

AMANDA M. THOMAS

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Research Profile

Earthquake, environmental, and volcano seismology, small earthquake science, slow earthquakes, fault mechanics and rheology, data science and machine learning, geodesy, strong ground motion, active tectonics, numerical analysis and modeling of geophysical data, planetary geophysics

Education

- Ph.D. Geophysics, University of California, Berkeley (December 2012)
- B.S. Civil Engineering (highest honors), Georgia Institute of Technology (May 2007)

Recognitions & Awards

- Presidential Early Career Award for Scientists and Engineers, PECASE (2025)
- National Academy of Sciences Kavli Fellow (2022)
- Katharina von Salis visiting faculty fellow, ETH Zurich (2022)
- NSF CAREER Award (2019-2024)
- Seismological Society of America Charles F. Richter Early Career Award (2018)
- Earthscope Distinguished Lecturer (2016-2017)
- National Science Foundation Postdoctoral Research Fellowship (2013-2015)
- G. D. Louderback Award for outstanding scholarship (2012)
- Seismological Society of America Best Student Presentation Award (2010)
- National Science Foundation Graduate Research Fellowship (2008-2011)
- Geological Society of America Graduate Research Award (2008)

Research Appointments

- Louise H. Kellogg Chair and Professor of Geophysics, University of California, Davis (January 2025-present)
- Associate Professor, University of Oregon (September 2019-December 2024)
- Assistant Professor, University of Oregon (August 2015-August 2019)
- National Science Foundation Postdoctoral Fellow, Stanford University (2013-2015)
- National Science Foundation Graduate Research Fellow, Berkeley Seismological Laboratory, University of California-Berkeley (2007-2012)
- Graduate Student Researcher, Tohoku University, Sendai, Japan (2009)
- SURE Summer Intern and undergraduate researcher, Department of Earth and Atmospheric Sciences, Georgia Institute of Technology (2006-2007)
- IRIS Summer Intern, Department of Geological Sciences, University of Colorado-Boulder (2005)

Submitted & Published Manuscripts

** Note: First authors contributed most of the analysis and writing of the paper. Junior group members are underlined. Asterisks indicate undergraduate authors.

1. Styron, R., L. Bachelot, and **A. M. Thomas** (202X) Open source tools for making geometrically-complex fault surfaces. Submitted to *Seismological Research Letters*.
2. Sahakian, V. J. A. Meigs, A. Clifford, S. Fasola, D. Melgar, **A. M. Thomas**, et al. (202X) The Cascadia Region Earthquake Science Center (CRESCENT): Regional Science in a Societal Resilience Context. Submitted to *Seismological Research Letters*.
3. Melgar, D., **A. M. Thomas**, et al. (2025) The Cascadia Region Earthquake Science Center (CRESCENT): Advancing Understanding of Cascadia's Earthquake Hazards. In revision in *Seismological Research Letters*.
4. Scholz, K., **A. M. Thomas**, and M. E. Townsend (202X) A Physics-Based Model of Repeating Deep Long-Period Earthquakes driven by second boiling at Mauna Kea. In revision in *Geophysical Research Letters*.
5. Journeau, C. R., **A. M. Thomas**, R. E. Abercrombie, B. Hirao, M. Liu, and V. Kuna (202X) OBS Data Mining Reveals Seismic Structure and Dynamics of the Blanco Transform Fault, offshore Oregon. In revision in *JGR-Solid Earth*.
6. Conner, A. E., **A. M. Thomas**, K. E. Allstadt, W. A. Thelen, E. Collins, M. Farin, W. J. Stephenson, and A. M. Iezzi (202X) Quantifying Seismic Properties of a River Channel at Mount Rainier for Use in Debris Flow Monitoring and Analysis. In revision in *Seismological Research Letters*.
7. Sun, Y., D. Melgar, and **A. M. Thomas** (202X) Correlation Lengths, Hurst exponents, and Source scaling properties of Global Slow Slip Events. In revision in *JGR-Solid Earth*.
8. Dybing, S. N., D. Melgar, **A. M. Thomas**, D. E. Goldberg, D. Mencin, and B. W. Crowell (202X) Detecting Earthquakes in Noisy Real-Time GNSS Data with Machine Learning for Improved PGD Magnitude Estimation. In revision in *JGR-Solid Earth*.
9. Shelly, D. R., **A. M. Thomas**, K. Z. Materna, and R. J. Skoumal (2025) Low-frequency earthquakes track the motion of a captured slab fragment. Accepted in *Science*.
10. Hirao, B., **A. M. Thomas**, D. R. Shelly, W. A. Thelen, and C. Journeau (2025) Magmatic volatile flux drives non-eruptive volcano-tectonic seismicity at Mount St. Helens, USA from 2008-2023. Accepted in *JGR-Solid Earth*.
11. **Thomas, A. M.**, J. M. Watkins, N. M. Beeler, M. E. French, and M. H. Reed (2025) Rapid fault healing from cementation in the source region of deep slow slip and tremor. *Science Advances*. DOI: [10.1126/sciadv.adz2832](https://doi.org/10.1126/sciadv.adz2832).
12. Ni, Y, M. Denolle, **A. M. Thomas**, A. Hamilton, J. Münchmeyer, Y. Wang, L. Bachelot, C. Trabant, D. Mencin (2025) A global-scale database of seismic phases from cloud-based picking at petabyte scale. *Seismica*. DOI: [10.26443/seismica.v4i2.1738](https://doi.org/10.26443/seismica.v4i2.1738).
13. Ni, Y, M. Denolle, J. Münchmeyer, Y. Wang, K.-F. Feng, C. G. J. Suarez, **A. M. Thomas**, C. Trabant, A. Hamilton, and D. Mencin (2025) A review of Cloud Computing in Seismology. *Geophysical Journal International*. doi: 10.1093/gji/ggaf322.
14. Shelly, D. R., D. E. Goldberg, A. G. Wech, and **A. M. Thomas** (2025) A Northeast-Dipping Zone of Low Frequency Earthquakes at the Southern Edge of Cascadia Subduction. *Geophysical Research Letters*. doi: 10.1029/2025GL116116.
15. Bachelot, L., **A. M. Thomas**, D. Melgar, J. Searcy, and Y.-S. Sun. (2025) Cascadia Daily GNSS Time Series Denoising: Graph Neural Network and Stack Filtering. *Seismica*. doi: 10.26443/seismica.v2i4.1419

