

CURRICULUM VITAE

ANNE F. SHEEHAN

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Education

Ph.D., Massachusetts Institute of Technology, Geophysics, 1991

Ph.D. Thesis, "Lateral Variation in Upper Mantle Temperature and Composition Beneath Mid-Ocean Ridges Inferred from Shear-Wave Propagation, Geoid, and Bathymetry"

ITT Fellow, Visiting Student/Researcher, University of Reading and Blacknest Seismological Laboratory, England, 1984-1985

B.S., University of Kansas, Geophysics (Highest Distinction and Honors), 1984

Senior honors thesis, "Interstation Phase Velocities in the Basin and Range"

Research Interests

Earthquake seismology, ocean bottom seismology, induced seismicity, structure of the Earth's crust and upper mantle, mountain building processes, active tectonics, GPS geodesy, magnetotellurics, shallow subsurface geophysics

Professional Experience

- 2006 - present *Professor*, Department of Geological Sciences, University of Colorado, Boulder, Colorado.
- 2000 - 2006 *Associate Professor*, Department of Geological Sciences, University of Colorado, Boulder, Colorado 80309
- 1993 - 2000 *Assistant Professor*, Department of Geological Sciences, University of Colorado, Boulder, Colorado 80309
- 1993 - present *Fellow* - Cooperative Institute for Research in Environmental Sciences (CIRES) University of Colorado, Boulder, Colorado
- 2010 – present *Associate Director for Solid Earth Sciences* - Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado, Boulder, Colorado
- 2015 *Visiting Professor*, University of Luxembourg, Luxembourg City, Luxembourg
- 2014 *Visiting Professor*, Earthquake Research Institute, University of Tokyo, Tokyo, Japan
- 2007 *Green Scholar, Visiting Professor*, Institute of Geophysics and Planetary Physics, Scripps Institution of Oceanography, University of California, San Diego
- 2000 - 2001 *Visiting Professor*, Victoria University, Wellington, New Zealand
- 1992 - 1993 *Research Assistant Professor*, Seismological Laboratory, University of Nevada, Reno, Nevada
- 1991 - 1992 *Postdoctoral Fellow*, Lamont-Doherty Geological Observatory, Columbia University, Palisades, New York
- 1985 - 1991 *Graduate Research Assistant*, Massachusetts Institute of Technology, Cambridge, Massachusetts

Honors and Awards

President, Seismology Section, American Geophysical Union	2019-
President-elect, Seismology Section, American Geophysical Union	2017-18
New Zealand Geophysics Prize (L. Wallace lead, with 7 coauthors)	2016
American Geophysical Union (AGU) Fellow	2014
College Scholar Award, University of Colorado College of Arts & Sciences	2014
EarthScope Speaker	2013
Erasmus Haworth Distinguished Alumni Award, University of Kansas Department of Geology	2009
Sloan Foundation Mentoring Award	2008
IRIS/SSA Distinguished Lecturer	2007
Green Scholar, Institute for Geophysics and Planetary Physics, Scripps Institution of Oceanography, University of California, San Diego	2007
CU Faculty Fellowship	2007
Emerging Leaders Program Fellow, CU President's Office	2005
NSF CAREER Award	1995

Professional Organizations

American Geophysical Union
Seismological Society of America
Society of Exploration Geophysicists
Geological Society of America

Field Experience

Chief Scientist, SKQ201816S, R/V Sikuliaq, Deployment of 30 ocean bottom seismometers and differential pressure gauges along Aleutian trench, Alaska, Alaska Amphibious Community Seismic Experiment (AACSE), Seward-Seward, AK, July 11-25, 2018.	
Weld County induced seismicity study, NE Colorado, 15 station telemetered earthquake network	2014-19
Hikurangi Ocean Bottom Investigation of Tremor and Slow Slip (HOBITSS) R/V Tangaroa, May 10-20, 2014, deploy 35 ocean bottom seismometers, ocean bottom pressure recorders, and electromagnetic instruments	2014
R/V Roger Revelle, recover HOBITSS ocean bottom seismometers, pressure recorders, electromagnetic instruments, June 19-30, 2015, Napier-Napier	2015
Deep Rift Electrical Resistivity (DRIFTER) experiment Geophysical electromagnetics (Magnetotellurics) Rio Grande Rift, Colorado and New Mexico	2012, 2013
Bighorns Arch Seismic Experiment (BASE), Broadband seismometer deployment, Sheridan, Wyoming	2009
Intermediate period seismometer deployment, Buffalo, Wyoming	2010
Active source experiment, Buffalo and Shell, Wyoming	2010
New Zealand Ocean Bottom Seismometer deployment, Marine Observations of Anisotropy near Aeteroa (MOANA) Cruise TN229, R/V Thomas G. Thompson, Lyttleton-Lyttleton, New Zealand, deploy 30 Ocean Bottom Seismometers	2009
Cruise RR1002, R/V Roger Revelle, Wellington-Wellington, New Zealand,	

