

Kristine L. Pankow
(née Kristine L. Eckhardt)
University of Utah Seismograph Stations
Department of Geology and Geophysics
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Salt Lake City, Utah 84112
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Education:

Ph.D. Earth Science/Geophysics, University of California, Santa Cruz, December 1999
Ph.D. Thesis Title: *Modeling Shear Wave Structure of the Subducting Kurile Slab Using Travel Time and Amplitude Residuals*
B.S. *cum laude* Geophysics and Mathematics, Southern Methodist University, August 1991

Licenses:

Professional Geologist, State of Utah, 2003-present

Employment:

Acting Director, University of Utah Seismograph Stations, August 2016 – December 2016
Research Professor, Dept. of Geology and Geophysics, University of Utah, 2016 – present
Associate Director, University of Utah Seismograph Stations, 2009 – present
Research Associate Professor, Dept. of Geology and Geophysics, University of Utah, 2009–2016
Assistant Director, University of Utah Seismograph Station, 2006–2009
Research Assistant Professor, Dept. of Geology and Geophysics, University of Utah, 2003–2009
Research Scientist, University of Utah Seismograph Station, 2000–2003
Faculty, Idyllwild Arts Academy (high school), 1997–2000
Graduate research assistant, Earth Sciences Dept., UC Santa Cruz 1992–1997
Intern, ARCO Oil and Gas Company, July – September 1991
Research assistant, Seismology Group, Southern Methodist University 1991–1992
Undergraduate research assistant, Geothermal Group, Southern Methodist University 1989–1991

Synergistic Activities:

Powell Center Working Group: Future Opportunities in Regional and Global Seismic Monitoring, 2018-2019

Utah Mine Safety Technical Advisory Council, July 1, 2011 – June 30, 2020

Advanced National Seismic System (ANSS):

Regional Coordinator, Intermountain West (IMW) region, 2010–present
Member, ANSS National Implementation Committee (NIC), 2010–present
Comprehensive Catalog Regional Representative, 2011–2014

ANSS NIC Working Groups:

Member, Large Magnitude Working Group, 2018
Member, NetOps Organizing Working Group, 2016
Member, Comprehensive Catalog (Comcat), 2014–2017
Chair, Depth Datum, 2013–2014
Member, Blast Policy Working Group, 2012

Member, Tracking ANSS Performance Metrics Working Group, 2008–2009

Utah Chapter Earthquake Engineering Research Institute, Board member, 2013–2014

Utah Chapter Earthquake Engineering Research Institute Committees:

Chair, Utah Earthquake Scenario Committee, 2014–2015
Member, Ground Motion Relations Workshop Organizing Committee, 2014–2015
Seismological Society of America:
Board of Directors Nominating Committee, 2017
Student Presentation Award subcommittee, 2009, 2013
Session Co-Chair, Advancements in Network Operations and Station Design, Seismological Society of America meeting, April 2016
Session Co-Chair, Triggering of Seismic and Volcanic Events, Seismological Society of America meeting, April 2013
IASPEI:
Session Co-chair, Induced Seismicity: observations, modelling, discrimination, and risk mitigation strategies, European Seismological Commission, September 2018 Valletta, Malta
Session Co-chair, Anthropogenic Seismicity: World overview of anthropogenic seismicity I, IASPEI Meeting, August 2017 Kobe, Japan
Commission Member, Seismological Observation and Interpretation, 2017-present
American Geophysical Union:
Session Chair, Earthquake Strong Ground Motion I, AGU Fall meeting, December 2010
Session Co-chair, The 2008 M 6.0 Wells, Nevada, Earthquake, AGU Fall meeting, December 2008
FEMA Wasatch Front ShakeMap/HAZUS Working Group, 2006–2012
Utah Geological Survey, Ground Shaking Working Group, 2003–present
Rowland-Hall St. Mark's High School, Earthquakes and Mathematics, 2003–2010
U. S. Geological Survey and National Science Foundation Review Panels, 2002, 2007, 2015, 2016, 2017
Proposal reviewer: CRDF, DOE-AFRL, NSF
Journal Reviewer: BSSA, Earthquake Spectra, GJI, GRL, JGR, PEPI, SRL

University of Utah:

University of Utah GG Department Energy Geoscience Faculty Search Committee, 2016–2017
University of Utah College of Mines and Earth Sciences College Council, 2006–2007, 2009–2010, 2012–2013
University of Utah GG Department Distinguished Lecture Series Committee, 2004, 2010
University of Utah GG Department Executive Committee, 2009–2010, 2015–2016, 2016–2017, 2018–2019
University of Utah GG Department Merit Review Committee, 2009–2010, 2010–2011, 2011–2012, 2017–2018, 2018–2019
University of Utah GG Department Outreach Committee, 2005 –present
University of Utah GG Department Aux. Faculty Committee, 2006–2007, 2007–2008, 2008–2009, 2009-2010
University of Utah GG Department Sutton Bldg. Design Committee, 2008–2009

Professional Societies and Honors:

International Association of Seismology and Physics of the Earth's Interior (IASPEI), 2015–present
Seismological Society of America member, 1994–1995; 2001–present
American Geophysical Union member, 1992–1997; 1999–present
Earthquake Engineering Research Institute (SSA Associate) member, 2012–2014
Acoustical Society of America member, 2007–2013
Utah Chapter Earthquake Engineering Research Institute member, 2012–present

Utah Geological Association member, 2013–2015
National Association of Geoscience Teachers member, 1997–2000

Keith Runcorn Travel Award to attend EGS-AGU-EUG Joint Assembly, 2003
Northern California, Phi Beta Kappa Graduate Student Award, 1996
Karen Shaw Scholarship in Geophysics, Dallas Geophysical Society, 1991
Dedman College Senior Science Award, Southern Methodist University, 1991

Current Students and Post Doctoral Associates:

Hao Zhang – Postdoctoral Research Associate, 2016–present
Megan Angell – MSSST Candidate, 2018
Amy Record – M.S. Candidate, Dept. of Geology and Geophysics, 2018–present
Daniel Wells – Ph.D. Candidate, Dept. of Geology and Geophysics, 2018–present

Previous Students:

Andy Trow – M.S. Candidate, Dept. of Geology and Geophysics, 2016–2018
M.S. Thesis: Seismic event characterization and ambient noise seismic imaging in southwestern Utah, using multiple dense geophone arrays, 2018, 84 p.
Lisa Linville – Ph.D. Candidate, Dept. of Geology and Geophysics, 2014–2018
Ph.D. Dissertation: Data-driven methods in earthquake monitoring, detection, and catalog building, 2018, 111 p.
Amy Record – Undergraduate Research Opportunity Program (UROP), 2017
Stephen Potter – M.S. Candidate, Dept. of Geology and Geophysics, 2015–2017
M.S. Thesis: Characterizing background seismicity in the region surrounding Milford, Utah, 2017, 81 p.
Jared Stein – M.S. Candidate, Dept. of Geology and Geophysics, 2013–2016
M.S. Thesis: Seismic source discrimination in the Wasatch Plateau Region of central Utah, 2016, 64 p.
Lisa Linville – M.S. Candidate, Dept. of Geology and Geophysics, 2012–2014
M.S. Thesis: Dynamic earthquake triggering potential across EarthScope’s transportable array, Department of Geology and Geophysics, University of Utah, 2014, 56 p.
Meagan Boltz – M.S. Candidate, Dept. of Mining Engineering, 2012–2014
M.S. Thesis: Mining-induced seismicity and FLAC3D modeling at the Trail Mountain Mine, 2014, xx p.
Mindy Timothy—MSSST Program, 2014
Project: Comparison of seismicity rates to Great Salt Lake elevation fluctuations, 2014, 34 p.
Kristel Hansen— MSSST Program, 2014
Project: An investigation of Utah Lake and reservoir induced seismicity, 2014, 41 p.
J. Mark Hale – M.S. Candidate, Dept. of Geology and Geophysics, 2009–2013
M.S. Thesis: Infrasound signal characteristics of small earthquakes, Department of Geology and Geophysics, University of Utah, 2013, 83 p.
Christine Gammans – M.S. Candidate, Dept. of Geology and Geophysics, 2011–2013
M.S. Thesis: Low-angle normal faulting in the Basin and Range-Colorado Plateau transition zone during the January 3, 2011 Circleville Utah earthquake sequence, Department of Geology and Geophysics, University of Utah, 2013, 71 p.
Meagan Boltz – undergraduate research, Dept. of Mining Engineering, 2010–2012
Tex Kubacki – undergraduate research, Dept. of Mining Engineering, 2010–2012
Simin Huang – M.S. Candidate, Dept. of Geology and Geophysics, 2009–2011
M.S. Thesis: Characterization of Shallow Shear Wave Velocity Structures in Southwestern Utah, Department of Geology and Geophysics, University of Utah, 2011, 40 p.