16. Lin, J.-T., **A. M. Thomas**, L. Bachelot, D. R. Toomey, J. Searcy, D. Melgar (2024) Detection of Hidden Low-Frequency Earthquakes in Southern Vancouver Island with Deep Learning. *Seismica*. doi: 10.26443/seismica.v2i4.1134
17. Lin, J.-T., D. Melgar, **A. M. Thomas**, and J. Searcy (2023) Real-time Fault Tracking and Ground Motion Prediction for Large Earthquakes with HR-GNSS and Deep Learning. *Journal of Geophysical Research, Solid Earth*. doi: 10.1029/2023JB027255.
18. **Thomas, A. M.**, D. Melgar, S. N. Dybing, and J. Searcy (2023) Deep learning for denoising High-Rate Global Navigation Satellite System data. *Seismica*. doi: 10.26443/seismica.v2i1.240.
19. Delph, J., **A. M. Thomas**, A. C. Stanciu, K. Aslam, A. Chatterjee, V. Sassard (2023) SCENTAR: A high-density nodal array to study the structure and seismogenic behavior of the southern Cascadia forearc. *Seismological Research Letters*. doi: 10.1785/0220220251
20. Dumont, S., S. Custódio, S. Petrosino, **A. M. Thomas**, G. Sottili (2022) A Journey through Tides Chapter 17: Tides, Earthquakes and Volcanic eruptions. *Elsevier*. Doi: 10.1016/C2020-0-02539-9.
21. Zhang, H., M. Glasgow, B. Schmandt, W. A. Thelen, S. C. Moran, and **A. M. Thomas** (2022) Revisiting the depth distribution of seismicity before and after the 2004–2008 eruption of Mount St. Helens. *Journal of Volcanology and Geothermal Research*. doi: 10.1016/j.jvolgeores.2022.107629.
22. Melgar, D. V. Sahakian, and **A. M. Thomas** (2022) Deep Coseismic Slip in the Cascadia Megathrust can be Consistent with Coastal Subsidence. *Geophysical Research Letters*. doi: 10.1029/2021GL097404.
23. Lin, J.-T., D. Melgar, **A. M. Thomas**, and J. Searcy (2021) Early warning for great earthquakes from characterization of crustal deformation patterns with deep learning. *Journal of Geophysical Research, Solid Earth*. doi: 10.1029/2021JB022703.
24. Aslam, K., **A. M. Thomas**, and D. Melgar (2021) The effect of Fore-arc Deformation on Shallow Earthquake Rupture behavior in the Cascadia Subduction Zone. *Geophysical Research Letters*. doi: 10.1029/2021GL093941.
25. Inbal, A., **A. M. Thomas**, T. J. Newton, and R. Burgmann (2021) Complex Migration of Tremor near Cholame, CA, Resolved by Seismic Array Analysis. *Journal of Geophysical Research, Solid Earth*. doi: 10.1029/2021JB022174.
26. Ramos, M., Y. Huang, T. Ulrich, D. Li., A.-A. Gabriel, and **A. M. Thomas** (2021) Assessing Margin-Wide Rupture Behaviors along the Cascadia Megathrust with 3-D Dynamic Rupture Simulations. *Journal of Geophysical Research, Solid Earth*. doi: 10.1029/2021JB022005.
27. **Thomas, A. M.**, A. Inbal, J. Searcy, D. R. Shelly, and R. Burgmann (2021) Identification of low-frequency earthquakes on the San Andreas fault with deep learning. *Geophysical Research Letters*. doi: 10.1029/2021GL093157.
28. Hughes, L., C. J. Chamberlain, J. Townend, and **A. M. Thomas** (2021) A Repeating Earthquake Catalog from 2003 to 2018 for the Raukumara Peninsula, Northern Hikurangi Subduction Margin, New Zealand. *Geochemistry, Geophysics, Geosystems*. doi: 10.1029/2021GC009670.
29. Klimasewski, A., V. J. Sahakian, and **A. M. Thomas** (2021) Comparing artificial neural networks with traditional ground-motion models for small-magnitude earthquakes in Southern California. *Bulletin of the Seismological Society of America*. doi: 10.1785/0120200200.
30. Delph, J., **A. M. Thomas**, A. Levander (2021) Subcretionary tectonics: Linking variability in the expression of subduction along the Cascadia forearc. *Earth and Planetary Science Letters*. doi: 10.1016/j.epsl.2020.116724.

