Katie Biegel, Ph.D.

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Davis, California, USA

Professional Appointments

- **Postdoctoral Scholar** — *Eugene, OR & Davis, CA, USA*
  Department of Earth and Planetary Sciences, University of California Davis — March 2025 – Present
  Department of Earth Sciences, University of Oregon — Aug. 2024 – Feb. 2025
  - **Supervisor:** Dr. Amanda Thomas
  - **Research Topics:** Debris flow and mass movement seismology and modeling; Adaptation of laboratory models to real data, using data from the USGS Experimental Debris-Flow Test Flume, Mount Rainier, and Mount St. Helens
- **Alberta Innovates Graduate Fellow** — *Calgary, AB, Canada*
  Department of Earth, Energy, and Environment, University of Calgary — Sep. 2017 – Aug. 2024
  - **Supervisor:** Dr. Jan Dettmer
  - **Research Topics:** Open-source scientific software development for earthquake relocation; earthquake source studies; induced and industrial seismicity; activated fault and fracture mapping in 3D
- **USGS Pathways Intern - Landslide Hazards** — *Golden, CO, USA*
  Geologic Hazards Science Center, United States Geological Survey (USGS) — June 2016 – Aug. 2017
  - **Supervisor:** Dr. Kate Allstadt
  - **Research Topics:** Software testing for earthquake-induced ground failure (landslide and liquefaction) estimation; Compilation and organization of metadata for global earthquake-induced landslide database

Research Interests

- Environmental Seismology
- Surface Processes and Geomorphology
- Debris Flows, Landslides, and Other Mass Movements
- Natural Hazards and Cascading Climate Hazards
- Induced and Industrial Seismicity
- Earthquake Source Studies and Fault Imaging

Education

- **PhD in Geoscience** — *Calgary, AB, Canada*
  University of Calgary — Nov. 2024
  - **Supervisor:** Dr. Jan Dettmer
  - **Degree Focus:** Geophysics/Earthquake Seismology
  - **Dissertation Title:** Double-Difference Seismic Event Relocation: A Study of the Applications and Limitations of the Relocation Problem
- **BSc in Geophysical Engineering** — *Golden, CO, USA*
  Colorado School of Mines — May 2017

Publications

Peer-Reviewed Journal Articles

[1] **Biegel, K.M.**, Dettmer, J., Igonin, N., and D. Eaton, 2025, Double-pair information improves depth relocation precision and highlights detailed 3D fault geometry for induced seismicity in Alberta, Canada, *Seismological Research Letters*, doi: 10.1785/0220240194.

[2] Gosselin, J., **Biegel, K.M.**, Dettmer, J., Gilbert, H., Colpron, M., and E. Enkelmann, 2024, Crustal stress in southwestern Yukon from probabilistic earthquake focal mechanisms, *Canadian Journal for Earth Sciences*, doi: 10.1139/cjes-2024-0095.

[3] **Biegel, K.M.**, Gosselin, J., Dettmer, J., Colpron, M., Enkelmann, E., and J.S. Caine, 2024, Regional active deformation on discrete shallow faults throughout Southeast Alaska and Southwest Yukon, *Tectonics*, 43, e2023TC008140, doi: 10.1029/2023TC008140.

[4] Vasyura-Bathke, H., Dettmer, J., **Biegel, K.M.**, Salvage, R.O., Eaton, D., Ackerley, N., and S. Samsonov, 2023, Bayesian inference elucidates fault-system anatomy and resurgent earthquakes induced by continuing saltwater disposal, *Communications Earth and Environment*, 4, 407, doi: 10.1038/s43247-023-01064-1

Journal Articles in Review

[1] Conner, A.E., Thomas, A.M., Allstadt, K.E., Thelen, W.A., Collins, E., Farin, M., Stephenson, W.J., Iezzi, A.M., and **K.M. Biegel**, 2026, Quantifying Seismic Properties of a River Channel at Mount Rainier for Use in Debris Flow Monitoring and Analysis, *Seismological Research Letters*, *In Press*.

[2] **Biegel, K.M.**, Collins, E., Allstadt, K.E., Conners, A.E., Thomas, A.M., Iezzi, A., Thelen, W.A., and S. Beason, 2026, Near-field Seismic Characteristics of the Transition from Debris Flow to Hyperconcentrated Flow at Mount Rainier, Washington, *Seismological Research Letters*, *In Review*.

Reviewed Government Reports

[1] Finley, T., Gosselin, J., **Biegel, K.**, Lipovsky, P., Cronmiller, D., Schaeffer, A., and J. Dettmer, 2026, The 6 December 2025 Mw 7.0 earthquake in Yukon, Canada: Tectonic significance and observations of ground failure, in: *Yukon Exploration and Geology 2025*, A. Stuart, L.H. Weston and S.K. Schultz (eds.), Yukon Geological Survey, Government of Yukon, p. 131–148.