Eleanor Sonley – Postdoctoral research associate, 2008–2009
Kevin Jensen – undergraduate research, Dept. of Geology and Geophysics, 2006–2009
Jonathan Warner – undergraduate research, Dept. of Mining Engineering, 2007–2009
Parker Phipps – undergraduate research, Dept. of Mining Engineering, 2007–2008
Kathryn Albee – high school internship, summers 2006 & 2007
J. Mark Hale – undergraduate Senior Thesis, Dept. of Geology and Geophysics, 2005;
internship, 2003–2004
Matthew Jensen – undergraduate research, Dept. of Mining Engineering, 2002
Elizabeth Siebeneck – undergraduate internship, Dept. of Geology and Geophysics, 2002

Graduate Student Committees University of Utah:

Amy Record— M.S. **advisor**, Dept. of Geology and Geophysics, 2018–
Daniel Wells— Ph.D. **advisor**, Dept. of Geology and Geophysics, 2018–
Meagan Angell—**advisor**, MSSST Program, 2018
Andy Trow— M.S. **advisor**, Dept. of Geology and Geophysics, 2016–2018
Stephen Potter— M.S. **advisor**, Dept. of Geology and Geophysics, 2015–2017
Jessica Wempen—Ph.D. committee member, Dept. of Mining Engineering, 2015–2016
Karla Kramer—M.S. committee member, Dept. of Mining Engineering, 2015–
Lisa Linville— Ph.D. **advisor**, Dept. of Geology and Geophysics, 2014–2018
Chase Bachelor—M.S. committee member, Dept. of Geology and Geophysics, 2014–2016
Eli Workman—M.S. committee member, Dept. of Geology and Geophysics, 2014–2016
Dan Stout—Ph.D. committee member, Dept. of Civil Engineering, 2014–2015
Mindy Timothy—**co-advisor**, MSSST Program, 2014
Kristel Hansen—**co-advisor**, MSSST Program, 2014
Jared Stein— M.S. **advisor**, Dept. of Geology and Geophysics, 2013–2016
Lisa Linville— M.S. **advisor**, Dept. of Geology and Geophysics, 2012–2014
Meagan Boltz— M.S. **co-advisor**, Dept. of Mining Engineering, 2012–2014
Oner Sufri—Ph.D. committee member, Dept. of Geology and Geophysics, 2013–2014
Kevin Kwong— M.S. committee member, Dept. of Geology and Geophysics, 2013
J. Mark Hale— M.S. **co-advisor**, Dept. of Geology and Geophysics, 2009–2013
Christine Gammans— M.S. **co-advisor**, Dept. of Geology and Geophysics, 2011–2013
Sam Brown— Ph.D. committee member, Dept. of Geology and Geophysics, 2013
Kevin Jensen— M.S. committee member, Dept. of Geology and Geophysics, 2013
Simin Huang— M.S. **co-advisor**, Dept. of Geology and Geophysics, 2011
Maike-L. Buddensiek, M.S. committee member, Dept. of Geology and Geophysics, 2004

Classes Taught:

Special Topics GEO 6920/7920: Detection and Location of Seismic Sources (co-taught with
Keith Koper), Spring 2016
Special Topics GEO 6920: Seismic Event Detection, Spring 2015
Special Topics GEO 6920: Induced Seismicity, Spring 2014
Special Topics GEO 5920/6920: High Performance Computing in the Physical Sciences (co-
taught with Mike Thorne), Fall 2010

Research Funding Record

Dates	Project	Funding Agency	Amount
2018-2019	Enhanced Geothermal System Testing and Development at the Milford, Utah FORGE (Phase 2c) (Co-I)	DOE	\$369,561 ²
2018-2019	Structurally Controlled Geothermal Systems in the Eastern Great Basin Extensional Regime, Utah (Phase 3) (Co-I)	DOE	\$52,505 ²
2017-2018	Enhanced Geothermal System Testing and Development at the Milford, Utah FORGE (Phase 2b) (Co-I)	DOE	\$105,348 ²
2016-2017	Enhanced Geothermal System Testing and Development at the Milford, Utah FORGE (Phase 2a) (Co-I)	DOE	\$189,479 ²
2016-2017	Structurally Controlled Geothermal Systems in the Eastern Great Basin Extensional Regime, Utah (Phase 2) (Co-I)	DOE	\$63,921 ²
2015-2016	Enhanced Geothermal System Concept Testing and Development Milford, Utah FORGE Site (Phase I) (Co-I)	DOE	\$35,976 ²
2015-2019	Collaborative Research: Capitalizing on EarthScope Transportable Array Data to Better Characterize Induced Seismic Sequences (PI)	NSF	\$255,709
2015-2020	Regional and urban seismic monitoring: Wasatch Front, Utah, and neighboring Intermountain region (Co-PI)	USGS	\$3,962,400
2014-2015	Structurally Controlled Geothermal Systems in the Eastern Great Basin Extensional Regime, Utah (Phase I) (Co-I)	DOE	\$69,044 ²
2013-2014	Infrasound Array Maintenance	LANL	\$9,000
2011-2016	Analysis of Mine Seismicity and Geotechnical Modeling for Improved Safety in Underground Coal Mines (Co-PI)	NIOSH	\$1,210,915
2011-2014	Collaborative Research: Systematic Analysis of Dynamic Earthquake Triggering Using the USArray Data (PI)	NSF	\$91,585
2010-2015	Regional and urban seismic monitoring: Wasatch Front, Utah, and neighboring Intermountain West (Co-PI)	USGS	\$3,887,949
2009-2012	Infrasound from Earthquakes: Signal Characteristics and Depth Discrimination (PI)	DOE	\$266,686
2009-2011	Upgrades to Earthquake Monitoring Systems in the Utah Region (Co-PI)	USGS-ARRA	\$458,025

2009 - 2011	Upgrading the Yellowstone Seismic Network. U.S. Geological Survey ARRA. (Senior Personnel)	USGS-ARRA	\$240,014
2007 - 2010	Cooperative regional/urban seismic monitoring—Wasatch Front, Utah and neighboring ANSS-Intermountain West area. U.S. Geological Survey NEHRP (Co-PI)	USGS	\$2,042,635
2008 - 2009	Deep Coal Mine Safety Improvements Subproject 2: Acquire and Retain Two Temporary High-Quality Seismic Stations Operating As Part of the NSF EarthScope Experiment in Utah's Wasatch Plateau-Book Cliffs Coal Mining Region (Co-PI)	NIOSH	\$75,000 ¹
2008 - 2009	Deep Coal Mine Safety Improvements Subproject 3: Improved Locations for Mining-Induced Seismicity (PI)	NIOSH	\$148,098 ¹
2007 - 2009	Integration of infrasound array data into the University of Utah regional seismic network (PI)	AFRL	\$33,368
2006 - 2007	Seismic and infrasound energy generation and propagation at local and regional distances: Active experiments in the Western United States (PI)	AFRL	\$106,567
2003 - 2004	Shallow shear wave velocity profiling of poorly characterized earthquake site-response units in urban Utah, Davis, and Weber counties (PI)	USGS	\$1,884
2003 - 2005	Determination of sediment thicknesses and site amplification factors in the Salt Lake Valley, Utah, using ANSS data. U.S. Geological Survey NEHRP (Co-PI)	USGS	\$44,043