31. Dunham, E. M., **A. M. Thomas**, T. W. Becker, et al. (2020) Modeling Collaboratory for Subduction RCN Megathrust Modeling Workshop Report. doi: 10.31223/X5730M.
32. Newton, T. J. and **A. M. Thomas** (2020) Stress orientations in the Nankai Trough constrained using seismic and aseismic slip. *Journal of Geophysical Research, Solid Earth*. doi: 10.1029/2020JB019841.
33. Lin, J.-T., K. Aslam, **A. M. Thomas**, and D. Melgar (2020) Overlapping regions of coseismic and transient slow slip on the Hawaiian décollement. *Earth and Planetary Science Letters*. doi: 10.1016/j.epsl.2020.116353.
34. Wech, A. G., W. A. Thelen, and **A. M. Thomas** (2020) Deep long-period earthquakes generated by second boiling beneath Mauna Kea volcano. *Science*. doi: 10.1126/science.aba4798.
35. Goldberg, D. E., D. Melgar, V. J. Sahakian, **A. M. Thomas**, X. Xu, J. Geng, and B. W. Crowell (2020) Complex Rupture of an Immature Fault Zone: A Simultaneous Kinematic Model of the 2019 Ridgecrest, CA Earthquakes. *Geophysical Research Letters*. doi:10.1029/2019GL086382.
36. **Thomas, A. M.**, Z. Spica, M. Bodmer, W. H. Schultz, and J. R. Roering (2020) Using a dense seismic array to determine resonances and structure of the Two Towers earthflow in Northern California. *Seismological Research Letters*. doi: 10.1785/0220190206.
37. Lin, J.-T., W. Chang, D. Melgar, **A. M. Thomas**, and C. Chiu (2019) Quick Determination of Earthquake Source Parameters from GPS Measurements: Cases of Taiwan Earthquakes. *Geophysical Journal International*. doi: 10.1093/gji/ggz359.
38. *Littel, G., **A. M. Thomas**, and A. S. Baltay (2018) Using tectonic tremor to constrain seismic-wave attenuation in Cascadia. *Geophysical Research Letters*. doi: 10.1029/2018GL079344.
39. Hawthorne, J. C., **A. M. Thomas**, and J.-P. Ampuero (2018) The rupture extent of low frequency earthquakes near Parkfield, CA. *Geophysical Journal International*. doi: 10.1093/gji/ggy429.
40. Parker, L., C. H. Thurber, X. Zeng, N. Lord, D. Fratta, H. F. Wang, M. Robertson, **A. M. Thomas**, M. Karplus and K. L. Feigl (2018) Active-Source Seismic Tomography at the Brady Geothermal Field, Nevada, with Dense Nodal and Fiber-Optic Seismic Arrays. *Seismological Research Letters*. doi: 10.1785/0220180085.
41. Bletery, Q., **A. M. Thomas**, A. W. Rempel, and Jeanne L. Hardebeck (2017) Imaging shear strength along subduction faults. *Geophysical Research Letters*. doi: 10.1002/2017GL075501.
42. Beeler, N. M., **A. M. Thomas**, R. Burgmann, and D. R. Shelly (2017) Constraints on friction, dilatancy, diffusivity, and effective stress from low-frequency earthquake rates on the deep San Andreas Fault. *Journal of Geophysical Research, Solid Earth*. doi: 10.1002/2017JB015052.
43. **Thomas, A. M.**, N. M. Beeler, Q. Bletery, R. Burgmann, and D. R. Shelly (2017) Using low frequency earthquake families on the San Andreas fault as deep creepmeters. *Journal of Geophysical Research, Solid Earth*. doi:10.1002/2017JB014404.
44. Bletery, Q., **A. M. Thomas**, J. C. Hawthorne, R. M. Skarbek, A. W. Rempel, & R. D. Krogstad (2017) Characteristics of secondary slip fronts associated with slow earthquakes in Cascadia. *Earth and Planetary Science Letters*. doi:10.1016/j.epsl.2017.01.046.
45. Bostock, M. G., **A. M. Thomas**, A. M. Rubin, and N. I. Christensen (2017) On corner frequencies, attenuation, and low-frequency earthquakes. *Journal of Geophysical Research, Solid Earth*. doi:10.1002/2016JB013405.
46. Hawthorne, J. C., M. G. Bostock, A. Royer, and **A. M. Thomas** (2016) Variations in slow slip moment rate associated with rapid tremor reversals in Cascadia. *Geochemistry, Geophysics, Geosystems*. doi:10.1002/2016GCo06489.