recover 30 (28) Ocean Bottom Seismometers	2010
Boulder Creek Critical Zone Observatory, Shallow subsurface geophysics (seismic refraction, GPR, ERT)	2008, 2009
EM31 ground conductivity, DC electrical resistivity	2012
Bijou Creek Terrestrial Lidar Survey, SE of Denver, Colorado,	2008
Instructor, CU Geophysics Field Course	1994, 1996, 1997, 1999, 2002, 2006, 2018
Rio Grande Rift GPS project, Colorado and New Mexico	2006-2013
Joya de Ceren, El Salvador, Electrical resistivity survey of archeological site	2005
Himalayan Nepal Tibet Seismic Experiment (HIMNT), Nepal,	2001-2002
New Zealand Marlborough Fault Zone Seismic Experiment,	2000-2001
Continental Dynamics of the Rocky Mountains (CDROM),	1999-2000
Front Range Seismic Network/ GEOL 4740 Class deployment, Instructor,	1996-1998
Colorado Plateau/Great Basin PASSCAL seismic experiment, Utah	1994-1995
Southern Sierra Seismic Experiment, California	1993
UNR Little Skull Mountain aftershock deployment, Nevada	1992-1993
PASSCAL Rocky Mountain Front Experiment,	1992
Scientific Crew, R/V Moana Wave, Cruise MW8801 (Australian - Antarctic Discordance),	1988
MIT Geophysics Field Camp, Panamint Valley, California,	1987
University of Kansas Geology Field Camp, Canon City, Colorado,	1982
Kansas Geological Survey field assistant - shallow reflection, heat flow	1980-1983

Publications

Books

Burger, R. L., A. F. Sheehan, and C. H. Jones, Introduction to Applied Geophysics: Exploring the Shallow Subsurface, 554 pages, *W. W. Norton Publishers*, New York, 2006.

Peer-reviewed Papers

Submitted or in press

- Abers, G., A. Adams, P. Haeussler, E. Roland, P. Shore, S. Schwartz, A. Sheehan, D. Shillington, S. Webb, D. Wiens, L. Worthington, AACSE: The Alaska Amphibious Community Seismic Experiment, EOS, submitted December 2018.
- Wang, Y., T. Maeda, K. Satake, M. Heidarzadeh, H. Su, A. Sheehan and A. Gusman, Tsunami data assimilation without a dense observation network, *Geophysical Research Letters*, submitted October 2018.
- Yarce, J., A. F. Sheehan, J.S. Nakai, S.Y. Schwartz, K. Mochizuki, M. K. Savage, L. M. Wallace, S. A. Henrys, S. C. Webb, Y. Ito, R. E. Abercrombie, B. Fry, H. Shaddox, E. K. Todd, Seismicity at the northern Hikurangi Margin, New Zealand, and investigation of the potential spatial and temporal relationships with a shallow slow slip event, submitted December 2018, *Journal of Geophysical Research*.
- Warren-Smith, E., B. Fry, L. Wallace, E. Chon, S. Henrys, A. Sheehan, K. Mochizuki, S. Schwartz, Episodic stress and fluid pressure cycling in subducting crust during slow slip events, revised January 2019, *Nature Geoscience*.
- Feucht, D. W., P. A. Bedrosian, and A. F. Sheehan, Lithospheric signature of late Cenozoic extension in electrical resistivity structure of the Rio Grande rift, New Mexico, USA, revised January 2019, *Journal of Geophysical Research - Solid Earth*, 2019.

Schulte-Pelkum, V., G. Monsalve, A. F. Sheehan, P. Shearer, F. Wu, and S. Rajaure, Mantle earthquakes and aseismic high-velocity lower crust in the Himalayan collision zone, Submitted to *Geology*, in review, 2019.

Published

- 89 Murray, K., M. Murray, and A. Sheehan (2018), Active deformation near the Rio Grande Rift and Colorado Plateau as measured by continuous GPS, *Journal of Geophysical Research: Solid Earth*, 123, <https://doi.org/10.1029/2018JB016626>.
- 88 Sheehan, A. F., A. R. Gusman, and K. Satake (2019), Improving forecast accuracy with tsunami data assimilation: The 2009 Dusky Sound, New Zealand, tsunami, *Journal of Geophysical Research: Solid Earth*, 124, <https://doi.org/10.1029/2018JB016575>.
- 87 Todd, E. K., Schwartz, S. Y., Mochizuki, K., Wallace, L. M., Sheehan, A. F., Webb, S. C., et al. (2018). Earthquakes and tremor linked to seamount subduction during shallow slow slip at the Hikurangi Margin, New Zealand. *Journal of Geophysical Research: Solid Earth*, 123. <https://doi.org/10.1029/2018JB016136>
- 86 Zietlow, D. W., A. F. Sheehan, and M. J. Bernardino, Teleseismic S-wave tomography of South Island, New Zealand upper mantle, *Geosphere*, 14(3), 1343-1364, doi:10.1130/GES01591.1, 2018.
- 85 Feucht, D. W., A. F. Sheehan, and P. A. Bedrosian, Magnetotelluric imaging of lower crustal melt and lithospheric hydration in the Rocky Mountain Front transition zone, Colorado, USA, *J. Geophys. Res.: Solid Earth*, 122, 9489-9510, doi:10.1002/2017JB014474, 2017.
- 84 Nakai, J., M. Weingarten, A. F. Sheehan, S. L. Bilek, S. Ge, Understanding spatial patterns of small-magnitude earthquakes in the Raton Basin from 2008-2010 in the context of larger magnitude historical and post-2010 seismicity, *Journal of Geophysical Research: Solid Earth*, 122, 8051-8065, <https://doi.org/10.1002/2017JB014415>.
- 83 Brown, M.R.M., S. Ge, A. F. Sheehan, J. Nakai, Evaluating the effectiveness of induced seismicity mitigation: Numerical modeling of wastewater injection near Greeley, Colorado, *J. Geophys. Res. Solid Earth*, 122, doi:10.1002/2017JB014456.
- 82 Yeck, W.L., A.F. Sheehan, J.C. Stachnik, F.C. Lin (2017) , Offshore Rayleigh group velocity observations of the South Island, New Zealand, from ambient noise data, *Geophysical Journal International*, v. 209, 827-841, 2017, doi: 10.1093/gji/ggx054
- 81 Nakai, J. S., A. F. Sheehan, and S. L. Bilek (2017), Seismicity of the Rocky Mountains and Rio Grande Rift from the EarthScope Transportable Array and CREST temporary seismic networks, 2008–2010, *J. Geophys. Res. Solid Earth*, 122, doi:10.1002/2016JB013389.
- 80 Gusman, A. R., I. E. Mulia, K. Satake, S. Watada, M. Heidarzadeh, and A. F. Sheehan (2016), Estimate of tsunami source using optimized unit sources and including dispersion effects during tsunami propagation: The 2012 Haida Gwaii earthquake, *Geophys. Res. Lett.*, 43, 9819–9828, doi:10.1002/2016GL070140.
- 79 Colin T. O'Rourke, G. Eli Baker, and Anne F. Sheehan, Using P/S Amplitude Ratios for Seismic Discrimination at Local Distances, *Bulletin of the Seismological Society of America*, v. 106, no. 4, doi:10.1785/0120160035.
- 78 Yeck, W. L., A. F. Sheehan, H. M. Benz, M Weingarten, J Nakai, Rapid response, monitoring, and mitigation of induced seismicity near Greeley, Colorado, *Seismological Research Letters*, v. 87, no. 4, July/August 2016, doi:10.1785/0220150275.