[2] Han, J., Dettmer, J., Gosselin, J., Gilbert, H., **Biegel, K.**, and S. Kim, 2024, Seismicity near the Eastern Denali fault from a temporary seismic deployment, in: *Yukon Exploration and Geology 2023*, L.H. Weston and Purple Rock Inc. (ed.), Yukon Geological Survey, Government of Yukon, p. 37–50.

[3] **Biegel, K.**, Gosselin, J., and J. Dettmer, 2023, Preliminary double-difference relocation earthquake catalogue for southwestern Yukon centred along the Denali fault zone, in: *Yukon Exploration and Geology 2022*, K.E. MacFarlane (ed.), Yukon Geological Survey, Government of Yukon, p. 63–76 plus digital appendices.

[4] Gosselin, J., **Biegel, K.**, Hamidbeygi, M., and J. Dettmer, 2023, Improvements in the regional earthquake focal mechanism catalogue for southwestern Yukon, in: *Yukon Exploration and Geology 2022*, K.E. MacFarlane (ed.), Yukon Geological Survey, Government of Yukon, p. 1–18 plus digital appendices.

[5] Schmitt, R.G., Tanyas, Hakan, Nowicki Jessee, M.A., Zhu, Jing, **Biegel, K.M.**, Allstadt, K.E., Jibson, R.W., Thompson, E.M., van Westen, C.J., Sato, H.P., Wald, D.J., Godt, J.W., Gorum, Tolga, Xu, Chong, Rathje, E.M., Knudsen, K.L., 2017, An Open Repository of Earthquake-Triggered Ground-Failure Inventories: *U.S. Geological Survey Data Series 1064*, 17 p. doi: 10.3133/ds1064.

[6] Schmitt, R.G., Tanyas, Hakan, Nowicki Jessee, M.A., Zhu, Jing, **Biegel, K.M.**, Allstadt, K.E., Jibson, R.W., Thompson, E.M., van Westen, C.J., Sato, H.P., Wald, D.J., Godt, J.W., Gorum, Tolga, Xu, Chong, Rathje, E.M., Knudsen, K.L., 2017, An Open Repository of Earthquake-Triggered Ground-Failure Inventories: *U.S. Geological Survey data release collection*, doi: 10.5066/F7H70DB4.

Code and Software Releases

[1] **Biegel, K.M.**, and J. Dettmer, 2024, relocDD-py (v1.0) Zenodo. doi: 10.5281/zenodo.10607406.

[2] Allstadt, K. E., Thompson, E. M., Hearne, M., and **Biegel, K.M.**, 2018, groundfailure, USGS software release. doi: 10.5066/P91G4NS4.

[3] **Biegel, K.M.** and Allstadt, K.E., 2017, landslides-metadata version 1.0.0: USGS Software Release, doi: 10.5066/F7DN43Z6.

TEACHING

- **Sessional Instructor** — *Calgary, AB, Canada*
  University of Calgary — Jan. – Apr. 2024
  - **GOPH 375** - Natural Disasters and Critical Earth Phenomena (*Winter 2024 Term*)
- **Graduate Teaching Assistant** — *Calgary, AB, Canada*
  University of Calgary — Sep. 2017 – Apr. 2024
  - **GLGY 297** - Science of Climate Change (*Winter 2024, Winter 2023, Winter 2022 Terms*)
  - **SCIE 699** - Communication and Effectiveness for Graduate Students (*Fall 2022 Term*)
  - **GLGY 705** - Graduate Skills in Science (*Fall 2018 Term*)
  - **GOPH 419/619** - Advanced Computational Methods for Geophysicists (*Winter 2018 Term*)
  - **GOPH 371** - Introduction to Geophysics (*Fall 2017 Term*)
- **Guest Lecturer** — *Eugene, OR, USA*
  University of Oregon — Nov. 2024
  - **ERTH 201** - Dynamic Planet Earth (*Covered lectures on the evidence for plate tectonic theory and hotspot volcanism*)