47. Bletery, Q., **A. M. Thomas**, L. Karlstrom, A. W. Rempel, A. Sladen and L. De Barros (2016) Mega-earthquakes rupture flat megathrusts. *Science*. doi:10.1126/science.aago482.
48. **Thomas, A. M.**, G. C. Beroza and D. R. Shelly (2016) Constraints on the Source Parameters of Low-Frequency Earthquakes on the San Andreas Fault. *Geophysical Research Letters*. doi:10.1002/2015GL067173.
49. Beeler, N. M., G. H. Hirth, **A. M. Thomas**, and R. Burgmann (2015) Effective pressure, friction and deep crustal faulting. *Journal of Geophysical Research, Solid Earth*. doi: 10.1002/2015JB012115.
50. Bostock, M. G., **A. M. Thomas**, G. Savard, L. Chuang, and A. Rubin (2015) Magnitudes and moment-duration scaling of low-frequency earthquakes beneath southern Vancouver Island. *Journal of Geophysical Research, Solid Earth*. doi:10.1002/2015JB012195.
51. **Thomas, A. M.** and M. G. Bostock (2015) Identifying low-frequency earthquakes in central Cascadia using cross-station correlation. *Tectonophysics*. doi:10.1016/j.tecto.2015.07.013.
52. Kyriakopoulos, C., A. V. Newman, **A. M. Thomas**, M. Moore-Driskell, and G. T. Farmer (2015) A new seismically constrained subduction interface model for Central America. *Journal of Geophysical Research, Solid Earth*. doi:10.1002/2014JB011859.
53. Plourde, A., M. G. Bostock, P. Audet, and **A. M. Thomas** (2015) Low-frequency earthquakes at the southern Cascadia margin. *Geophysical Research Letters*. doi:10.1002/2015GL064363.
54. Royer, A., **A. M. Thomas**, and M. G. Bostock (2014) Tidal Modulation of Low Frequency Earthquakes and triggering of secondary events in Northern Cascadia. *Journal of Geophysical Research, Solid Earth*. doi:10.1002/2014JB011430.
55. Thurber, C. H., X. Zeng, **A. M. Thomas**, and P. Audet (2014) Phase-Weighted Stacking Applied to Low-Frequency Earthquakes. *Bulletin of the Seismological Society of America*. doi:10.1785/0120140077.
56. *Culha, C., A. Hayes, M. Manga, and **A. M. Thomas** (2014) Double ridges on Europa accommodate some of the missing surface contraction. *Journal of Geophysical Research, Planets*. doi:10.1002/2013JE004526.
57. Beeler, N. M., **A. M. Thomas**, R. Burgmann, and D. R. Shelly (2013) Inferring fault rheology from low frequency earthquakes on the San Andreas fault. *Journal of Geophysical Research, Solid Earth*. doi:10.1002/2013JB010118.
58. **Thomas, A. M.**, R. Burgmann, and D. S. Dreger (2013) Incipient faulting near Lake Pillsbury, CA and the role of accessory faults in plate boundary evolution. *Geology*. doi:10.1130/G34588.1.
59. McLaskey, G. C., **A. M. Thomas**, S. D. Glaser, R. M. Nadeau (2012) Fault healing promotes high frequency earthquakes in the laboratory and on natural faults. *Nature*. doi:10.1038/nature11512.
60. **Thomas, A. M.**, R. Burgmann, D. R. Shelly, N. M. Beeler, and M. L. Rudolph (2012) Tidal sensitivity of low frequency earthquakes near Parkfield, CA: implications for fault mechanics within the brittle-ductile transition. *Journal of Geophysical Research, Solid Earth*. doi:10.1029/2011JB009036.
61. **Thomas, A.M.**, R. M. Nadeau, and R. Burgmann (2009) Tremor-tide correlations and near-lithostatic pore pressure on the deep San Andreas fault. *Nature*. doi:10.1038/nature08654.
62. Ghosh, A., A. V. Newman, **A. M. Thomas**, and G. T. Farmer (2008) Interface locking along the subduction megathrust from b-value mapping near Nicoya Peninsula, Costa Rica, *Geophysical Research Letters*, doi:10.1029/2007GL031617.

Open-source software and other resources

63. **Thomas, A. M.** (2023). The 1700 Great Cascadia Earthquake - Infographic. CRESCENT Open Documents Library. <https://doi.org/10.5281/zenodo.17664654>
64. **Thomas, A. M.**, L. Bachelot, N. Stevens, I. McBrearty, M. Denolle, Y. Ni, and A. Kharita. (2025). Machine Learning Technical Short Course 2025 (v1.o.o). CRESCENT Open Documents Library. <https://doi.org/10.5281/zenodo.15548185>
65. Bahavar, M., Staisch, L., Dura, T., Hawkes, A., Kelsey, H., La Selle, S., Witter, R., Bruce, D., Bachelot, L., & **A. M. Thomas** (2025). The Cascadia Region Earthquake Science Center (CRESCENT) Paleoseismic viewer (1.o.o). CRESCENT Open Documents Library. <https://doi.org/10.5281/zenodo.15866115>
66. Bahavar, M., J. Delph, J., A. Ashraf, P.-E. Share, V. Sahakian, **A. M. Thomas**, L. Bachelot, E. Hooft, R. Ajala, & the CRESCENT CVM Working Group. (2025). The Cascadia Region Earthquake Science Center (CRESCENT) Community Velocity Model viewer (v1.o.o). Zenodo. <https://doi.org/10.5281/zenodo.15015095>
67. Bahavar, M., R. Styron, A. Streig, **A. M. Thomas**, L. Bachelot, & the CRESCENT CFM working group. (2025). The Cascadia Region Earthquake Science Center (CRESCENT) Community Fault Model viewer (1.o.o). Zenodo. <https://doi.org/10.5281/zenodo.15021861>

Thesis

Thomas, A. M. (2013) Fact or friction: Inferring rheology from low-frequency earthquakes on the San Andreas fault. University of California, Berkeley Ph.D. Dissertation.

Lectures & Conference Presentations

Note: This list includes only presentations since 2016 on which the first author was either myself or a junior advisee. Asterisks denote upcoming presentations.