- 77 Wallace, L. M., S. C. Webb, Y. Ito, K. Mochizuki, R. Hino, S. Henrys, S. Y. Schwartz, A. F. Sheehan, Slow slip near the trench at the Hikurangi subduction zone, New Zealand, *Science*, 06 May 2016, Vol. 352, Issue 6286, pp. 701-704, DOI: 10.1126/science.aaf2349
- 76 Ball, J. S., A. F. Sheehan, J. C. Stachnik, F.-C. Lin, W. L. Yeck, and J. A. Collins (2016), Lithospheric shear velocity structure of South Island, New Zealand, from amphibious Rayleigh wave tomography, *J. Geophys. Res. Solid Earth*, 121, 3686–3702, doi:10.1002/2015JB012726.
- 75 Zietlow, D. W., P. H. Molnar, and A. F. Sheehan (2016), Teleseismic *P* wave tomography of South Island, New Zealand upper mantle: Evidence of subduction of Pacific lithosphere since 45 Ma, *J. Geophys. Res. Solid Earth*, 121, 4427–4445, doi:10.1002/2015JB012624.
- 74 Harris, R., L. Wallace, S. Webb, Y. Ito, K. Mochizuki, H. Ichihara, S. Henrys, A. Trehu, S. Schwartz, A. Sheehan, D. Saffer, and R. Lauer, Investigations of shallow slow slip offshore of New Zealand (2016), *Eos*, 97, doi:10.1029/2016EO048945.
- 73 Gusman, A. R. A. F. Sheehan, K. Satake, M. Heidarzadeh, I. E. Mulia, and T. Maeda (2016), Tsunami data assimilation of Cascadia seafloor pressure gauge records from the 2012 Haida Gwaii earthquake, *Geophysical Research Letters*, vol. 43, issue 9, p. 4189-4196, doi:10.1002/2016GL068368.
- 72 O'Rourke, C. T., A. F. Sheehan, E. A. Erslev, and M. L. Anderson, Small-Magnitude Earthquakes in North-Central Wyoming Recorded during the Bighorn Arch Seismic Experiment Bulletin of the Seismological Society of America, vol. 106, no. 1, p. 281-288, doi:10.1785/0120150114
- 71 Worthington, L. L., K. C. Miller, E. A. Erslev, M. L. Anderson, K. R. Chamberlain, A. F. Sheehan, W. L. Yeck, S. H. Harder, and C. S. Siddoway (2015), Crustal structure of the Bighorn Mountains region: Precambrian influence on Laramide shortening and uplift in north-central Wyoming, *Tectonics*, 34, doi:10.1002/2015TC003840.
- 70 Sheehan, A. F., A. R. Gusman, M. Heidarzadeh, and K. Satake (2015), Array observations of 2012 Haida Gwaii tsunami using Cascadia Initiative absolute and differential seafloor pressure gauges, *Seismological Research Letters*, v. 86, no. 5, September/October 2015, doi: 10.1785/0220150108.
- 69 Karalliyadda, S. C., M. K. Savage, A. Sheehan, J. Collins, D. Zietlow, and A. Shelley (2015), S-wave splitting in the offshore South Island, New Zealand: Insights into plate-boundary deformation, *Geochem. Geophys. Geosyst.*, 16, doi:10.1002/2015GC005882.
- 68 McGarr, A., B. Bekins, N. Burkhardt, J. Dewey, P. Earle, W. Ellsworth, S. Ge, S. Hickman, A. Holland, E. Majer, J. Rubinstein, and A. Sheehan, Coping with earthquakes induced by fluid injection, *Science 20 February 2015: 347 (6224)*, 830-831. (DOI:10.1126/science.aaa0494).
- 67 Ball, J. S., A. F. Sheehan, J. C. Stachnik, F.-C. Lin, and J. A. Collins (2014), A joint Monte Carlo analysis of seafloor compliance, Rayleigh wave dispersion and receiver functions at ocean bottom seismic stations offshore New Zealand, *Geochem. Geophys. Geosyst.*, 15, 5051–5068, doi:10.1002/2014GC005412.
- 66 Yeck, W. L., A. F. Sheehan, M. Anderson, E. A. Erslev, K. C. Miller, C. S. Siddoway, Structure of the Bighorn Mountain region from teleseismic receiver function analysis: Implications for the mechanics of Laramide shortening, *J. Geophys. Res.*, 119, doi:10.1002/2013JB010769.