Field Experience

- **Nodal Seismic Network Installation** *Mt. St. Helens National Volcanic Monument, WA, USA*
  University of California, Davis Sep. 2025
  - **Purpose:** Monitor for debris flows triggered by rainfall and atmospheric river events on the north and west faces of Mt. St. Helens, Washington
  - **Equipment Installation:** Installation of temporary nodal seismometer network; helicopter-only access; Additional installation of game cameras and infrasound near permanent broadband stations
- **Nodal Seismic Network Installation** *Mt. Rainier National Park, WA, USA*
  University of California, Davis July & Sep. 2025
  - **Purpose:** Monitoring for debris flows, flooding, and glacial outburst events near Tahoma Glacier and in the Tahoma Creek drainage in Mt. Rainier National Park, Washington
  - **Equipment Installation:** Installation and removal of a nodal seismometer network along the drainage system
- **Geophysical Instrumentation at Mt. Meager, BC** *Pemberton, BC, Canada*
  University of Calgary Sep. 2019
  - **Purpose:** Monitoring of environmental seismicity, including glacial movement, slope stability, and potential hydrothermal events at Mt. Meager in BC
  - **Equipment Installation:** DAS fibre optic cable installation including partial installation on glacier; movement of generator and fuel supply to the mountain top; installation of nodal seismometers; installation of broadband seismometer and solar panel; helicopter-only access
- **Nodal Seismometer Installation at CaMI Monitoring Site** *Brooks, AB, Canada*
  University of Calgary Feb. 2019
  - **Purpose:** Ambient noise monitoring at the Containment and Monitoring Institute (CaMI) carbon storage experimental site
  - **Equipment Installation:** Installation of nodal seismometer array at horizontal drilling site; installation into frozen ground using auger

Funding and Awards

Funding and Scholarship Awards

- **NSF** EAR Postdoctoral Fellowship - Title: "Extension and validation of a robust global seismic debris flow model" (*Under Review*) 2025
- **Society of Exploration Geophysicists (SEG)** Scholarship Award (*2 years; total 20,000 USD*) 2022, 2021
- **University of Calgary (UCalgary)** Robert T.D. Wickenden Memorial Scholarship (*1,900 CAD*) 2022
- **Alberta Innovates** Technology Graduate Fellowship (*4 years; total 124,000 CAD*) 2021–2018
- **SEG/EAGE** Thomsen/BP Scholarship (*6,000 USD*) 2020
- **SEG** Scholarship Award (*3 years; total 22,000 USD*) 2019–2017
- **UCalgary** Faculty of Graduate Studies Scholarship (*declined for another award; 10,000 CAD*) 2018
- **Colorado School of Mines** Harvey Scholarship (*5 years; 120,000 USD*) 2017–2013
- **Newmont Mining** Scholarship (*10,000 USD*) 2016

Teaching Awards

- **UCalgary** Jim and Josie Gray Award - *Faculty of Science Teaching Assistant Award* 2021

Conference Awards

- **Seismological Society of America** Annual Conference - *Student Presentation Award* 2024

Skills

- **Programming Languages:** Python, Fortran, Bash, R, C, Matlab, C++, Java, HTML
- **Software Proficiency:** Latex, GIS (QGIS & ArcGIS), GMT
- **Data Processing & Software Development** MPI (mpi4py and in C), GPU Parallelization (numba, jax, python cuda, cuda fortran), Machine Learning and Neural Networks (tensorflow, keras, theano), git, inverse methods (LSQR, SVD, nonlinear Bayesian methods)
- **Geophysical Data Analysis:** Seismic (Broadband & Nodal), LiDAR, INSAR, GNSS
- **Geophysical Instrumentation:** DGPS, CG-5 Gravimeter, EM-31 and EM-63, DC Resistivity, Self-Potential, Hammer Seismic, Seismometers (Inova HAWK, SmartSolo, Nanometrics Trilliums, Raspberry Shakes)
- **Languages:** English (Native), Spanish (Professional Working Proficiency)
- **Certifications:** University Teaching and Learning (University of Calgary), Helicopter Safety Training and Hazardous Material Transport (USGS)
- **Professional Organization Memberships:** AGU, SSA, CGU, SEG, AWG

Professional Service

Committee Service

- **Geoscience Education & Mentoring Support (GEMS) Steering Committee** — *University of California, Davis*
  Steering Committee Representative — 2025
- **Equity, Diversity, and Inclusion (EDI) Committee** — *Department of Geoscience, University of Calgary*
  Graduate Student Representative — 2020–2022
- **Geoscience Research Exchange (GeoREX) Organizing Committee** — *Department of Geoscience, University of Calgary*
  Committee President and Fundraising Director — 2021
  Communications Director — 2019–2020
- **Hazards Equity Working Group (HEWG)** — *American Geophysical Union (AGU)*
  Science Communication and Outreach SubCommittee Chair — 2020
- **Gender and Sexuality Alliance Committee (GSA^2)** — *Graduate Student Union, University of Calgary*
  Faculty of Science Graduate Student Representative — 2018–2020

Other Professional Service

- **GeoGirls at the Mt. St. Helens Institute** — *University of California. Davis*
  Science Volunteer; Taught and guided research project on environmental seismology in volcanic settings — 2025
- **Geoscience Education & Mentoring Support (GEMS)** — *University of Oregon*
  Mentor to two undergraduate students — 2024
- **Unlearning Racism in Geosciences (URGE)** — *University of Calgary*
  Working Group Member — 2023

Presentations

Invited Talks

[1] **Biegel, K.**, 2026, New Insights into the Totschunda-Fairweather Connector: Lessons from the 6 December 2025 M_w 7.0 Hubbard Glacier Earthquake, UAA Geological Sciences Seminar, *University of Alaska - Anchorage*.

