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Research Profile

Earthquake Seismology, Fault Mechanics and Rheology, Strong Ground Motion, Active Tectonics, Slow earthquakes, Numerical analysis and modeling of geophysical data, Planetary Geophysics

Education

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

Recognitions & Awards

- 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

- Assistant Professor, University of Oregon (August 2015-present)
- 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)
- Undergraduate Research Assistant, Department of Earth and Atmospheric Sciences, Georgia Institute of Technology (2006-2007)
- Undergraduate Research Assistant, 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. Hawthorne, J. C., **A. M. Thomas**, and J.-P. Ampuero (201?) The rupture extent of low frequency earthquakes near Parkfield, CA. Submitted to <i>Geophysical Journal International
2. *Littel, G., **A. M. Thomas,** and A. S. Baltay (201?) Using tectonic tremor to constrain seismic-wave attenuation in Cascadia. In revision in *Geophysical Research Letters*.
3. **Thomas, A. M**., Z. Spica, M. Bodmer, W. H. Schultz, and J. R. Roering (201?) Using a dense seismic array to determine resonances and structure of the Two Towers earthflow in Northern California. In revision in *Geophysical Research Letters*.
4. 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 (201?) Active-Source Seismic Tomography at the Brady Geothermal Field, Nevada, with Dense Nodal and Fiber-Optic Seismic Arrays. Submitted to *Seismological Research Letters*.
5. 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.
6. 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. *JGR-Solid Earth*. doi: 10.1002/2017JB015052.
7. **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. *JGR-Solid Earth*. doi:10.1002/2017JB014404.
8. 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.
9. Bostock, M. G., **A. M. Thomas**, A. M. Rubin, and N. I. Christensen (2017) On corner frequencies, attenuation, and low-frequency earthquakes. *JGR-Solid Earth*. doi:10.1002/2016JB013405.
10. 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. *G-Cubed*. doi:10.1002/2016GC006489.
11. 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.aag0482.
12. **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.
13. Beeler, N. M., G. H. Hirth, **A. M. Thomas**, and R. Burgmann (2015) Effective pressure, friction and deep crustal faulting. *JGR-Solid Earth.* doi: 10.1002/2015JB012115.

14. 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. *JGR-Solid Earth*. doi:10.1002/2015JB012195.
15. **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.
16. 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. *JGR-Solid Earth*. doi:10.1002/2014JB011859.
17. Plourde, A., M. G. Bostock, P. Audet, and **A. M. Thomas** (2015) Low-frequency earthquakes at the southern Cascadia margin. *Geophyical Research Letters.* doi:10.1002/2015GL064363.
18. Royer, A., **A. M. Thomas**, and M. G. Bostock (2014) Tidal Modulation of Low Frequency Earthquakes and triggering of secondary events in Northern Cascadia. *JGR-Solid Earth.* doi:10.1002/2014JB011430.
19. 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.
20. *Culha, C., A. Hayes, M. Manga, and **A. M. Thomas** (2014) Double ridges on Europa accommodate some of the missing surface contraction. *JGR-Planets.* doi:10.1002/2013JE004526.
21. 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. *JGR-Solid Earth.* doi:10.1002/2013JB010118.
22. **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.
23. 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.
24. **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. *JGR-Solid Earth.* doi:10.1029/2011JB009036.
25. **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.

26. 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.

Thesis

1. **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 within the last 5 years on which the first author was either myself or a junior advisee. Asterisks denote upcoming presentations.

- **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, Eugene, OR
  2017 poster at the American Geophysical Union, New Orleans, LA
  2017 poster at the Undergraduate Research Opportunity Program symposium, Eugene, OR
- **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, New Orleans, LA
- **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, New Orleans, LA
- **Stress orientations in the Nankai Trough region of Japan** (T. Newton, A. M. Thomas, Q. Bletery)
  2017 poster at the American Geophysical Union, New Orleans, LA
- **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, New Orleans, LA
- **Imaging shear strength along subduction zones** (Q. Bletery, A. M. Thomas, A. W. Rempel, J. L. Hardebeck)
  2017 poster at the CIDER workshop, Berkeley, CA
  2017 talk at the Seimological Society of America meeting, Denver, CO (*INVITED*)
- **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, Berkeley, CA