¹Funding is part of a larger award to the Department of Mining Engineering

²Funding is part of a larger award to the Energy Geoscience Institute

Publications (student authors italicized):

Papers in Preparation:

1. *Linville, L., K. L. Pankow, T. Draelos, C. J. Young, and S. Alvarez (to be submitted 2018). Leveraging long-term seismic catalogs for automated real-time event classification, Geophys. Res. Lett., in preparation*
2. *Stein, J., K. L. Pankow, K. D. Koper, and D. Chambers (to be submitted 2018). Using properties of seismic event families for seismic source discrimination in the coal mining regions of central Utah, USA, Bull. Seism. Soc. Am., in preparation*
3. *Linville, L., K. L. Pankow, D. Kilb, and J. Rubinstein (to be submitted 2018). Identifying new earthquake templates adds valuable information to induced seismicity sequences, J. Geophys. Res. Solid Earth*

Papers in Review:

1. Zhang, H., M. Brudzinski, K. D. Koper, and **K. L. Pankow** (2018). Imaging the 2017 Mw 8.2 Tehuantepec intermediate-depth earthquake using teleseismic P waves, *Geophys. Res. Lett.*, in review.
2. Zhang, H., **K. L. Pankow**, and W. Stephenson (2018). A Bayesian monte-carlo inversion of spatial auto-correlation (SPAC) for near surface Vs structure applied to both broadband and geophone data, *Geophys. J. Intl.*, in review.
3. **Pankow, K. L.**, S. Potter, H. Zhang, A. Trow, A. S. Record, (2019). Micro-seismic characterization of the Utah FORGE Site, Utah Geological Survey Special Bulletin, in review
4. Trow, A. J., **K. L. Pankow**, Y. Wang, F. C. Lin (2019). Local ambient noise tomography over the FORGE Utah site, Utah Geological Survey Special Bulletin, in review

Journal Articles

1. Arrowsmith, S., C. Young, and **K. Pankow** (2018), Implementation of the waveform correlation event detection system (WCEDS) method for regional seismic event detection in Utah, *Bull. Seism. Soc. Am.*, accepted.
2. Koper, K. D., **K. L. Pankow**, J. C. Pechmann, J. M. Hale, R. Burlacu, W.L. Yeck, H. M. Benz, R. B. Herrmann, D. T. Trugman, P. M. Shearer (2018). Afterslip enhanced aftershock activity during the 2017 earthquake sequence near Sulphur Peak, Idaho, *Geophys. Res. Lett.*, 45, 5352-5361, doi:10.1029/2018GL078196.
3. Linville, L., **K. L. Pankow**, and D. Kilb (2018) Contour-based earthquake detection using Transportable Array data, *Seism. Res. Lett.*, 89, 1514-1523, doi:10.1785/0220170242.
4. Trow, A. J., H. Zhang, A. S. Record, K. A. Mendoza, **K. L. Pankow**, P. E. Wannamaker (2018). Microseismic event detection using multiple geophone arrays in southwestern Utah, *Seism. Res. Lett.*, 89, 1660-1670, doi:10.1785/0220180065.
5. Kilb, D. L., A. Yang, N. Garrett, **K. Pankow**, J. Rubinstein, and L. M. Linville (2018) Tilt Trivia: A free multiplayer app to learn geoscience concepts and definitions, *Seism. Res. Lett.*, 89, 1908-1915, doi:10.1785/0220180049.
6. Pang, G., K. D. Koper, M. C. Stickney, J. C. Pechmann, R. Burlacu, **K. L. Pankow**, S. Payne, and H. M. Benz (2018). Seismicity in the Challis, Idaho region, January 2014 – May 2017: Late aftershocks of the 1983 Ms 7.3 Borah Peak earthquake, *Seism. Res. Lett.*, 89, 1366-1378, doi:10.1785/0220180058.
7. Tibi, R., K. D. Koper, **K. L. Pankow**, and C. Y. Young (2018), Discrimination of anthropogenic events and tectonic earthquakes in Utah using a quadratic function approach with local-distance amplitude ratios, *Bull. Seism. Soc. Am.*, 108, 2788-2800, doi:10.1785/0120180024.
8. Tibi, R., K. D. Koper, **K. L. Pankow**, and C. Y. Young (2018), Depth discrimination using Rg-to-Lg amplitude ratios for seismic events in Utah recorded at local distances, *Bull. Seism. Soc. Am.*, 108, 1355-1368, doi:10.1785/0120170257.
9. Zhang, H., K. D. Koper, **K. Pankow**, and Z. Ge (2017). Imaging the 2016 Mw 7.8 Kaikoura, New Zealand, earthquake with teleseismic P waves: A cascading rupture across multiple faults, *Geophys. Res. Lett.*, 44, doi:10.1002/2017GL073461.
10. Moore, J. R., K. L. Pankow, S. R. Ford, K. D. Koper, J. M. Hale, J. Aaron, and C. F. Larsen (2017). Dynamics of the Bingham Canyon rock avalanches (Utah, USA) resolved from topographic, seismic, and infrasound data, *J. Geophys. Res. Earth Surface*, doi:10.1002/2016JF004036.
11. Koper, K. D., J. C. Pechmann, R. Burlacu, **K. L. Pankow**, J. Stein, J. M. Hale, P. Roberson, M. K. McCarter (2016). Magnitude-based discrimination of man-made events from naturally occurring earthquakes in Utah, USA, *Geophys. Res. Lett.*, 43, 10,638-10,645, doi:10.1002/2016GL070742.