- **Rapid fault healing in the deep slow slip source region** (A. M. Thomas, J. M. Watkins, N. M. Beeler, M. E. French, W. M. Behr, and M. H. Reed)
2025 talk at the Berkeley Seismological Laboratory (INVITED)

2025 talk at the United States Geological Survey earthquake source processes group (INVITED)
2024 talk at the University of Oregon (INVITED)
2024 talk at the Thomas Hanks symposium (INVITED)
2024 talk at the Gordon Research Conference on Rock Deformation (INVITED)
2024 talk at the University of California, Davis (INVITED)
2023 poster at the CRESCENT Kickoff Meeting
2023 talk at Rice University (INVITED)
- **Introduction to CRESCENT** (A. M. Thomas, D. Melgar, V. Sahakian, et al.)
2024 talk at the SCEC Community Models workshop (INVITED)
2023 talk at the CRESCENT kickoff meeting (INVITED)
- **Two decades of seismicity at Mt. St. Helens** (B. Hirao, A. M. Thomas, D. R. Shelly, and W. A. Thelen)
2025 poster at the USGS Subduction Zone Science meeting
2024 poster at the Seismological Society of America meeting
2023 poster at the Seismological Society of America meeting
- **Quantifying seismic properties of a river channel at Mt. Rainier for use in debris flow monitoring and analysis** (A. Conner, A. M. Thomas, K. E. Allstadt, E. A. Collins, W. A. Thelen)
2024 poster at the Seismological Society of America meeting

- **Linking seismic images with geologic and seismogenic variability along the forearc of the Cascadia subduction zone** (J. R. Delph, A. M. Thomas, A. Levander, and F. Niu)
2023 talk at the American Geophysical Union meeting
- **Receiver Function Imaging of the Southern Cascadia Forearc using the SCENTAR Nodal Array** (J. R. Delph, B. Herr, A. M. Thomas)
2023 poster at the American Geophysical Union meeting
- **Insights into Cascadia's Offshore Seismicity from OBS Data Mining** (C. Journeau, A. M. Thomas, R. E. Abercrombie, B. Hirao, D. R. Toomey, and E. E. Hooft)
2025 talk at IGP, Paris
2025 talk at the Massachusetts Institute of Technology
2025 talk at the European Geophysical Union Meeting
2024 poster at the American Geophysical Union meeting
2024 poster at the Cargèse earthquake school
2024 talk at the Seismological Society of America meeting
2023 talk at the American Geophysical Union meeting
2023 poster at the CRESCENT Kickoff Meeting
- **Cascadia GNSS Time Series Denoising Using Graph Neural Networks** (L. Bachelot, A. M. Thomas, D. Melgar, J. Searcy)
2024 poster at the Seismological Society of America meeting
2023 talk at the American Geophysical Union meeting
- **Insights into the Magmatic Drivers of Deep Long-Period Earthquakes at Mauna Kea** (K. Scholz, A. M. Thomas, M. Townsend)
2024 talk at the American Geophysical Union meeting
2024 talk at the Seismological Society of America meeting
2023 talk at the American Geophysical Union meeting
2023 poster at the Seismological Society of America meeting
- **Detecting Hidden Low-Frequency Earthquakes in Southern Vancouver Island with Deep-Learning** (J.-T. Lin, A. M. Thomas, D. Melgar, L. Bachelot, J. Searcy)
2023 poster at the Southern California Earthquake Center Meeting
- **Repeating Low-Frequency Earthquakes Near Wrangell Volcano, Alaska** (A. G. Wech, T. Newton, A. M. Thomas)
2023 poster at the American Geophysical Union meeting
2023 poster at the Seismological Society of America meeting
- **Analysis of seismic noise using probabilistic power spectral densities for non-volcanic tremors in Cascadia prior to the onset of slow slip events** (L. Papin, A. M. Thomas)
2023 poster at the Seismological Society of America meeting
- **Generating Green's functions for use in seismic monitoring of debris flows using the ambient seismic field** (A. Conner, A. M. Thomas, K. E. Allstadt, E. A. Collins, W. A. Thelen)
2023 talk at the Seismological Society of America meeting
- **Rapid Ground Motion Forecasting for Large Earthquakes with HR-GNSS and Deep Learning** (J.-T. Lin, D. Melgar, A. M. Thomas, V. J. Sahakian, J. Searcy)
2022 poster at the American Geophysical Union meeting
- **SCENTAR: A Nodal Array to Study the Structure and Seismogenic Behavior of the Southern Cascadia Forearc** (Delph et al.)
2022 poster at the American Geophysical Union meeting
- **Geodetic constraints on the slow slip source and transient detection with Machine Learning: Kinematic Slow Slip and Synthetic Displacement Data** (Y. Sun, D. Melgar, A. M. Thomas)
2022 poster at the American Geophysical Union meeting