2017 seminar at the United States Geological Survey Earthquake Science Center, Menlo Park, CA
2017 seminar at the Institut de Physique du Globe, Strasbourg, France
2017 seminar at the Ecole Normale Superieure , Paris, France
2016 seminar at the Cascades Volcano Observatory, Vancouver, WA

- **Source properties of LFEs in Parkfield and Cascadia** (A. M. Thomas, M. Bostock, G. Beroza, A. Rubin, D. Shelly, G. Savard, L. Chuang)
  2016 seminar at the University of California, Davis, Davis, CA
  2016 seminar at the SCEC Annual Meeting, Palm Springs, CA (*INVITED*)
  2016 seminar at the University of New Mexico, Albuquerque, NM
  2016 seminar at Harvard University, Boston, MA
  2016 seminar at Oregon State University, Corvallis, OR
  2016 seminar at University of Washington, Seattle, WA
  2016 seminar at Scripps Institution of Oceanography, San Diego, CA
- **How fault geometry controls earthquake magnitude** (Q. Bletery, A. M. Thomas, A. W. Rempel, L. Karlstrom, A. Sladen, L. De Barros)
  2016 poster at the American Geophysical Union, San Francisco, CA
  2016 talk at the UJNR meeting, Napa, CA (*INVITED*)
  2016 poster at the SCEC meeting, Palm Springs, CA
- **Past and future great earthquakes in Cascadia** (A. M. Thomas)
  2017 seminar at the Oakridge Public Library, Oakridge, OR
  2016 seminar for the Lane League of Women Voters, Eugene, OR
- **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, Ixtapa, Mexico
  2016 talk at the Japanese Geophysical Union meeting, Chiba, Japan (*INVITED*)
  2015 talk at the Earthscope National Meeting, Stowe, VT (*INVITED*)
- **Catalog and Characteristics of Earthquake Swarms in Northern California** (S. Chlorini, A. M. Thomas, V. Lekic)
  2016 poster at the American Geophysical Union, San Francisco, CA
- **Automated detection of secondary slip fronts in Cascadia** (Q. Bletery, A. M. Thomas, R. D. Krogstad, J. C. Hawthorne, R. M. Skarbek, A. W. Rempel, M. G. Bostock)
  2016 talk at the American Geophysical Union, San Francisco, CA (*INVITED*)
  2016 poster at the AGU Chapman conference on slow slip, Ixtapa, Mexico
- **Investigating tidal triggering of induced seismicity in Oklahoma using Schuster Spectra** (K. M. Pearson, A. M. Thomas, V. Lekic)
  2018 talk at the Seismological Society of America meeting, Miami, FL
  2016 poster at the Eastern Section Seismological Society of America meeting, Reston, VA
- **Source-time functions of LFEs on the San Andreas fault** (A. M. Thomas, G. C. Beroza, and D. R. Shelly)
  2014 poster at the American Geophysical Union meeting, San Francisco, CA

- **Effects of tidal modulation in heterogeneous models of slow slip** (R. M. Skarbek, A. W. Rempel, A. M. Thomas)
  2014 poster at the American Geophysical Union meeting, San Francisco, CA
- **Tidal Triggering of earthquakes at injection and geothermal sites** (S. Cooper, A. M. Thomas)
  2014 poster at the American Geophysical Union meeting, San Francisco, CA
- **LFEs in Central and Southern Cascadia** (A. M. Thomas, A. Plourde, P. Audet, and M. Bostock)
  2014 poster at the American Geophysical Union meeting, San Francisco, CA
- **Tides and LFEs in Cascadia** (A. Royer, A. M. Thomas, M. Bostock)
  2013 poster at the American Geophysical Union meeting, San Francisco, CA
  2013 poster at the Summer school on Earthquake Science, Tokyo, Japan
- **Tides and LFEs on the San Andreas and in Cascadia** (A. M. Thomas, N. Beeler, D. Shelly, A. Royer, and M. Bostock)
  2013 seminar at the University of California, Santa Cruz, CA
- **Identifying Contraction and Expansion Along Double Ridges and Bands on Europa with Strike Slip Displacements** (C. Culha, A. Hayes, M. Manga, and A. M. Thomas)
  2014 workshop on the Habitability of Icy Worlds, Pasadena, CA
  2013 talk at the American Geophysical Union meeting, San Francisco, CA
  2013 poster at the Lunar and Planetary Science Conference, Houston, TX
- **Tides and LFEs on the San Andreas fault** (A. M. Thomas, R. Bürgmann, N. Beeler, D. Shelly, and M. Rudolph)
  2013 seminar at Brown University, Providence, RI
  2013 seminar at the University of Oregon, Eugene, OR
- **Swarms and incipient faulting** (A. M. Thomas, R. Bürgmann and D. Dreger)
  2013 seminar at Brown University, Providence, RI