[2] **Biegel, K.**, 2026, A Brief Look at the Seismology of Debris Flows, UC Davis Earth and Planetary Sciences Departmental Seminar, *University of California Davis*.

[3] **Biegel, K.** and S. Fasola, 2025, Addressing Geologic Hazards and Planning for the Future in the Pacific Northwest, LCC Science Seminar, *Lane Community College*.

[4] **Biegel, K.**, 2024, Whose Fault? Source Studies of Induced Seismicity in Western Canada, Earth Sciences Department Seminar, *University of Oregon*.

[5] **Biegel, K.**, 2024, RelocDD-py: A Python Tool for Precision Double-Difference Relocations for Small to Medium-sized Datasets, Seminar on Small Earthquake Location, *Korea University*.

Conference Presentations

[1] **Biegel, K.**, Finley, T., Gosselin, J., Lipovsky, P., Cronmiller, D., Schaeffer, A., and J. Dettmer, 2026, Tectonic Significance and Observations of Ground Failure from the 6 December 2025 M_w 7.0 Earthquake in Yukon, Canada, Seismological Society of America Meeting 2026, Pasadena, California, *Oral Presentation*.

[2] **Biegel, K.**, Conner, A., Thomas, A., Allstadt, K., Obryk, M., and M. Farin, 2026, Adapting a Granular Flow Model to the U.S. Geological Survey Experimental Debris-Flow Flume, Seismological Society of America Meeting 2026, Pasadena, California, *Poster Presentation*.

[3] **Biegel, K.**, Conner, A., Thomas, A., Allstadt, K., Obryk, M., Farin, M., and R. Iverson, 2025, Toward a Seismic Model of a Debris Flow: Applying and Adapting a Granular Flow Model to the U.S. Geological Survey Experimental Debris-Flow Flume, Seismological Society of America - Environmental Seismology Meeting 2025, Denver, Colorado. *Poster Presentation*.

[4] **Biegel, K.**, Conner, A., Thomas, A., Iezzi, A., Thelen, W., Allstadt, K., Collins, E., Beason, S., and C. Todd, 2025, Seismic Characteristics of the Transition from Debris Flow to Hyperconcentrated Flow, Tahoma Creek, Washington, Seismological Society of America - Environmental Seismology Meeting 2025, Denver, Colorado. *Poster Presentation*.

[5] **Biegel, K.**, Dettmer, J., Igonin, N. and D. Eaton, 2024, Double-pair double-difference relocation for dense network improves depth precision of induced seismicity, leading to a detailed 3D fault geometry model, Seismological Society of America Meeting 2024, Anchorage, Alaska. *Oral Presentation*.

[6] **Biegel, K.**, Gosselin, J., Dettmer, J., Colpron, M., Enkelmann, E., and J. Caine, 2024, Refining the nature of distributed and localized slip-partitioning of the Totschunda-Fairweather to Denali Corridor Using Earthquake Relocations and Focal Mechanisms, Seismological Society of America Meeting 2024, Anchorage, Alaska. *Poster Presentation*.

[7] **Biegel, K.**, Gosselin, J., and J. Dettmer, 2023, Studying catalogue completeness and earthquake relocations to understand tectonic deformation in Southwest Yukon, Canadian Geophysical Union Meeting 2023, Banff, Alberta. *Poster Presentation*.

[8] **Biegel, K.**, Gosselin, J., and J. Dettmer, 2023, Interpretation of tectonic deformation in SW Yukon from relocation of earthquakes, Cordilleran Tectonics Workshop 2023, Whitehorse, Yukon. *Poster Presentation*.

[9] **Biegel, K.M.** and Dettmer, J., 2019, Location uncertainty for induced events: A comparison of fully nonlinear Bayesian estimates to double-pair double difference relocations for large datasets, American Geophysical Union Fall Meeting 2019. *Oral Presentation*.

[10] **Biegel, K.M.**, Dettmer, J., and Igonin, N., 2019, Double-Pair Double Difference Location of Microseismicity with Dense-Station Microseismic Arrays, International Union of Geodesy and Geophysics (IUGG) General Conference 2019. *Oral Presentation.*

REFERENCES

1. **Dr. Amanda Thomas**
   Louise H. Kellogg Endowed Chair
   Department of Earth and Planetary Sciences
   University of California, Davis
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   Relationship: Postdoc Advisor

2. **Dr. Jan Dettmer**
   Geoscience Research Manager
   Energy and Mines
   Yukon Geological Survey
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   Relationship: PhD Advisor

3. **Dr. Rachel Lauer**
   Associate Professor
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   University of Calgary
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   Relationship: Teaching Supervisor