- **The many manifestations of slow earthquakes and their interpretation** (A. M. Thomas)
2022 talk at Kavli Frontiers of Science symposium, Beckman Center, Irvine, CA (INVITED)
- **Deep learning detection of small magnitude Earthquakes and slip transients** (A. M. Thomas)
2022 talk at Géoazur, Nice, France (INVITED)
- **An introduction to small earthquake science** (A. M. Thomas)
2022 Von Salis lecture at ETH Zurich, Switzerland (INVITED)
- **Data mining nontraditional seismicity using deep learning** (A. M. Thomas, J.-T. Lin, T. Newton, J. Searcy, D. Toomey, M. Bostock)
2022 talk at USGS Northern California Earthquake Hazards Workshop (INVITED)
- **Overlapping regions of coseismic and transient slow slip on the Hawaiian décollement** (A. M. Thomas, T. Lin, K. Aslam, D. Melgar)
2022 talk at Ludwig Maximilian University, Munich, Germany (INVITED)
2020 talk at the University of Utah (INVITED)
- **Towards a comprehensive earthquake catalog for the Pacific Northwest** (A. M. Thomas, J. Searcy, D. Toomey)
2021 talk at the University of Washington (INVITED)
2021 talk at the Seismological Society of America meeting (INVITED)
- **Relating microseismicity to fault geometry at the Rattlesnake Ridge Landslide** (T. Newton, A. M. Thomas, S. DeLong, A. Pickering, D. R. Toomey)
2019 poster at the American Geophysical Union, San Francisco, CA
- **The seismic expression of hydration in the crust and mantle of the Cascadia margin** (J. R. Delph, A. M. Thomas, A. Levander)
2019 talk at the American Geophysical Union Meeting
2019 poster at the Modelling Collaboratory for Subduction workshop
2019 poster at SAGE/GAGE workshop
2019 talk at the Geological Society of America workshop
- **Rapid magnitude assessment of large earthquakes from machine learning** (T. Lin, D. Melgar, A. M. Thomas, J. R. Searcy)
2021 talk at the Seismological Society of America meeting
2019 poster at the American Geophysical Union
2019 poster at the Modelling Collaboratory for Subduction workshop
2019 poster at the Seismological Society of America meeting
2018 poster at the American Geophysical Union
2018 talk at the University of Oregon Machine Learning Symposium
- **Stress regime of the Nankai Trough** (T. Newton, A. M. Thomas)
2019 poster at the Modelling Collaboratory for Subduction workshop
2019 poster at the SAGE/GAGE workshop
2019 poster at the Seismological Society of America meeting
2018 poster at the International Joint Workshop on Slow Earthquakes
2017 poster at the American Geophysical Union
- **Multinomial logistic regression applied to identify tectonic tremor in northern South America by using the Colombian National Seismic Network** (M. Gomez-Ospina, A. M. Thomas, G. Monsalve)
2018 poster at the American Geophysical Union meeting
- **Machine learning applied to some outstanding problems in earthquake science** (A. M. Thomas, T. Lin, M. Gomez-Ospina, D. Melgar, G. Monsalve)
2018 seminar at the University of Texas, Austin (INVITED)
- **Using tectonic tremor to constrain seismic-wave attenuation in Cascadia** (G. Littel, A. M. Thomas, A. Baltay)

- 2018 poster at the Undergraduate Research Opportunity Program symposium
- 2017 poster at the American Geophysical Union
- 2017 poster at the Undergraduate Research Opportunity Program symposium
- **Using low frequency earthquake families on the San Andreas fault as deep creepmeters** (A. M. Thomas, N. Beeler, Q. Bletery, R. Burgmann, D. Shelly)
2017 talk at the American Geophysical Union, New Orleans, LA (INVITED)
- **Characterization of aftershock sequences from large strike-slip earthquakes along geometrically complex faults** (E. Sexton, A. M. Thomas, B. Delbridge)
2017 poster at the American Geophysical Union
- **Tidal sensitivity of declustered low frequency earthquake families and inferred creep episodes on the San Andreas Fault** (A. Babb, A. M. Thomas)
2017 poster at the American Geophysical Union
- **Dense array studies of volcano-tectonic and long-period earthquakes beneath Mount St. Helens** (M. Glasgow, S. Hansen, B. Schmandt, A. M. Thomas)
2017 poster at the American Geophysical Union
- **Imaging shear strength along subduction zones** (Q. Bletery, A. M. Thomas, A. W. Rempel, J. L. Hardebeck)
2017 poster at the CIDER workshop
2017 talk at the Seismological Society of America meeting
- **Mega-earthquakes and fault properties** (Q. Bletery, A. M. Thomas, A. W. Rempel, A. Sladen, B. Delouis, M. Simons)
2017 seminar at the Berkeley Seismological Laboratory
2017 seminar at the United States Geological Survey Earthquake Science Center
2017 seminar at the Institut de Physique du Globe, Strasbourg, France
2017 seminar at the Ecole Normale Supérieure, Paris, France
2016 seminar at the Cascades Volcano Observatory
2016 poster at the American Geophysical Union
2016 talk at the UJNR meeting
2016 poster at the SCEC meeting, Palm Springs, CA
- **Source properties of LFEs in Parkfield and Cascadia** (A. M. Thomas, M. Bostock, G. Beroza, A. Rubin, D. Shelly, G. Savard, L. Chuang)
2018 seminar at the University of Texas, Austin (INVITED)
2016 seminar at the University of California, Davis (INVITED)
2016 seminar at the SCEC Annual Meeting (INVITED)
2016 seminar at the University of New Mexico (INVITED)
2016 seminar at Harvard University (INVITED)
2016 seminar at Oregon State University (INVITED)
2016 seminar at University of Washington (INVITED)
2016 seminar at Scripps Institution of Oceanography (INVITED)
- **Constraints on source properties of LFEs in Parkfield, CA** (A. M. Thomas, G. Beroza, D. Shelly)
2016 talk at the AGU Chapman conference on slow slip
2016 talk at the Japanese Geophysical Union meeting, Chiba, Japan (INVITED)
2015 talk at the Earthscope National Meeting (INVITED)
- **Automated detection of secondary slip fronts in Cascadia** (Q. Bletery, A. M. Thomas, R. D. Krogstad, J. C. Hawthorne, R. M. Skarbak, A. W. Rempel, M. G. Bostock)
2016 talk at the American Geophysical Union
2016 poster at the AGU Chapman conference on slow slip, Ixtapa, Mexico

