mines & Earth Sciences (CMES) College Council Feb. 2022 – May 2023
- **Undergraduate Research Mentor** (for Zac Claerhout), UUSS Jan. 2022 – Dec. 2022
- **Vice-President**, Inclusive Earth student organization May 2021 – Aug. 2022
- **Co-organizer**, SeismoTea Geophysical Seminar Series Aug. 2021 – May 2022
- **Participant**, Undergraduate Research Mentor Development Program Feb. 2021 – Apr. 2021
- **Participant**, Unlearning Racism in Geosciences (URGE) Jan. 2021 – May 2021
- **Treasurer**, Inclusive Earth student organization Aug. 2020 – May 2021
- **Participant**, Summer of Applied Geophysical Experience (SAGE) June 2019 – July 2019

## Meeting Abstracts

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- **Armstrong, A. D.**, B. Baker, and K. D. Koper (2024). Feature-based Magnitude Estimates for Small, Nearby Earthquakes in the Yellowstone Volcanic Region, *SSA Annual Meeting*, Anchorage, AK.
- B. Baker, **A. D. Armstrong**, and K. L. Pankow (2024). Improving Shear-Arrival Time Estimates for Real-Time Association and Location Algorithms, *SSA Annual Meeting*, Anchorage, AK.
- Yeck, W., H. Cole, J. Patton, **A. D. Armstrong**, S. Dybing, and P. S. Earle (2023). Machine Learning Research and Infrastructure Developments at the National Earthquake Information Center, *AGU Fall Meeting*, San Francisco, CA.
- **Armstrong, A. D.** (*Invited Student*), B. Baker, and K. D. Koper (2023). Calibrated Uncertainty Estimates for Deep Learning-Based Phase Arrival Time Estimates, *SSA Annual Meeting*, San Juan, PR.
- Baker, B., **A. D. Armstrong**, K. L. Pankow, and K. D. Koper (2023). Using the University of Utah Messaging Passing System to Help Realize Real-Time Machine-Learning Modules in Network Operations, *SSA Annual Meeting*, San Juan, PR.
- Mendoza, K. A., **A. D. Armstrong**, S. Bagge, H. Bai, E. Humphrey, C. Kiessner, E. H. Cunningham, M. M. Holt, J. Lerback, and G. St Pierre (2022). Student Resiliency and Advancement of DEI Objectives Through Leadership Change and Pandemic Uncertainties: Perspectives from Inclusive Earth, *AGU Fall Meeting*, Chicago, IL.
- **Armstrong, A. D.**, B. Baker, and K. D. Koper (2022). Supervised Deep Learning Models to Improve the Yellowstone Seismic Catalog, *2022 SAGE/GAGE Community Science Workshop*, Pittsburgh, PA.
- **Armstrong, A. D.**, B. Baker, and K. D. Koper (2022). Supervised Deep Learning Models to Improve the Yellowstone Seismic Catalog with Application to the 2013-14 Norris Geyser Basin Earthquake Swarm, *15th Biennial Scientific Conference on the Greater Yellowstone Ecosystem*, Bozeman, MT.
- **Armstrong, A. D.**, B. Baker, and K. D. Koper (2021). Supervised Deep Learning Models to Improve the Yellowstone Seismic Catalog with Application to the 2013/2014 Norris Geyser Basin Earthquake Swarm, *AGU Fall Meeting*, New Orleans, LA.
- Baker, B., **A. D. Armstrong**, K. L. Pankow, and K. D. Koper (2021). Preliminary Incorporation of Machine Learning Models into Network Operations at the University of Utah Seismograph Stations, *AGU Fall Meeting*, New Orleans, LA.
- **Armstrong, A. D.**, K. D. Koper, and M. P. Poland (2021). Taking Yellowstone seismology to the classroom for some “deep learning”, *Yellowstone Caldera Chronicles*.
- **Armstrong, A. D.**, G. G. Euler, K. D. Koper, and W. S. Phillips (2019). Investigation of the spectral nature of quarry blasts and earthquakes at local distances in Northern Utah, *AGU Fall Meeting*, San Francisco, CA.
- Weaver, H., **A. D. Armstrong**, C. Babendreier, O. Huff, Q. Zeng, C. Martinez, J. F. Ferguson, S. Kelley, and D. E. Lumley (2019). Geophysical Investigation of the Northwestern Valles Caldera, New Mexico, *AGU Fall Meeting*, San Francisco, CA.

- **Armstrong, A. D.**, A. A. Allam, A. Sorscher, C. Richards, and S. Clairmont (2019). Precariously Balanced Rocks in Northern Utah, *University of Utah Undergraduate Research Symposium*, Salt Lake City, UT.
- **Armstrong, A. D.**, M. M. Scales, K. D. Koper, and R. Burlacu (2018). High-precision relative relocation of seismicity near a central Utah mine, *AGU Fall Meeting*, Washington, D. C.
- Allam, A. A., A. Sorscher, **A. D. Armstrong**, C. Richards, S. Clairmont, and A. McKell (2018). Precariously balanced rocks in northern Utah: are Wasatch Fault earthquakes worse than expected?, *AGU Fall Meeting*, Washington, D. C.

## Honors and Awards

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| • <b>Cooper-Hansen Graduate Fellowship</b> , CMES                                 | 2020, 2024           |
| • <b>Student Travel Grant</b> , Seismological Society of American Annual Meeting  | 2023                 |
| • <b>Student Service Award</b> , Dept. of Geology and Geophysics (GG)             | 2022, 2023           |
| • <b>Student Travel Scholarship</b> , SAGE/GAGE Workshop                          | 2022                 |
| • <b>Student Travel Grant</b> , Associated Students of the University of Utah     | 2019, 2021           |
| • <b>Student Travel Grant</b> , Office of Undergraduate Research                  | 2019                 |
| • <b>Frischknecht Endowed Scholarship</b> , Dept. of GG                           | 2018/2019, 2019/2020 |
| • <b>Thomas Parry Billings Scholarship</b> , CMES                                 | 2018/2019, 2019/2020 |
| • <b>Cooper-Hansen Foundation Scholarship</b> , CMES                              | 2019/2020            |
| • <b>Mineralogical Society of Utah Memorial Scholarship</b> , Dept. of GG         | 2017/2018            |
| • <b>1<sup>st</sup> place in Undergraduate Research</b> , CMES Research Symposium | 2017                 |

## Skills

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- Knowledge in Python, Java, C#, MATLAB, SAC, Unix, GMT, and shell scripting
- Ability to produce various machine learning models using Python, scikit-learn, and PyTorch
- Familiar with AQMS, C/C++, OpenMP, MPI, HTML, JavaScript, and CSS
- Experience deploying Fairfield Nodal seismometers in Southern California and Yellowstone

## Relevant Courses

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- Seismology, Seismic Sources, Signal Processing, Machine Learning, Probabilistic Machine Learning, High Performance and Parallel Computing, Deep Learning, Data Mining, Visualization for Data Science, Geodynamics, Inversion Theory, Software Practices, Algorithms and Data Structures, Discrete Structures, Applied Complex Variables, Numerical Analysis, Partial Differential Equations, Seismic Array Processing, Database Systems