- 65 Godin, O. A., N. A. Zabolin, A. F. Sheehan, and J. A. Collins, Interferometry of infragravity waves off New Zealand, *J. Geophys. Res.-Oceans*, 119, doi:10.1002/2013JC009395, 2014.
- 64 Sheehan, A. F., T. L. de la Torre, G. Monsalve, G. A. Abers, and B. R. Hacker, Physical state of Himalayan crust and uppermost mantle: Constraints from seismic attenuation and velocity tomography, *J. Geophys. Res. Solid Earth*, 119, doi:10.1002/2013JB010601, 2014.
- 63 Zietlow, D. W., A. F. Sheehan, P. H. Molnar, M. K. Savage, G. Hirth, J. A. Collins, and B. H. Hager, Upper mantle seismic anisotropy at a strike slip boundary: South Island, New Zealand, *J. Geophys. Res. Solid Earth*, 119, doi:10.1002/2013JB010676, 2014.
- 62 O'Rourke, C., A. Sheehan, E. Erslev, and K. Miller, Estimating Basin Thickness using a High Density Passive Source Geophone Array, *Earth & Planetary Science Letters*, <http://dx.doi.org/10.1016/j.epsl.2013.10.035>, 2013.
- 61 Yeck, W., L., A. F. Sheehan, and V. Schulte-Pelkum, Sequential H-K Stacking to obtain accurate crustal thicknesses beneath sedimentary basins, *Bulletin of the Seismological Society of America*, vol. 103, no. 3, p. 2142-2150, doi: 10.1785/0120120290, 2013.
- 60 Godin, O. A., N. A. Zabolin, A. F. Sheehan, Z. Yang, and J. A. Collins, Power spectra of infragravity waves in a deep ocean, *Geophysical Research Letters*, V. 40, no. 10, p. 2159-2165, doi: 10.1002/grl.50418, 2013.
- 59 Wech, A.G., A. F. Sheehan, C. M. Boese, J. Townend, and T. A. Stern, Tectonic tremor recorded at ocean bottom seismometers, *Seismological Research Letters*, 84(5), p. 752-758, doi: 10.1785/0220120184, 2013.
- 58 Boese, C.M., T. A. Stern, J. Townend, S. Bourguignon, A. Sheehan, and E. G. C. Smith, E.G.C., Sub-crustal earthquakes within the Australia-Pacific plate boundary zone beneath the Southern Alps, New Zealand, *Earth and Planetary Science Letters*, 376, p. 212-219, 2013.
- 57 Yang, Z., A. F. Sheehan, J. A. Collins, G. Laske, The character of seafloor ambient noise recorded offshore New Zealand: Results from the MOANA ocean bottom seismic experiment, *Geochem. Geophys. Geosyst.*, Vol. 13, Q1001, doi:10.1029/2012GC004201, 2012.
- 56 Stachnik, J. C., A. Sheehan, D. Zietlow, Z. Yang, J. Collins, and A. Ferris (2012), Determination of ocean bottom seismometer orientation via Rayleigh wave polarization, *Seismol. Res. Lett.*, 83(4), 704-713, 2012.
- 55 Berglund, H.T., A.F. Sheehan, M. Murray, M. Roy, A. R. Lowry, R.S. Nerem, and F. Blume, Distributed Deformation across the Rio Grande Rift, Great Plains, and Colorado Plateau, *Geology*, 40, 23-36, doi:10.1130/G32418.1, 2012.
- 54 Yang, Z., A. Sheehan, W. Yeck, K. Miller, E. Erslev, L. Worthington, and S. Harder, Imaging basin structure with teleseismic virtual source reflection profiles, *Geophys. Res. Lett.*, 39, L02303, doi:10.1029/2011GL050035, 2012.
- 53 Befus, K.M., A. F. Sheehan, M. Leopold, S. P. Anderson, and R. S. Anderson, Seismic constraints on critical zone architecture, Boulder Creek Watershed, Colorado, *Vadose Zone J.*, 10:915-927, doi:10.2136/vzj2010.0108, 2011.
- 52 Collins, J., P. Molnar, and A. Sheehan, Multibeam bathymetric surveys of submarine volcanoes and mega-pockmarks on the Chatham Rise, New Zealand, *New Zealand Journal of Geology and Geophysics*, 54:3, 329-339, doi: 10.1080/00288306.2011.589860, 2011.