External funding*Current*

- \$1,772,446 - (PI) National Science Foundation: Collaborative Research: Exploring the Role of Rapid Cementation, Cohesion, and Pore Fluid Pressure Evolution in the Dynamics of Slow Slip Events (with coPIs James Watkins, Melodie French, Brittany Erickson, and Mark Reed), 10/1/2024-9/30/2027
- \$14,977,362 - (coPI) National Science Foundation: Track II—Center Operations: Cascadia Region Earthquake Science Center (CRESCENT) (with PI Diego Melgar), 10/1/2023-9/30/2028
- \$450,000 - (PI) United States Geological Survey: Debris Flow Research in support of the Rainier Lahar Detection System, 09/15/2023-09/14/2026
- \$591,575 - (PI) National Science Foundation: CAREER: Using the Rattlesnake Ridge landslide as a natural laboratory to study earthquake and landslide processes, 07/01/2018-06/30/2025
- \$550,195 - (coPI) National Aeronautics and Space Administration: Forecasting earthquake shaking intensity and tsunami amplitude from crustal deformation patterns with machine learning (with coPI Diego Melgar), 01/01/2022-12/31/2024

Previous

- \$154,310 - (PI) United States Geological Survey: Towards a comprehensive earthquake catalog for the Pacific Northwest: Collaborative research with the University of Oregon and Boston University (with coPIs Rachel Abercrombie and Doug Toomey), 07/01/2022-06/30/2024
- \$540,320 - (coPI) National Aeronautics and Space Administration: Machine learning for rapid magnitude and hazard characterization of large earthquakes with HR-GNSS (with coPI Diego Melgar), 10/01/2018-09/30/2021
- \$494,037 - (PI) National Aeronautics and Space Administration: Using 25 years of deformation due to groundwater extraction in the Central Valley, CA to characterize time-dependent aquifer properties and quantify the associated stress change on faults, 09/01/2019-08/31/2022
- \$95,609 - (coPI) United States Geological Survey: Machine learning and GNSS displacements in ShakeAlert (with coPI Diego Melgar), 01/01/2022-12/31/2022
- \$284,149 - (PI) United States Geological Survey: Improving seismic and infrasound constraints on surface flows on Cascade Volcanoes, 04/01/2020-09/30/2023
- \$20,000 - (contractor) Department of Energy (via Lawrence Berkeley Laboratory): Large-scale carbon storage in saline volcanic basins, 08/01/2021-09/30/2021
- \$75,000 - (PI) Binational Science Foundation: High-resolution imaging of slow earthquake source processes resulting from the Cholame Dense Array Experiment (with coPI Asaf Inbal), 10/01/2019-09/30/2021
- \$207,000 - (collaborator) New Zealand Marsden Fund VUW1702: The straw that didn't break the Camel's back: what variations in loading rate can faults withstand? (with PI Calum Chamberlain and coPI John Townend), 11/01/2017-10/31/2019
- \$92,340 - (coPI) National Science Foundation PREEVENTS-1663769: Cascadia scenario earthquakes: source, path, and earthquake early warning (with PI Yihe Huang and coPI Marine Denolle), 07/01/2017-06/30/2020
- \$100,470 - (PI) USGS NEHRP- G18AP00045: Using large N to better understand slow earthquake processes, 01/01/2018-12/31/2018

- \$8,719 - (PI) National Science Foundation EAR-1824223: RAPID: Deploying a Dense Seismic Network to Record Seismicity at the Rattlesnake Ridge Landslide, 01/15/2018-03/15/2018
- \$6,935 - (PI) Incorporated Research Institutions in Seismology 9002-002: Preliminary diagnosis of tectonic tremor in Colombia using broad-band seismological data, 05/28/2018-08/31/2018
- \$240,000 - (PI) National Science Foundation EAR-1520238: Exploring the influence of Tidal Stress Changes on the Generation of Secondary Slip Fronts during Slow Slip Events in Cascadia (with coPI Alan Rempel), 06/01/2015-05/31/2017
- \$22,000 - (PI) Southern California Earthquake Center-16053: Using low frequency earthquakes families on the San Andreas as deep creepmeters (with coPI Nicholas Beeler, Roland Burgmann, David Shelly), 02/01/2016-01/31/2017
- \$170,000 - (PI) National Science Foundation EAR-1249775: Spectral morphology and source characteristics of low-frequency earthquakes near Parkfield, CA, 06/01/2013-05/31/2015

Teaching History

- University of Oregon EARTH 201: Dynamic Planet Earth (F2015, F2016, F2017, F2018, W2019, W2020, F2020, F2022, F2024)
- University of Oregon EARTH 353: Geologic Hazards (S2021)
- University of Oregon EARTH 467: Fault Mechanics (W2016, S2018, F2021)
- University of Oregon EARTH 601: Introduction to Scientific Computing (F2016)
- University of Oregon EARTH 610: Advanced Computational Earth Science—Machine learning and data science (F2018, S2020)
- University of Oregon EARTH 199: Volcanoes in Your Backyard (F2014)
- University of California, Berkeley EPS 12: The Planets (2012)
- University of California, Berkeley EPS 116: Structural Geology (2011)
- University of California, Berkeley EPS 39: Geological Influences in California (2010, 2012)
- University of California, Berkeley EPS 122: Physics of the Earth (2008)
- Georgia Institute of Technology Math 1711: Finite Mathematics (2006)
- Georgia Institute of Technology Math 2401: Multivariable Calculus (2006)
- Georgia Institute of Technology Math 1501: Single Variable Calculus (2005)

Professional Service

Departmental service

- Initiated and oversaw renovation of the departmental laboratory space utilized by lower-level courses – this included advocating for new lighting, painting, changing wall hangings, removing clutter, organizing the lab materials, and advocating for changes to the lab facilities (2022-2024)
- Meierjurgan faculty fellow committee (2022-2024)
- Graduate admissions committee (2018-2021)
- Earth Science undergraduate geophysics track advisor (2019-2024)
- Earth Science weekly Seismology Seminar Organizer (2017-2022)
- Wrote and maintained the University of Oregon geophysics group webpage (2017-2024)
- Departmental Diversity and Inclusion Committee (2017-2019)