12. Arrowsmith, S., C. Young, S. Ballard, M. Slinkard, and **K. Pankow** (2016). Pickless event detection and location: The waveform correlation event-detection system (WCEDS) revisited, *Bull. Seism. Soc. Am.*, **106**, 2037-2044, doi:10.1785/0120160018.
13. Whidden, K. M. and **K. L. Pankow** (2016). Shear waves from isotropically dominated sources: Comparison of the 2013 Rudna, Poland and 2007 Crandall Canyon, Utah mine collapses, *Bull. Seism. Soc. Am.*, **106**, doi:10.1785/0120150179.
14. Velasco, A. A., R. Alfaro-Diaz, D. L. Kilb, and **K. L. Pankow** (2016). A time-domain approach to identify small earthquakes within the Continental U.S. recorded by the USArray and regional networks, *Bull. Seism. Soc. Am.*, **106**, 1825-1835, doi:10.1785/0120140310.
15. Chambers, D., K. D. Koper, **K.L. Pankow**, and M. K. McCarter (2015). Detecting and characterizing coal mine related seismicity in the Western U.S. using subspace methods, *Geophys. J. Intl.*, **203**, 1388-1399.
16. Linville, L.M., **K.L. Pankow**, D.L. Kilb, and A.A. Velaasco (2014). Exploring remote earthquake triggering potential across EarthScopes' Transportable Array through frequency domain array visualization, *J. Geophys. Res. Solid Earth*, **119**, 8950–8963, doi:10.1002/2014JB011529.
17. Kanu, C., R. Snieder and **K. Pankow** (2014). Time-lapse monitoring of velocity changes in Utah, *J. Geophys. Res. Solid Earth*, **119**, 7209–7225, doi:10.1002/2014JB011092.
18. Kubacki, T., K. D. Koper, **K. L. Pankow**, and M. K. McCarter (2014). Changes in mining induced seismicity before and after the 2007 Crandall Canyon Mine collapse, *J. Geophys. Res. Solid Earth*, **119**, 4876–4889, doi:10.1002/2014JB011037.
19. Boltz, M., **K. Pankow**, and M. K. McCarter (2014). Fine details of mining-induced seismicity at the Trail Mountain Mine coal mine using modified hypocentral relocation techniques, *Bull. Seism. Soc. Am.* **104**, doi:10.1785/0120130011.
20. **Pankow, K.L.**, J. R. Moore, J.M. Hale, K.D. Koper, T. Kubacki, K. M. Whidden, and M. K. McCarter (2014), Massive landslide at Utah copper Mine generates wealth of geophysical data, *GSA Today*, **24**, 4-9.
21. Whidden, K. M. and **K. L. Pankow** (2012). A catalog of regional moment tensors in Utah, *Seismol. Res. Lett.*, **83**, 775-783.
22. Arrowsmith, S., R. Burlacu, **K. Pankow**, B. Stump, R. Stead, R. Whitaker, and C. Hayward (2012). A seismoacoustic study of the January 3, 2011 Circleville earthquake, *Geophys. J. Intl.*, 1148-1158.
23. Velasco, A. A., S. Hernandez, S., T. Parsons, and **K. L. Pankow** (2008). Global ubiquity of dynamic earthquake triggering, *Nature Geoscience* **1**, 375 - 379.
24. Pechmann, J. C., W. J. Arabasz, **K. L. Pankow**, R. Burlacu, and M. K. McCarter (2008). Seismological report on the 6 August 2007 Crandall Canyon Mine collapse in Utah, *Seismol. Res. Lett.* **79** (5), 620-636.
25. **Pankow, K. L.**, J. C. Pechmann, and W. J. Arabasz (2007). Use of ANSS strong-motion data to analyze small local earthquakes, *Seismol. Res. Lett.*, **78**, 369-374.
26. Arabasz, W. J., S. J. Nava, M. K. McCarter, **K. L. Pankow**, J. C. Pechmann, J. Ake, and A. McGarr (2005). Coal-mining seismicity and ground-shaking hazard—A case study in the Trail Mountain area, Emery County, Utah, *Bull. Seism. Soc. Am.*, **95**, 18-30.
27. **Pankow, K. L.**, W. J. Arabasz, S. J. Nava, and J. C. Pechmann (2004). Triggered seismicity in Utah from the 3 November 2002 Denali fault earthquake, *Bull. Seism. Soc. Am.* **94**, S332-S347.
28. Velasco, A. A., C. J. Ammon, J. Farrell, and **K. Pankow** (2004). Rupture directivity of the 3 November 2002 Denali fault earthquake determined from surface waves, *Bull. Seism. Soc. Am.* **94**, S293-S299.

29. **Pankow, K. L.** and J. C. Pechmann (2004). The SEA99 ground motion predictive relations for extensional tectonic regimes: Revisions and a new peak ground velocity relation, *Bull. Seism. Soc. Am.* **94**, 341-348.
30. **Pankow, K. L.** and T. Lay (2002). Modeling S wave amplitude patterns for events in the Kurile slab using three-dimensional Gaussian beams, *J. Geophys. Res.*, *107*(B8), DOI 10.1029/2001JB000594.
31. **Pankow, K. L.**, Q. Williams, and T. Lay (2002). Using shear wave amplitude patterns to detect metastable olivine in subducted slabs, *J. Geophys. Res.*, *107*(B6), DOI 10.1029/2001JB000608.
32. **Pankow, K. L.** and T. Lay (1999). Constraints on the Kurile slab from shear wave residual sphere analysis, *J. Geophys. Res.*, *104*: 7255-7278.
33. Baldrige, W. S., J. F. Ferguson, L. W. Braille, B. Wang, **K. Eckhardt**, D. Evans, C. Schultz, B. Gilpin, G. R. Jiracek, and S. Biehler (1994). The western margin of the Rio Grande Rift in northern New Mexico: An aborted boundary? *GSA Bull.*, *105*: 1538-1551.

Proceedings

1. Simmons, S. F., J. Moore, R. Allis, S. Kirby, C. Jones, J. Bartley, E. Kleber, T. Knudsen, J. Miller, C. Hardwick, K. Rahilly, M. Gwynn, J. McLennan, B. Forbes, R. Podgorney, **K. Pankow**, P. Wannamaker, and T. Fischer (2018) A revised geoscientific model for FORGE Utah EGS Laboratory: *Proceedings, 43rd Workshop on Geothermal Reservoir Engineering*, Stanford University, CA February 12- 14, 2018, 8 p.
2. **Pankow, K. L.**, S. Potter, H. Zhang, and J. Moore (2017). Local seismic monitoring at the Milford, Utah FORGE site: *Proceedings of the Geothermal Resources Council*, v. 41
3. Wannamaker P. E., J. N. Moore, **K. L. Pankow**, and S. F. Simmons (2017). Phase II of play fairway analysis for the Easter Great Basin extensional regime, Utah: Status of indications, *Proceedings of the Geothermal Resources Council*, v. 41
4. Wannamaker P. E., **K. L. Pankow**, J. N. Moore, G. D. Nash, V. Maris, S. F. Simmons and C. L. Hardwick (2016). Play Fairway Analysis for Structurally Controlled Geothermal Systems in the Eastern Great Basin Extensional Regime, Utah: *Proc. 41st Workshop Geothermal Reservoir Engineering*, Stanford University, Stanford, CA, SGP-TR-209, 17 pp.
5. Allis, R.G., Moore, J.N., Davatzes, N., Gwynn, M., Hardwick, C., Kirby, S., **Pankow, K.**, Potter, S., and Simmons, S.F. (2016). EGS Concept Testing and Development at the Milford, Utah FORGE Site: *Proceedings, 41st Workshop on Geothermal Reservoir Engineering*, Stanford University, 13 p. <http://www.geothermal-energy.org/pdf/IGAstandard/SGW/2016/Allis.pdf>
6. Wannamaker, P.E., Moore, J. N., **Pankow, K. L.**, Simmons, S.F., Nash, G. D., Maris, V., Batchelor, C., and Hardwick, C. L. (2015). Play fairway analysis of the eastern Great Basin extensional regime, Utah, preliminary indications: *Proceedings of the Geothermal Resources Council*, v. 39, p. 793-804. <https://www.geothermal-library.org/index.php?mode=pubs&action=view&record=1032220>
7. *Chambers, D.*, K. D. Koper, **K.L. Pankow**, and M. K. McCarter (2015). Subspace detection to detect small mining events: A comparison of catalogs, in *Proceedings, 34th International Conference on Ground Control in Mining*, Morgantown, West Virginia, July 2015: Morgantown, West Virginia University.
8. *Stein, J.*, **K.L. Pankow**, K. D. Koper, and M. K. McCarter (2015). Discriminating mining induced seismicity from natural tectonic earthquakes in the Wasatch Plateau region of central Utah, in *Proceedings, 34th International Conference on Ground Control in Mining*, Morgantown, West Virginia, July 2015: Morgantown, West Virginia University.
9. *Chambers, D.*, J. A., Wempen, J. M., McCarter, M. K., **Pankow, K. L.**, & Koper, K. D. (2015). Correlation of newly detected mining induced seismicity with subsidence in a Wyoming