External funding

Pending

$598,921 - (PI) National Science Foundation: CAREER: Using the Rattlesnake Ridge landslide as a natural laboratory to study repeating earthquake evolution and development of operational repeating signal detectors

$427,189 - (coPI) National Aeronautics and Space Administration: Machine learning for rapid magnitude and hazard characterization of large earthquakes with HR-GNSS (with coPI Diego Melgar)

Current

$100,470 - (PI) USGS NEHRP- G18AP00045: Using large N to better understand slow earthquake processes

$207,000 - (coPI) 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)

$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)

$8,719 - (PI) National Science Foundation EAR-1824223: RAPID: Deploying a Dense Network to Record Seismicity at the Rattlesnake Ridge Landslide

$6,935 - (PI) Incorporated Research Institutions in Seismology 9002-002: Preliminary diagnosis of tectonic tremor in Colombia using broad-band seismological data

Previous

$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)

$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)

$361,416 - (coPI) United States Geological Survey-283270: Implementation and Development of US West Coast ShakeAlert: Collaborative Research with University of California at Berkeley, California Institute of Technology, University of Washington, and University of Oregon (with PI Douglas Toomey)

$170,000 - (PI) National Science Foundation EAR-1249775: Spectral morphology and source characteristics of low-frequency earthquakes near Parkfield, CA

Teaching History

- University of Oregon GEOL 601: *Introduction to Scientific Computing* (2016, 2018)
- University of Oregon GEOL 467: *Fault Mechanics* (2016, 2018)
- University of Oregon GEOL 201: *Earth's Interior Heat and Dynamics* (2015, 2016, 2017, 2018)
- University of Oregon GEOL 199: *Volcanoes in Your Backyard* (2014)
- 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

- 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*
- Session chair at AGU (2012) and JpGU (2016)
- Member, IRIS Data Services Committee (2017-2020)
- Member, Subduction Zone Modelling RCN Steering Committee (2017-present)
- 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 is 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)
- Developed a new Freshman Interest Group (FIG) course called Volcanoes in Your Backyard designed to recruit undergraduates into geology (2014)
- 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 and 2016)
- Fall Department colloquium organizer (2016)
- Wrote and maintain the University of Oregon geophysics group webpage: http://geophysics.uoregon.edu/
- Geodesy Position Search Committee member (2017)
- Undergraduate Research Opportunities Program (UROP) Faculty Advisory Group (2017-2018)
- Earth Science weekly Seismology Seminar Organizer (2017-2018)

Advising

- Undergraduate students: Mariana Gomez (UNC-Medellin, summer 2018), Ty Amorsano (McGill University,summer 2018), Geena Littel (UO, 2015-present), Shane Cooper (UNR, IRIS Intern Summer 2014), Cansu Culha (UC-Berkeley, 2011-2012)
- Graduate Students (primary advisor): Tyler Newton (Ph.D., current), Tim Lin (Ph.D., current), Alex Babb (M.S., current), Emily Sexton (M.S., current)
- Graduate Students (committee member): Ben Heath (Ph.D., current), Brennah McVey (M.S., current), Kevin Gardner (M.S., current) and Karen Pearson (U. Maryland, current)
- Postdoctoral scholars: Quentin Bletery, Rob Skarbek