- 51 Schulte-Pelkum, V., G. Biasi, A. Sheehan, and C. Jones, Differential motion between upper crust and lithospheric mantle in the central Basin and Range, *Nature Geoscience*, v. 4, 619-623, doi:10.1038/NGEO1229, 2011.
- 50 Yang, Z., A. Sheehan, and P. Shearer, Stress-induced upper crustal anisotropy in southern California, *J. Geophys. Res.*, doi:10.1029/2010JB007655, 2011.
- 49 Huang, G. C., F. T. Wu, S. W. Roecker, and A. F. Sheehan, Lithospheric structure of the central Himalaya from 3-D tomographic imaging, *Tectonophysics*, 475, 524-543, 2009. <http://dx.doi.org/10.1016/j.tecto.2009.06.023>
- 48 Monsalve, M., P. J. McGovern, and A. Sheehan, Mantle fault zones beneath the Himalayan Collision: Flexure of the continental lithosphere, *Tectonophysics*, 477, 66-76, 10.1016/j.tecto.2008.12.014, 2009.
- 47 Sheehan, A. F., T. de la Torre, G. Monsalve, V. Schulte-Pelkum, R. Bilham, F. Blume, R. Bendick, F. Wu, M. R. Pandey, S. Sapkota, and S. Rajaure, Earthquakes and crustal structure of the Himalaya from the Himalayan Nepal Tibet Seismic Experiment (HIMNT), *Journal of the Nepal Geological Society*, V. 28, p. 1-8, 2008.
- 46 Bailey, A. R., and A. F. Sheehan, Shaking up the lesson plan, *Seismological Research Letters*, v. 79, n. 6, 879-880, 2008.
- 45 Monsalve, G., C. Viviano, and A. Sheehan, An assessment of Colorado seismicity from a statewide temporary seismic station network, *Seismological Research Letters*, v. 79, n. 5, p. 645-652, 2008.
- 44 Monsalve, G., A. Sheehan, C. Rowe, S. Rajaure, Seismic structure of the crust and upper mantle beneath the Himalayas: Evidence for eclogitization of lower crustal rocks in the Indian Plate, *Journal of Geophysical Research*, v. 113, B8, B08315, doi: 10.1029/2007JB005424, 2008.
- 43 De la Torre, T. L., G. Monsalve, A. F. Sheehan, S. Sapkota, F. Wu (2007) Earthquake processes of the Himalayan collision zone in eastern Nepal and the southern Tibetan Plateau, *Geophysical Journal International* 171 (2), 718–738. doi:10.1111/j.1365-246X.2007.03537.x
- 42 Boyd, O. S., M. K. Savage, A. F. Sheehan, and C. H. Jones, Illuminating the plate interface structure beneath Cook Strait, New Zealand, with receiver functions, *J. Geophys. Res.*, Vol. 112, B06310, doi:10.1029/2006JB004552, 2007.
- 41 Monsalve, G., A. Sheehan, V. Schulte-Pelkum, S. Rajaure, M. R. Pandey, and F. Wu, Seismicity and one-dimensional velocity structure of the Himalayan collision zone: Earthquakes in the crust and upper mantle, *Journal of Geophysical Research*, Vol. 111, B10301, doi:10.1029/2005JB004062, 2006.
- 40 Schulte-Pelkum, V., G. Monsalve, A. F. Sheehan, M. Pandey, S. Sapkota, R. Bilham, and F. Wu, Imaging the Indian subcontinent beneath the Himalaya, *Nature*, v. 435, pp. 1222-1225, 30 June 2005|doi:10.1038/nature03678, 2005.
- 39 De la Torre, T., and A. F. Sheehan, Broadband seismic noise analysis of Himalayan Nepal Tibet Seismic Experiment, *Bull. Seismol. Soc. Am.*, v. 95, 1202-1208, doi:10.1785/0120040098, 2005.
- 38 Sheehan, A. F., V. Schulte-Pelkum, O. Boyd, and C. Wilson, Passive source seismology of the Rocky Mountain region, in *The Rocky Mountain Region: An Evolving Lithosphere, Geophysical Monograph Series 154*, 10.1029/154GM23, p. 309-315, 2005.
- 37 Boyd, O. S., and A. F. Sheehan, Attenuation tomography beneath the Rocky Mountain Front: Implications for the physical state of the upper mantle, in *The Rocky Mountain Region: An*

- Evolving Lithosphere, Geophysical Monograph Series 154*, 10.1029/154GM27, p. 361-377, 2005.
- 36 Fox, O. C., and A. F. Sheehan, Upper mantle anisotropy beneath Precambrian Province boundaries, Southern Rocky Mountains, in *The Rocky Mountain Region: An Evolving Lithosphere, Geophysical Monograph Series 154*, 10.1029/154GM26, p. 347-360, 2005.
- 35 Lastowka, L. A., and A. F. Sheehan, CDROM interstation Pn study across the Rio Grande Rift, in *The Rocky Mountain Region: An Evolving Lithosphere, Geophysical Monograph Series 154*, 10.1029/154GM28, p. 379-384, 2005.
- 34 Boyd, O. S., C. H. Jones, and A. F. Sheehan, Foundering lithosphere imaged beneath the Southern Sierra Nevada, California, *Science*, 305, 660-662, 2004.
- 33 Wilson, C. K., C. H. Jones, P. Molnar, A. F. Sheehan, and O. Boyd, Distributed deformation in the lower crust and upper mantle beneath a continental strike-slip fault zone: Marlborough Fault System, South Island, New Zealand, *Geology*, 32, 837-840, doi:10.1130/G20657.1, 2004.
- 32 Gilbert, H. J., and A. F. Sheehan, Images of crustal variations in the intermountain west, *Journal of Geophysical Research*, Vol. 109, B03306, doi:10.1029/2003JB002730, 2004.
- 31 Gilbert, H. J., A. F. Sheehan, K. G. Dueker, P. Molnar, Receiver functions in the western United States, with implications for upper mantle structure and dynamics, *J. Geophys. Res.* Vol. 108 No. B5, 10.1029/2001JB001194, 2003.
- 30 Blume, F., and A. F. Sheehan, Quantifying seismic hazard in the Southern Rocky Mountains through GPS measurements of crustal deformation, in *Engineering Geology in Colorado: Contributions, Trends, and Case Histories*, eds. D. Boyer, P. Santi, and W. Rogers, Association of Engineering Geologists Special Publication No. 15, Colorado Geological Survey Special Publication 55, 2003.
- 29 Sheehan, A. F., J. D. Godchaux, and N. Hughes, Colorado Front Range Seismicity and Seismic Hazard, in *Engineering Geology in Colorado: Contributions, Trends, and Case Histories*, eds. D. Boyer, P. Santi, and W. Rogers, Association of Engineering Geologists Special Publication No. 15, Colorado Geological Survey Special Publication 55, 2003.
- 28 Karlstrom, K. E., S. A. Bowring, K. R. Chamberlain, K. G. Dueker, T. Eshete, E. A. Erslev, G. L. Farmer, M. Heizler, E. D. Humphreys, R. A. Johnson, G. R. Keller, S. A. Kelley, A. Levander, M. B. Magnani, J. P. Matzel, A. M. McCoy, K. C. Miller, E. A. Morozova, F. J. Pazzaglia, C. Prodehl, H. M. Rumpel, C. A. Shaw, A. F. Sheehan, E. Shoshitaishvili, S. B. Smithson, C. M. Snelson, L. M. Stevens, A. R. Tyson, and M. L. Williams, Structure and evolution of the lithosphere beneath the Rocky Mountains: Initial results from the CD-ROM experiment, *GSA Today*, v. 12, no. 3, p. 4-10, March 2002.
- 27 Wannamaker, P. E., J. M. Bartley, A. F. Sheehan, C. H. Jones, A. R. Lowry, Trevor A. Dumitru, Todd A. Ehlers, W. S. Holbrook, G. L. Farmer, M. J. Unsworth, D. B. Hall, D. S. Chapman, D. A. Okaya, B. E. John, and J. A. Wolfe, Great Basin-Colorado Plateau transition in central Utah: An interface between active extension and stable interior, in *The Geologic Transition, High Plateaus to Great Basin: A symposium and field guide: The Mackin Volume*, ed. by M. C. Erskine, J. E. Faulds, J. M. Bartley and P. Rowley, Utah Geol. Assoc. UGA_30/Amer. Assoc. Petr. Geol. Guideb. GB78, Cedar City, Utah, September 20-23, p. 1-38, 2001.
- 26 Smith, K.D., J. N Brune, D. dePolo, M. K. Savage, R. Anooshehpour, and A. F. Sheehan, The 1992 Little Skull Mountain earthquake sequence, Southern Nevada Test Site, *Bull. Seismol. Soc. Am.*, 91, 1595-1606, 2001.