- Department of Earth Science geodesy position search committee member (2017)
- Organized seminar for graduate students on applying to national fellowship programs and provided feedback on several research and personal statements of graduate students in the Geological Sciences Department (2015- 2016)
- Developed a new Freshman Interest Group (FIG) course called Volcanoes in Your Backyard designed to recruit undergraduates into geology (2014)

University service

- Mentor for undergraduates in the Noyce MasterIt program, which pairs STEM majors and aspiring K-12 teachers with a research lab so interns can learn about scientific research and best practices (2023)
- Undergraduate Research Opportunities Program Faculty Advisory Group (2017-2018)
- University of Oregon state and federal relations delegate tasked with testifying and promoting Earthquake Early Warning to Congressman Peter DeFazio, Senator Jeff Merkeley, and other Oregon legislators (the overarching goal of this effort was to promote EEW on the west coast and to secure recurring investment by the State of Oregon in seismic monitoring) (2015)
- Aided in lobbying the State of Oregon to purchase 15 Transportable Array stations that were due to be decommissioned in summer of 2015. This, to my knowledge, is the first investment in seismic monitoring by the State of Oregon (2014)

Outreach activities

- Lead organizer of the CRESCENT Machine Learning Technical Short Course May 12-14, 2025 in Seattle, WA
- Led a field trip for students from Heritage University to the Rattlesnake Ridge landslide in Union Gap, WA (2019)
- Collaborative development of place-based laboratory assignments for Geoscience students at Heritage University, a minority serving institution in Toppenish, WA (2019-present)
- Public talks on earthquake hazards in Cascadia to organizations such as the Oakridge Public Library, Lane League of Women Voters, and intro to Earth Science students (2016-present)

Leadership and scientific community service

- Planning committee for the CRESCENT Fluids in Cascadia topical workshop in Portland, OR April 23-25 2025
- CoPI of the Cascadia Region Earthquake Science Center (CRESCENT), a new National Science Foundation funded subduction zone earthquake science center focused on the Cascadia Subduction Zone (2019-present)
- Chief technical officer for CRESCENT which involves managing cloud-based cyberinfrastructure, connecting teams of PIs with cyberinfrastructure resources, development of best coding and code review practices, ensuring FAIR compliance, website design and development (cascadiaquakes.org), etc. (2023-present)
- Chair of the CRESCENT science planning committee which coordinates CRESCENT's five working groups and four special interest groups (2023-2025)
- Organizer for the CRESCENT kickoff meeting held in Eugene, OR in October of 2023 (2023)

- Organizer of the Syros science workshop on slow slip which included attendees from UO, ETH-Zurich, Lausanne, Purdue, and Berkeley (2022)
- Editor, EOS: Science News by AGU (2019-2023)
- Modelling Collaboratory for Subduction Zones Steering Committee and contributor to SZ4D planning efforts (2017-2023)
- Organizer of Megathrust Earthquake Modeling workshop held at University of Oregon October 6-9, 2019
- Session chair at AGU (2012), JpGU (2016), SSA (2019, 2021, 2024)
- Member, IRIS Data Services Standing Committee (2017-2020)
- Referee for manuscripts submitted to Geophysical Research Letters, Earth and Planetary Science Letters, G-Cubed, Geosphere, Science, Journal of Geophysical Research, Nature Geoscience, Science Advances, Terra Nova, and proposals submitted to the National Science Foundation and United States Geological Survey (2010-present)

Advising

Postdoctoral scholars

- Katie Biegel (2024-present)
- Cyril Journeau (2023-present)
- Khurram Aslam (2019-2021, now at Verisk)
- Jonathan Delph (2019-2020, now at Purdue University)
- Quentin Bletery (2016-2018, now at Institut de Recherche pour le Developpement)
- Rob Skarbek (2015, now at Planetary Science Institute)

Software engineers

- Loïc Bachelot (2023-present)

Graduate Students (primary advisor)

- Loïs Papin (Ph. D., UC Davis, 2024-present)
- Avery Conner (Ph.D., U. Oregon, 2020-present)
- Brenton Hirao (Ph. D., U. Oregon, 2021-present)
- Tyler Newton (Ph.D., U. Oregon, 2016-2022)
- Tim Lin (Ph.D., U. Oregon, 2017-2022)
- Alex Babb (M.S., U. Oregon, 2016-2018)
- Emily Sexton (M.S., U. Oregon, 2016-2018)

Graduate Students (committee member)

- Keel Wilde (Ph.D., U. Oregon, 2022-present)
- PJ Zrelak (Ph.D., U. Oregon, 2020-2025)
- Sydney Dybing (Ph.D., U. Oregon, 2019-2024)
- Tara Nye (Ph.D., U. Oregon, 2021-2024)
- Kate Scholz (Ph.D., U. Oregon, 2021-2025)
- Lexie Klimasewski (M.S., U. Oregon, 2019-2020)

- Brennah McVey (M.S., U. Oregon, 2018-2019)

Undergraduate students

- Ethan McClelland (U. Oregon, MasterIt Intern Summer 2023-2024)
- Georgia Smalls (U. Oregon, MasterIt Intern Summer 2023)
- Mariana Gomez (UNC-Medellin, IRIS Intern Summer 2018)
- Ty Amorsano (McGill University, IRIS Intern Summer 2018)
- Geena Littel (U. Oregon, 2015-2018)
- Shane Cooper (UNR, IRIS Intern Summer 2014)
- Cansu Culha (UC-Berkeley, 2011-2012)