- mining district. In *2015 SME Annual Conference and Expo and CMA 117th National Western Mining Conference - Mining: Navigating the Global Waters*. (pp. 192-198). Society for Mining, Metallurgy and Exploration.
10. Kubacki, T., K.D. Koper, **K.L. Pankow**, and M. K. McCarter (2013). Cross-correlation detection of seismic events related to the Crandall Canyon mine collapse, in *Proceedings, 32nd International Conference on Ground Control in Mining*, Morgantown, West Virginia, July 2013: Morgantown, West Virginia University.
 11. Hale, J.M., J. Park, **K. Pankow**, S. Arrowsmith, R. Burlacu, B. Stump, C. Hayward, G. and S. Taylor (2012) Infrasound Signal Characteristics from Small Earthquakes, in *Proceedings of 2012 Monitoring Research Review: Ground-Based Nuclear Explosion Monitoring Technologies*,
 12. Boltz, M., **K. Pankow**, M. K. McCarter (2012). Relocating mining-induced seismicity at the Trail Mountain Mine, in *Proceedings, 31st International Conference on Ground Control in Mining*, Morgantown, West Virginia, July 2012: Morgantown, West Virginia University
 13. Kubacki, T., M. K. McCarter, and **K. Pankow** (2012). Mining-induced seismicity of the Crandall Canyon Mine collapse using double difference relocations, in *Proceedings, 31st International Conference on Ground Control in Mining*, Morgantown, West Virginia, July 2012: Morgantown, West Virginia University
 14. Arrowsmith, S., J. Hale, R. Burlacu, **K. Pankow**, B. Stump, C. Hayward, G. Randall, and S. Taylor (2011). Infrasound Signal Characteristics from Small Earthquakes, in *Proceedings of 2011 Monitoring Research Review: Ground-Based Nuclear Explosion Monitoring Technologies*, LA-UR-11-04823, 743 – 754.
 15. Hale, J., S. Arrowsmith, C. Hayward, R. Burlacu, **K. Pankow**, B. Stump, G. Randall, and S. Taylor (2010). Infrasound Signal Characteristics from Small Earthquakes, in *Proceedings of 2010 Monitoring Research Review: Ground-Based Nuclear Explosion Monitoring Technologies*, LA-UR-10-05578, 720 – 730.
 16. Stump, B., R. Burlacu, C. Hayward, T. Kim, S. Arrowsmith, R. Zhou, and **K. Pankow** (2009). Seismo-Acoustic Generation by Earthquakes and Explosions and Near-Regional Propagation, in *Proceedings of 2009 Monitoring Research Review: Ground-Based Nuclear Explosion Monitoring Technologies*, LA-UR-09-05276, 230 – 238.
 17. Stump, B.W., C. T. Hayward, S. J. Arrowsmith, G. E. Randall, **K. Pankow**, R. Burlacu, and S. R. Taylor (2009). Infrasound from earthquakes: Signal characterization, in *Proceedings of 2009 Monitoring Research Review: Ground-Based Nuclear Explosion Monitoring Technologies*, LA-UR-09-05276, 742-749.
 18. Sonley, E., **K. Pankow**, and M. McCarter (2009). Trail Mountain Mine: A Case Study for Improving Locations of Mining-Induced Seismicity with Double-Difference Relocation, in *Proceedings, 28th International Conference on Ground Control in Mining*, Morgantown, West Virginia, July 2009: Morgantown, West Virginia University, p. 187 – 194.
 19. Stump, B., R. M. Zhou, T. S. Kim, Y. T. Chen, Z. X. Yang, R. B. Herrmann, R. Burlacu, C. Hayward, and **K. Pankow** (2008). Shear velocity structure in NE China and characterization of infrasound wave propagation in the 1-210 kilometer range, *Proceedings of the 30th Monitoring Research Review: Ground-Based Nuclear Explosion Monitoring Technologies*, LA-UR-08-05261, 287-296.
 20. **Pankow, K.**, M. McCarter, W. Arabasz, and R. Burlacu (2008). Coal-mining-induced seismicity in Utah improving spatial resolution using double-difference relocations, in *Proceedings, 27th International Conference on Ground Control in Mining*, Morgantown, West Virginia, July 2008: Morgantown, West Virginia University, 91- 97.
 21. Stump, B., R. Burlacu, C. Hayward, J. Bonner, **K. Pankow**, A. Fisher, and S. Nava (2007). Seismic and Infrasound Energy Generation and Propagation at Local and Regional

Distances: Phase 1 - Divine Strake Experiment, *Proceedings of the 29th Monitoring Research Review*, National Nuclear Security Administration, LA-UR-07-5613.

22. Zhou, R., B. Stump, Z. Yang, Y. Chen, R. Herrmann, R. Burlacu, C. Hayward, and **K. Pankow** (2007). Broadband Network Operation and Shear Velocity Structure Beneath the Xiuyan Area, NE China, *Proceedings of the 29th Monitoring Research Review*, National Nuclear Security Administration, LA-UR-07-5613.

Reports and Other Publications:

1. **Pankow, K.**, W. J. Arabasz, R. Carey, G. Christenson, J. Groeneveld, B. Maxfield, P. W. McDonough, B. Welliver, T. L. Youd (2015). Scenario for a Magnitude 7.0 Earthquake on the Wasatch Fault—Salt Lake City Segment: Hazards and Loss Estimates, Earthquake Engineering Research Institute, Utah Chapter, 60 p.
2. **Pankow, K.** (2012). Instrumentally recorded ground motions in the Utah Region since 2000, in Hylland, M.D. and Harty, K.M., editors, Selected topics in engineering and environmental geology in Utah: Utah Geological Association Publication 41, p. 1-8.
3. Petersen, M., **K. Pankow**, G. Biasi, M. Meremonte, S. Harmsen, C. Mueller, and Y. Zeng (2011). Ground motions from the 2008 Wells, Nevada Earthquake Sequence and Implications for Seismic Hazard, in *The 21 February 2008 M_w 6.0 Wells, Nevada Earthquake*, C.M. dePollo and D.D. LaPointe (Editors), *Nevada Bureau of Mines and Geology Special Pub.* 36, 163-172.
4. Smith, K., J. Pechmann, M. Meremonte, and **K. Pankow** (2011). Preliminary analysis of the M_w 6.0 Wells, Nevada earthquake sequence, in *The 21 February 2008 M_w 6.0 Wells, Nevada Earthquake*, C.M. dePollo and D.D. LaPointe (Editors), *Nevada Bureau of Mines and Geology Special Pub.* 36, 127-146.
5. **Pankow, K. L.**, W. J. Arabasz, R. Burlacu (2009). Seismicity and Seismotectonic Issues of Western Utah, in *Geology and Geologic Resources and issues of Western Utah*, B. T. Tripp, K. Krahulec, and J. L. Jordan (Editors), *Utah Geological Association Pub.* 38, 1–15.
6. Stump, B., R. Burlacu, C. Hayward, **K. Pankow**, S. Nava, J. Bonner, S. Hoch, D. Whiteman, A. Fisher, T. S. Kim, R. Kubacki, M. Leidig, J. Britton, D. Drobeck, P. O Neill, K. Jensen, K. Whipp, G. Johanson, P. Roberson, R. Read, R. Brogan, and S. Masters (2008a). Seismic and infrasound energy generation and propagation at local and regional distances: Phase 1 Divine Strake Experiment, Technical Report to Air Force Research Laboratory under contract FA8718-06-C-0028, 23 pp.
7. Arabasz, W. J., R. Burlacu, and **K. L. Pankow** (2007). An overview of historical and contemporary seismicity in central Utah, in *Central Utah—Diverse Geology of a Dynamic Landscape*, C. G. Willis, M. D. Hylland, D. L. Clark, and T. C. Chidsey, Jr. (Editors), *Utah Geological Association Pub.* 36, 237–253.
8. Arabasz, W. J., D. L. Drobeck, R. Burlacu, **K. L. Pankow**, and J. C. Pechmann (2006). Station CCUT—Cooperative Broadband Seismograph Station Near Cedar City, Utah (ANSS/USArray National Backbone Network), IRIS Subaward Agreement No. 383, under NSF Cooperative Agreement No. EAR-0004370, 52 pp., including tables, figures, and appendix; online at <http://www.quake.utah.edu/MONRESEARCH/research.htm>
9. **Pankow, K. L.** and J. C. Pechmann (2005). Determination of Low-Strain Site Amplification Factors in the Salt Lake Valley, Utah, Using ANSS Data: Proceedings volume Basin and Range Province seismic-hazard summit (ed.) W.R. Lund, *Utah Geological Survey Misc. Pub.* 05-2.
10. Wald, D. J., B. C. Worden, V. Quitoriano, and **K. L. Pankow** (2003). ShakeMap Manual: Technical manual, user's guide and software guide: U.S. Geological Survey Techniques and Methods, book 12, section A, chap. 1, 132p.