- 25 Gilbert, Hersh J., A. F. Sheehan, D. A. Wiens, K. G. Dueker, L. M. Dorman, J. Hildebrand, and S. Webb, Upper mantle discontinuity structure in the region of the Tonga Subduction Zone, *Geophys. Res. Lett.*, 28, 1855-1858, 2001.
- 24 Lastowka, L. A., A. F. Sheehan, and J. M. Schneider, Seismic evidence for partial delamination model for Colorado Plateau uplift, *Geophys. Res. Lett.*, 28, 1319-1322, 2001.
- 23 Hazler, S. E., A. Sheehan, D. McNamara, and W. Walter, One-dimensional shear velocity structure of northern Africa from Rayleigh wave group velocity dispersion, *Pure Appl. Geophys.*, 158, 1475-1493, 2001.
- 22 Sheehan, A. F., Microearthquake study of the Colorado Front Range: Combining research and teaching in seismology, *Seismol. Res. Lett.*, 71, 175-179, 2000.
- 21 Savage, M. K., and A. F. Sheehan, Seismic anisotropy and mantle flow from the Great Basin to the Great Plains, western United States, *Journal of Geophysical Research*, 105, 13715-13734, 2000.
- 20 Sheehan, A. F., P. M. Shearer, H. Gilbert, and K. G. Dueker, Seismic migration processing of P-SV converted phases for mantle discontinuity structure beneath the Snake River Plain, western United States, *Journal of Geophysical Research*, v. 105, p. 19055-19065, 2000.
- 19 Bhattacharyya, J., A. F. Sheehan, K. Tiampo, and J. Rundle, Using a genetic algorithm to model broadband regional waveforms for crustal structure in the western United States, *Bull. Seismol. Soc. Am.*, 89, 202-214, 1999.
- 18 Bump, H., and A. F. Sheehan, Crustal thickness variations across the Northern Tien Shan mountains from teleseismic receiver functions, *Geophysical Research Letters*, 25, 1055-1058, 1998.
- 17 Dueker, K. G., and A. F. Sheehan, Mantle discontinuity structure beneath the Colorado Rocky Mountains and High Plains, *J. Geophys. Res.*, 103, 7153-7169, 1998.
- 16 Forsyth, D. W., D. S. Scheirer, S. C. Webb, L. M. Dorman, J. A. Orcutt, A. J. Harding, D. K. Blackman, J. Phipps Morgan, R. S. Detrick, Y. Shen, C. J. Wolfe, P. Canales, D. R. Toomey, A. F. Sheehan, S. C. Solomon, and W. S. D. Wilcock, Imaging the deep structure beneath a mid-ocean ridge: Overview of the seismological component of the MELT experiment, *Science*, 280, 1215-1218, 1998.
- 15 Shen, Y., A. Sheehan, K. Dueker, C. de Groot-Hedlin, and H. Gilbert, Mantle discontinuity structure beneath the southern East Pacific Rise (MELT experiment region) from P-to-S converted phases, *Science*, 280, 1232-1235, 1998.
- 14 Keller, G. R., C. M. Snelson, A. F. Sheehan, and K. G. Dueker, Geophysical studies of crustal structure in the Rocky Mountain region: A review, *Rocky Mountain Geology*, 33, 217-228, 1998.
- 13 Lerner-Lam, A., A. Sheehan, S. Grand, E. Humphreys, K. Dueker, E. Hessler, H. Guo, D. K. Lee, and M. Savage, Deep structure beneath the Southern Rocky Mountains from the Rocky Mountain Front broadband seismic experiment, *Rocky Mountain Geology*, 33, 199-216, 1998.
- 12 Dueker, K. G., and A. F. Sheehan, Mantle discontinuity structure from mid-point stacks of converted P to S waves across the Yellowstone hotspot track, *Journal of Geophysical Research*, 102, 8313-8327, 1997.
- 11 Ozalaybey, S., M. K. Savage, A. F. Sheehan, J. N. Louie, and J. N. Brune, Shear wave velocity structure in the northern Basin and Range province from the combined analysis of receiver functions and surface waves, *Bulletin of the Seismological Society of America*, 87, 183-199, 1997.

- 10 Sheehan, A. F., C. H. Jones, M. K. Savage, *S. Ozalaybey, and *J. M. Schneider, Contrasting lithospheric structure beneath the Colorado Plateau and Great Basin: Initial results from Colorado Plateau - Great Basin PASSCAL experiment, *Geophysical Research Letters*, *24*, 2609-2612, 1997.
- 9 Savage, M. K., A. F. Sheehan, and A. L. Lerner-Lam, Teleseismic shear-wave splitting observations from PASSCAL Rocky Mountain Front experiment, *Geophysical Research Letters*, *23*, 2267-2270, 1996.
- 8 Sheehan, A. F., G. A. Abers, A. L. Lerner-Lam, and C. H. Jones, Crustal thickness variations across the Colorado Rocky Mountains from teleseismic receiver functions, *J. Geophys. Res.*, *100*, 20391-20404, 1995.
- 7 Sheehan, A.F., and S.C. Solomon, Differential shear wave attenuation and its lateral variation in the north Atlantic region, *J. Geophys. Res.*, *97*, 15339-15350, 1992.
- 6 Douglas, A., A.F. Sheehan, and R.C. Stewart, On the onset of PP and other mini-max phases, *Geophys. J. Int.*, *108*, 394-398, 1992.
- 5 Douglas, A., A.F. Sheehan, and R.C. Stewart, Northern Chile earthquake of 1980 May 26: Evidence of unilateral fracture, *Geophys. J. Int.*, *110*, 201-210, 1992.
- 4 Sheehan, A.F., and S.C. Solomon, Joint inversion of shear wave travel time residuals, geoid, and depth anomalies along the Mid-Atlantic Ridge: Implications for upper mantle temperature and compositional variations, *J. Geophys. Res.*, *96*, 19,981-20,009, 1991.
- 3 Sheehan, A.F., and M.K. McNutt, Constraints on thermal and mechanical structure of the oceanic lithosphere at the Bermuda Rise from geoid height and depth anomalies, *Earth Planet. Sci. Lett.*, *93*, 377-391, 1989.
- 2 Riedesel, M.A., T.H. Jordan, A.F. Sheehan, and P.G. Silver, Moment-tensor spectra of the 19 Sept 85 and 21 Sept 85 Michoacan, Mexico, earthquakes, *Geophys. Res. Lett.*, *13*, 609-612, 1986.
- 1 Sheehan, A.F., and D.W. Steeples, Sensitivity of Kansas Microearthquake Network, *Earthquake Notes*, *54*, 13-20, 1983.

Teaching Activities

Courses Taught (partial list)

- Introduction to Physical Geology (GEOL 1010), 2000, 2003, 2005, 2008, 2009, 2010, 2012, 2016
Freshman level introduction to geological sciences
- Principles of Geophysics (GEOL 4130), 1995, 1996, 1998, 1999, 2000, 2002, 2003, 2005, 2006, 2007, 2009, 2010, 2012, 2013, 2014, 2016, 2017, 2018, 2019
Senior level course introducing key principles of geophysics to Geology and Geophysics students. Until 1998 included lab covering seismic, gravity, and magnetism experiments and exercises.
- Field Geophysics (GEOL 4714/5714), 1996, 1997, 1999, 2002, 2006, 2018
Geophysics field course for undergraduate geology and geophysics students and graduate engineering, archaeology, and geology students. Includes field experiments and subsequent analysis, makes use of computer laboratory exercises.
- Geodynamics (GEOL 5750), 1997
Graduate course in continuum physics applied to geologic problems.
- Observational Seismology (GEOL/PHYS 6650), 1997

- Graduate geophysics course on applied earthquake seismology. Emphasis on waveform analysis.
- Geophysical Inverse Theory (GEOL/PHYS 6670), 1996, 1999, 2006, 2009, 2012, 2015
Graduate geophysics course on application of inverse theory to problems in geophysics, engineering, and atmospheric science. Rigorous theoretical development, applications, computer exercises.
- Graduate Seminar in Geophysics (GEOL/PHYS/ASTR 6650), Spring 2003, Fall 2010, Fall 2011. Fall 2018.
- Graduate Seminar: Induced Earthquakes (led by Abbie Liel), Fall 2016, Spring 2019
- Graduate Seminar: Magnetotellurics (with Paul Bedrosian), Spring 2013
- Graduate Seminar: Geomagnetism (with Manoj Nair), Spring 2016
- Graduate Seminar: Earthquake Source Mechanics (GEOL 6650), Fall 2013
- Graduate Seminar: Earthquake Seismology (with Craig Jones), Fall 2017
- Graduate Seminar: Introduction to Geological Sciences Faculty (GEOL 5700), Fall 2011.
- Earth and Planetary Physics I, Seismology (GEOL/PHYS/ASTR 6610), Spring 2000, Spring 2002, Spring 2011. Introduction to seismology and wave propagation at the graduate level.

Short Courses Taught

- International Association of Seismology and Physics of the Earth's Interior (IASPEI), General Assembly 2005, Post-conference training school, Tomography short course, Departamento de Geofisica, University of Chile, Santiago, Chile, October 2005.
- Incorporated Research Institutions for Seismology (IRIS), Summer Intern Training School, New Mexico Tech, May 2006. Lectures on geophysical inverse theory, earthquake focal mechanisms and moment tensors, receiver functions, Himalayan seismotectonics.
- Cooperative Institute for Deep Earth Research (CIDER), Summer program – tutorial and workshop, Kavli Institute of Theoretical Physics, University of California, Santa Barara, July 16 – August 4, 2006. Lecture and computer tutorial on receiver functions.
- Instructor, Teaching Geodesy in the 21st Century – an ‘On the Cutting Edge’ Follow-on Workshop, 2010 UNAVCO Science Workshop premeeting workshop, Monday, March 8, 2010.