11. Arabasz, W. J., S. J. Nava, M. K. McCarter, and **K. L. Pankow** (2002). Ground-motion recording and analysis of mining-induced seismicity in the Trail Mountain area, Emery County, Utah: Technical Report to State of Utah School and Trust Lands Administration, University of Utah Seismograph Stations, Salt Lake City, Utah, 28p. plus 5 tables, 22 figs. and 6 appendices.

Abstracts Submitted:

1. **Pankow, K.** and D. Kilb (2018) Re-evaluating remote dynamic earthquake triggering by first establishing background seismicity rates, 2018 Fall Meeting, AGU, Washington D. C. December 2018.
2. Moore, J., J. McLennan, R. Allis, **K. Pankow**, S. Simmons, R. Podgorney, P. Wannamaker, and W. Rickard (2018) An overview of the Utah Frontier Observatory for Research in Geothermal Energy (FORGE), 2018 Fall Meeting, AGU, Washington D. C. December 2018.
3. Zhang, H. Zhang, L. and **K. Pankow** (2018) The December 20, 2016 earthquake swarm in the Great Salt Lake, northern Utah, 2018 Fall Meeting, AGU, Washington D. C. December 2018.

Recent Abstracts (2013-2018):

1. **Pankow, K. L.**, J. R. Stein, D. Chambers, and K. D. Koper (2018). Using seismic event clusters for seismic discrimination in central Utah, Banff 2018 International Induced Seismicity Workshop, Banff, Canada, October 2018.
2. **Pankow, K. L.**, H. Zhang, and S. Potter (2018). Discriminating induced from tectonic earthquakes near Roosevelt Hot Springs, Utah, U.S.A, European Seismological Commission Meeting, Valletta, Malta, September 2018.
3. Zhang, H. and **K. Pankow** (2018). A Bayesian application of SPAC to resolve Vs30 using Nodal seismic instruments, 2018 Annual Meeting Seismological Society of America, Miami, FL.
4. Rusho, J. R. Burlacu, W. Blycker, D. Drobeck, C. Hatch, **K. L. Pankow**, and K. D. Koper (2018) Preserving seismic data at the University of Utah Seismograph Stations, 2018 Annual Meeting Seismological Society of America, Miami, FL.
5. Koper, K. D., J. C. Pechmann, J. M. Hale, R. Burlacu, **K. L. Pankow**, W. L. Yeck, H. M. Benz, D. T. Trugman, and P. M. Shearer (2018). The 2017 earthquake sequence near Sulphur Peak, Idaho, 2018 Annual Meeting Seismological Society of America, Miami, FL.
6. **Pankow, K. L.**, K. D. Koper, R. Burlacu, J. C. Pechmann, W. L. Blycker, D. L. Drobeck, J. M. Farrell, J. M. Hale, C.S. Hatch, C. B. Meier, P. M. Roberson, and J. Rusho (2018). The University of Utah Seismograph Stations: Mission and operations, 2018 Annual Meeting Seismological Society of America, Miami, FL.
7. Kilb, D. and **K. L. Pankow** (2018). Exploring subtle temporal changes in earthquake catalogs to guide identification of dynamically triggered events, 2018 Annual Meeting Seismological Society of America, Miami, FL.
8. Linville, L., T. Draelos, **K. L. Pankow**, C. J. Young, and S. Alvarez (2017). Leveraging long-term seismic catalogs for automated real-time event classification, Abstract S41D-04 presented at 2017 Fall Meeting, AGU, New Orleans, LA 11-15 Dec.
9. Zhang, H., M. Brudzinski, K. D. Koper, and **K. L. Pankow** (2017). Imaging the 2017 MW 8.2 Tehuantepec intermediate-depth earthquake using teleseismic P waves, Abstract S33G-2933 presented at 2017 Fall Meeting, AGU, New Orleans, LA 11-15 Dec.
10. Arrowsmith, S., **K. L. Pankow**, R. Brogan, and C. J. Young (2017). Evaluating the waveform correlation event detection system (WCEDS) through comparison with an analyst catalog, Abstract S13B-0649 presented at 2017 Fall Meeting, AGU, New Orleans, LA 11-15 Dec.

11. Trow, A., **K. L. Pankow**, P. E. Wannamaker, F. C. Lin, and K. M. Ward (2017). Seismic imaging of a prospective geothermal play, using a dense geophone array, Abstract NS13A-0008 presented at 2017 Fall Meeting, AGU, New Orleans, LA 11-15 Dec.
12. Tibi, R., C. Y. Young, K. D. Koper, and **K. L. Pankow** (2017). Discrimination of man-made events and tectonic earthquakes in Utah using data recorded at local distances, Abstract S41A-0731 presented at 2017 Fall Meeting, AGU, New Orleans, LA 11-15 Dec.
13. Moore, J., R. Allis, **K. L. Pankow**, S. Simmons, J. McLennan, and P. Wannamaker (2017). Overview of the Utah FORGE Project, *Geothermal Resources Council*, v. 41
14. **Pankow, K.L.**, S. Potter, H. Zhang, F. Lin, and J. Moore (2017) Developing an induced seismic mitigation plan for the proposed Utah Frontier Observatory for Research in Geothermal Energy (FORGE), submitted to 2017 IASPEI meeting Kobe, Japan
15. Linville, L. M., **K. Pankow**, D. Kilb, and J. Rubinstein (2017). Identifying new earthquake templates adds valuable information to induced seismicity sequences, 2017 Annual Meeting Seismological Society of America, Denver, CO.
16. Trow, A., L. M. Linville, **K. Pankow**, and P. Wannamker (2017). Detecting seismicity in a prospective geothermal play, using a 48 geophone array, 2017 Annual Meeting Seismological Society of America, Denver, CO.
17. Potter, S., **K. Pankow**, J. Moore, and R. Allis (2017). Seismicity in the Mineral Mountains, Utah and the possible association with the Roosevelt Hot Springs geothermal system, 2017 Annual Meeting Seismological Society of America, Denver, CO.
18. Arrowsmith, S. J., C. Young, and **K. Pankow** (2017). Accessing WCEDS as an alternative pipeline processing system, 2017 Annual Meeting Seismological Society of America, Denver, CO.
19. Zhang, H., K. D. Koper, **K. L. Pankow**, and Z. Ge (2017). Imaging the 2016 MW 7.8 Kaikoura, New Zealand earthquake with teleseismic P waves: A cascading rupture across multiple faults, 2017 Annual Meeting Seismological Society of America, Denver, CO.
20. Kilb, D. L., A. Yang, N. Garrett, V. Hilke, **K. Pankow**, J. Rubinstein, and L. M. Linville (2017) Tilt Trivia: A multiplayer app teaching induced seismicity concepts, 2017 Annual Meeting Seismological Society of America, Denver, CO.
21. Koper, K. D., J. C. Pechmann, R. Burlacu, **K. L. Pankow**, J. Stein, J. M. Hale, P. Roberson, M. K. McCarter (2016). Magnitude-based discrimination of man-made events from naturally occurring earthquakes in Utah, USA, Abstract S31A-2721, presented at 2016 Fall Meeting, AGU, San Francisco, Calif., 12-16 Dec.
22. Earle, P., M. R. Perry, J. R. Andrews, M. M. Withers, M. Hellweg, W. K. Kim, B. Shiro, M. E. West, D. A. Storchak, **K. L. Pankow**, V. A. Huerfano Moreno, L. S. Gee, and C. J. Wolfe (2016). Populating the Advanced National Seismic System Comprehensive Earthquake Catalog, Abstract S53A-2821, presented at 2016 Fall Meeting, AGU, San Francisco, Calif., 12-16 Dec.
23. Batchelor, C. E., K. D. Koper, **K. L. Pankow**, and R. Burlacu (2016), Waveform correlation detection methods as applied to Utah seismic swarms, *Seis. Res. Lett.*, 87(2B), 574.
24. Linville, L., **K. Pankow**, D. Kilb (2016). Lowering template magnitudes using frequency domain array processing in regions of induced seismicity, *Seis. Res. Lett.*, 87(2B), 527.
25. Stein, J. R., **K. L. Pankow**, K.D. Koper, and D. Chambers (2016). Discriminating sources (mining-induced seismicity, fluid injection induced seismicity, and tectonic earthquakes) in Central Utah, USA, *Seis. Res. Lett.*, 87(2B), 543.
26. Hale, J. M., **K. L. Pankow**, S. J. Arrowsmith, B. Stump, C. Hayward (2016), Infrasound scaling characteristics from small earthquakes in the Utah region, *Seis. Res. Lett.*, 87(2B), 535.
27. Rusho, J., C. Hatch, D. Drobeck, and **K. Pankow** (2016), Waveform recovery enhancements in the Utah network, *Seis. Res. Lett.*, 87(2B), 524.

28. Alfaro-Diaz, R., A. Velasco, D. Kilb, and **K. Pankow** (2015). Observations of dynamic triggering in the Coso Geothermal Field 2004-2013, Abstract S13B-2812, presented at 2015 Fall Meeting, AGU, San Francisco, Calif., 14-18 Dec.
29. **Pankow, K. L.**, J. Stein, D. Chambers, K. Koper (2015). Discriminating seismic sources (mining-induced seismicity, fluid injection seismicity, and tectonic earthquakes) in central Utah, USA, 26th IUGG General Assembly, Prague, Czech Republic, June 22-July 2, 2015.
30. Wannamaker, P. E., J. N. Moore, **K. L. Pankow**, S. D. Simmons, G. D. Nash, V. Maris, C. Batchelor, and C. L. Hardwick (2015). Play fairway analysis of the Eastern Great Basin extensional regime Utah: Preliminary Indications, GRC Transactions, 39, 31.
31. Batchelor, C. E., K. D. Koper, and **K. L. Pankow** (2015), Characterization of seismic swarms in Utah, *Seis. Res. Lett.*, 86, no. 2B, 681.
32. Kilb, D., L. Linville, and **K. L. Pankow** (2014), Frequency domain detection with nearest neighbor clustering to detect dynamically triggered remote earthquakes within the footprint of the EarthScope USArray transportable array, Abstract S13B-4451, presented at 2014 Fall Meeting, AGU, San Francisco, Calif., 15-19 Dec.
33. Stickney, M. S., **K.L. Pankow**, K.D. Koper, and K. M. Whidden (2014), The 2014 Challis, Idaho earthquake swarm, Abstract T13B-4639, presented at 2014 Fall Meeting, AGU, San Francisco, Calif., 15-19 Dec.
34. Stein, J., **K.L. Pankow**, K. D. Koper, and M. K. McCarter (2014), Discriminating mining induced seismicity from natural tectonic earthquakes in the Wasatch Plateau region of central Utah, Abstract S51A-4384, presented at 2014 Fall Meeting, AGU, San Francisco, Calif., 15-19 Dec.
35. Whidden, K. M., K. Hansen, M. Timothy, M. S. Boltz, **K.L. Pankow**, and K. D. Koper (2014), Natural reservoirs and triggered seismicity: A study of two northern Utah lakes, Abstract S51A-4404, presented at 2014 Fall Meeting, AGU, San Francisco, Calif., 15-19 Dec.
36. Alfaro-Diaz, R., A. A. Velasco, D. Kilb, K. L. Pankow, and L. Linville (2014), Timepdomain techniques to automatically detect local earthquakes in the wavetrain of large remote teleseismic events using data within the continental United States, Abstract S43A-4424, presented at 2014 Fall Meeting, AGU, San Francisco, Calif., 15-19 Dec.
37. **Pankow, K.L.**, T. Kubacki, K.D. Koper, K. M. Whidden, and J. R. Moore, M. K. McCarter (2014), Induced earthquakes from the 2013 Bingham Canyon landslides, *Geological Society of America Abstracts with Programs*, 46, no 6, 466.
38. Pechmann, J. C., K. D. Koper, R. B. Hermann, K. M. Whidden, H. M. Benz, **K. L. Pankow**, F. Lin, and D. S. Chapman (2014), An M 4.8 earthquake in the upper mantle beneath the Wind River Range, Wyoming, *Seis. Res. Lett.*, 85, no. 2, 507.
39. **Pankow, K.L.**, S.R. Ford, T. Kubacki, K.D. Koper, K. M. Whidden, and J. R. Moore, M. K. McCarter (2013), Bingham Canyon landslide: Force history analysis and identification of induced earthquakes, Abstract NH14A-02, presented at 2013 Fall Meeting, AGU, San Francisco, Calif., 9-13 Dec.
40. Whidden, K.M., L. Rudzinski, G. Lizurek, and **K.L. Pankow** (2013), Regional, local, and in-mine moment tensors for the 2013 Rudna Mine collapse, Abstract S21B-2396, presented at 2013 Fall Meeting, AGU, San Francisco, Calif., 9-13 Dec.
41. Hale, J.M., S. Arrowsmith, R. Burlacu, C. Hayward, and **K.L. Pankow** (2013). Infrasound observations of the massive landslide at Bingham Canyon Copper Mine, Abstract S23B-2489, presented at 2013 Fall Meeting, AGU, San Francisco, Calif., 9-13 Dec.
42. Linville, L.M., **K.L. Pankow**, D.L. Kilb, and A.A. Velaasco (2013). Dynamic triggering potential of large earthquakes recorded by the EarthScope U.S. Transportable Array using a frequency domain detection method, Abstract S44B-02, presented at 2013 Fall Meeting, AGU, San Francisco, Calif., 9-13 Dec.

43. Velasco, A.A, I. Cerda, L. Linville, D.L. Kilb, and **K.L. Pankow** (2013). Remotely triggered earthquakes recorded by Earthscope's transportable array and regional seismic networks: A case study of four large earthquakes, AGU Meeting of the Americas, Cancun, Mexico, 14 – 17 May.
44. Gammans, C.N, **K.L. Pankow**, J.C. Pechmann, K.M. Whidden, and K.D. Koper (2013). Analysis of aftershocks from the 3 January 2011 Mw 4.5 Tushar Mountains (Utah) earthquake, *Seism. Res. Lett.*, **84**, 321.
45. Bausch, D., J. Rozelle, and **K.L. Pankow** (2013). The great Utah shakeout and HAZUS applications, *Seism. Res. Lett.*, **84**, 357.
46. **Pankow, K.L.**, J. Rusho, M. Ellis, and B.Carey (2013). Integrating shakemap with shakecast from earthquake response in Utah, *Seism. Res. Lett.*, **84**, 357.
47. Boltz, M.S., T.M. Kubacki, D.J. Chambers, K.M. Whidden, **K.L. Pankow**, K.D. Koper, and M.K. McCarter (2012). Analysis of mining induced seismicity at central Utah coal mines, *Seism. Res. Lett.*, **84**, 384.
48. Linville, L.M., **K.L. Pankow**, D.L. Kilb, and A.A. Velasco (2013). An automated algorithm to detect remotely triggered aftershocks recorded by Earthscope's transportable array and regional seismic networks: A case study of four large earthquakes, *Seism. Res. Lett.*, **84**, 391.

Invited Presentations and Press Related Activities:

1. Developing an Induced Seismic Mitigation Plan for the Utah Frontier Observatory for Research in Geothermal Energy (FORGE), University of Utah, Department of Geology and Geophysics Distinguished Lecture Series, November 2018.
2. Women in STEM MUSE Lunchtime Lecture Series, University of Utah, April 2018.
3. Field trip to UUSS for SACNAS Annual Meeting, October 2017.
4. Lecture to MSSST cohort on potential research projects, October 2017.
5. Podcast Interview with Jim Dabakis, Utah Earthquake and Yellowstone, October 2017 (with Jamie Farrell).
6. Utah's Earthquake Threat, OSHER Lunch and Learn, University of Utah, January 2017.
7. Shake-Rattle-and Roll, Speed Date an Extreme Expert, Natural History Museum of Utah, September 2016.
8. University of Utah Seismograph Stations (UUSS Network), Scientific Earthquake Studies Advisory Committee (SEASAC), Winter 2016 Meeting, February 2016.
9. Utah Earthquakes, UP with Jim Dubakis, ABC4 Salt Lake City, Utah (taped 2015 to air early 2016).
10. Science Behind the Utah Earthquake Scenario Report, Brigham Young University, Department of Geological Sciences, October 8, 2015.
11. Bingham Canyon Rock Avalanche, University of Utah, OSHER Lifelong Learning Institute, September 30, 2015.
12. Utah Earthquake Scenario Report to Lt. Governor Bell (joint presentation with USSC and EERI), September 21, 2015.
13. Utah Education Network: Sci-Fi Friday Podcast, April 2015.
14. Induced earthquakes from the 2013 Bingham Canyon landslides, Geological Society of America Annual Meeting, Vancouver, Canada, October 2014.
15. Bingham Canyon Rock Avalanche, Southern Methodist University Dept. of Earth Sciences Seminar Series, October 2014.
16. Earthquake Hazard in Utah, Desert News Disaster Recovery Committee, September 30, 2014.
17. Monitoring Seismic Sources in the Intermountain Region, Boise State Department of Geosciences Invited Guest Speaker Series, April 14, 2014.

18. Bingham Canyon Rock Avalanche GSA Today Paper Press Interviews included: KUER, KCPW, KSL, Fox 13, Science Now, Nature (incomplete list), January 6-9, 2014.
19. Bingham Canyon Rock Avalanche, Kennecott Offices Daybreak, Utah (Joint with Jeff Moore), December 3, 2013.
20. Bingham Canyon Rock Avalanche, Distinguished Lecture Series (Joint with Jeff Moore), University of Utah Department of Geology and Geophysics, October 24, 2013.
21. Scientist in the Spotlight: Utah's Earthquakes, Natural History Museum of Utah, September 20, 2013.
22. Preparing for Disaster: Starting Now, on-air expert, KUED production, originally aired April 17, 2013.
23. Earthquake Hazard in Utah, KSL Business Continuity/Disaster Recovery, August 1, 2012
24. Observations from the 2011 Tushar (Circleville) Mountain Earthquake, Utah Geological Association, March 2012.
25. Instrumentally recorded ground motions in the Utah Region since 2000, Utah Geological Survey Ground Motion Working Group, February 2012.
26. The New Zealand Earthquake and Earthquake Hazard in Utah, KSL Sunday Edition with Bruce Lindsay, February 2011.
27. Earthquake hazard in Utah—Seismological perspectives and tools for managing the earthquake threat, 2010 UDOT Engineering Conference, Salt Lake City, UT, November 17, 2010.
28. Utah Education Network: Sci-Fi Friday Podcast, October, 2010.
29. Utah's Regional Seismic Network—The Next Phase, Swiss Seismological Services, May, 2010
30. Improving hypocentral locations of induced seismicity in the Wasatch Plateau-Book Cliffs coal-mining region, central Utah, USA, Symposium Lithospheric Deformation: Turning observations into models (invited keynote speaker), Bochum, Germany, May, 2010
31. Report on Recent Utah Earthquakes, Utah Seismic Safety Committee, Salt Lake City, Utah, January 2010.
32. Seismicity and Seismotectonic Issues of Central and Western Utah (invited speaker), Utah Valley University, Orem, Utah, November 2009.
33. Earthquake Hazard in Utah Seismological Perspectives (invited joint presentation by W. J. Arabasz and K. L. Pankow), FEMA Regional Interagency Steering Committee Meeting Salt Lake City, Utah, July 2009.
34. Locating MIS Using the URSN, NIOSH Information Meeting for Stakeholders: Seismic Monitoring Applicable to Deep Coal Mines, April 2009.
35. February 21, 2008 Wells Earthquake, Utah Geological Survey, Ground Motion Working Group, February 2009.
36. Dynamic Earthquake Triggering, University of Utah, Department of Geology and Geophysics Distinguished Lecture Series, October 2008.
37. Dynamic Earthquake Triggering, Southern Methodist University, Huffington Department of Earth Sciences, Department Seminar, September 2008.
38. Utah's Earthquake Hazard, Foothill Elementary School In-Service, Riverton, Utah, August 2008.
39. Central Utah Seismicity, International Continental Drilling Program, Testing the Extensional Detachment Paradigm: A borehole in the Sevier Desert Basin, western United States Workshop, July 2008.
40. February 21, 2008 Wells Earthquake, Utah Seismic Safety Commission, April 2008.

41. Improving Seismic Event Locations (Double Difference), Bureau of Land Management, Salt Lake City, Utah, March 2008.
42. Continuous Infrasonic Recording Within the Utah Regional Seismic Network, Acoustical Society of America Meeting, Salt Lake City, June 2007.
43. Utah's Earthquake Hazard, Park City Newcomers Club, Park City, Utah, March 2007.
44. Overview of Utah Seismicity and Earthquake Information Products, Utah Claims Managers Association, December 2006.
45. Triggered Seismicity in Utah from the November 3, 2002, Denali Fault Earthquake, Utah Association of Engineering Geologists, November 2006.
46. Managing Earthquake Risk in Utah, Utah League of Cities and Towns Meeting, Arabasz and Pankow, September 2006.
47. Understanding and Living with Earthquake in Utah, Utah League of Cities and Towns Meeting (Auxiliary Program), Arabasz and Pankow, September 2006
48. Overview of Utah Seismicity & ShakeMaps, Utah Department of Transportation, Post-earthquake Bridge Inspection Workshop, June 2006.
49. Tools for Rapid Notification and Response, Utah Seismic Safety Commission: Emergency Managers Workshop, December 2005.
50. Utah's Earthquake Hazard, Woods Cross Town Hall Meeting, Woods Cross, Utah, October 2005.
51. Triggered Seismicity in Utah from the November 3, 2002, Denali Fault Earthquake, New Mexico Tech, Department of Earth & Environmental Science, February 2004.
52. Triggered Seismicity in Utah from the November 3, 2002, Denali Fault Earthquake, Utah State University, Department of Geology, Distinguished Lecturer Series, January 2004.
53. The Denali Park, Alaska Earthquake and Utah, Utah Seismic Safety Commission, January 2003.
54. ShakeMap Capabilities, Utah Seismic Safety Commission, January 2002.
55. Modeling Shear Wave Structure of the Subducting Kurile Slab Using Both Travel Time and Amplitude Residuals, University of Utah, Department of Geology and Geophysics Distinguished Lecture Series, September 2000.
56. Modeling Shear Wave Structure of the Subducting Kurile Slab Using Both Travel Time and Amplitude Residuals, Seismology Laboratory, California Institute of Technology, Spring 2000.