Ph.D. Theses Directed

- Gilbert, Hersh, Ph.D. 2001, “Thermal and compositional structure of the upper mantle”
- Boyd, Oliver, Ph.D. 2004, “The Heterogeneous Upper Mantle: Insights from Seismology”
- De la Torre, Thomas, Ph.D. 2007, “Upper Lithospheric Seismic Characteristics Beneath the Himalaya and the Southern Tibetan Plateau”
- Monsalve, Gaspar, Ph.D. 2007, “Deformation and seismic structure of the upper lithosphere beneath the Himalayan collision”
- Yeck, William, Ph.D. 2015, “Investigation into the deformation of the lithosphere past and present using passive seismic methods: Case studies of the Wyoming Craton and South Island of New Zealand”
- Colin O’Rourke, PhD 2015, Imaging and investigating the crust of Wyoming using multiple seismic sources and techniques, Ph.D. Thesis, University of Colorado Boulder, 2015.
- Daniel Zietlow, PhD 2016, Four Brothers and a Waka: Investigating Lithospheric

- Accommodation of Shear and Convergence Underlying the South Island of New Zealand., Ph.D. Thesis, University of Colorado Boulder, 2016.
- Justin Ball, PhD 2016, Passive seismoacoustic imaging from the seafloor to the lithosphere: Methods and applications to New Zealand and Ascension Island, Ph.D. Thesis, University of Colorado Boulder, 2016.
- Daniel Feucht, PhD 2017, Magnetotelluric imaging of lithospheric modification in the Rio Grande Rift, Colorado and New Mexico, USA, Ph.D. thesis, University of Colorado Boulder, 2017.
- Jenny Nakai, PhD 2018, Earthquake studies of Continental Rift Deformation, Human-Induced Seismicity, and Subduction Zone Processes, Ph.D. Thesis, University of Colorado, 2018.
- Plescia, Steven, 2014-
- Yarce, Jefferson, 2015-
- Schepf, Neesha, 2015-
- Chon, Enrique, 2017-

Master's Students Supervised

- Bump, Heidi, M.S., "Study of the crustal structure of the Northern Tien Shan Mountain Belt, Kyrgyzstan, from teleseismic data", 1995.
- Schneider, Jeffrey M., M.S., "Crustal and upper mantle structure of the Colorado Plateau and Eastern Basin and Range", 1997.
- Hazler, Shannon, M.S., "One-dimensional velocity structure of Northern Africa as determined by Rayleigh wave group velocity dispersion", 1998.
- Lastowka, Lynda A., M.S., "The uppermost mantle beneath the southwestern United States", 2001.
- Fox, Otina, M.S., "Seismic anisotropy across Precambrian province boundaries : southern Rocky Mountain region", 2002.
- Rystrom, Victoria, M.S., "Structure of the Tucson Basin, Arizona from gravity and aeromagnetic data", 2003.
- Berglund, Henry, M.S. 2010, "Geodetic Measurements of Deformation in the Rio Grande Rift Region", 2010.
- Befus, Kevin, M.S. 2010, "Applied geophysical characterization of the shallow subsurface: Towards quantifying recent landscape evolution and current processes in the Boulder Creek watershed, Colorado", 2010.
- Kurz, Ivan, M.S. 2017, Studies of induced seismicity, Weld County, Colorado. Plan II M.S. 2017.
- Bell, Jackson, 2018-
- Zhang, Melody, 2018-
- Clifford, Thomas, 2019-

Postdoctoral Associates

- Dr. Ken Dueker, 1994-99. Deep discontinuity structure beneath the western United States.
- Dr. Joydeep Bhattacharyya, 1995-97. Inversion of regional waveforms for crustal structure
- Dr. Frederick Blume, 2001-2003. Colorado GPS experiment. Himalayan Nepal Tibet Seismic Experiment.
- Dr. Vera Schulte-Pelkum, 2002-2004. Himalayan converted wave seismic imaging.
- Dr. Gaspar Monsalve, 2007-2008. Himalayan seismotectonics, flexural modeling.
- Dr. Hersh Gilbert, 2001-2. Deep discontinuity imaging.

Dr. Zhaohui Yang, 2009 – 2011. Bighorns EarthScope project and New Zealand OBS experiment
Dr. Joshua Stachnik, 2010 - 2011, Bighorns and New Zealand OBS experiment
Dr. Steven Hansen, 2013-14. Western US and New Zealand seismic imaging
Dr. Justin Ball, 2016-18. Ocean hydroacoustics, induced seismicity.
Dr. Daniel Feucht, 2017-2018. Magnetotellurics and electric grid geohazard.
Dr. Md. Jakir Hossen, 2018- . Tsunami studies, time-reverse imaging, adjoint methods.

Undergraduate Students

Have mentored over 50 undergraduate students on research and field experiences including IRIS interns (8), RESESS interns (2), CU UROP, Department of Geological Sciences Mentorships, NSF REU, and field assistants.

Professional Service (partial list)

Incorporated Research Institutions for Seismology (IRIS)

Chair, Ocean Bottom Instrumentation Pool Oversight Committee (OBSIP OC), 2015-2019
Coordinating Committee, IRIS, 2016-2018
Session organizer, IRIS workshop, 2018
Special interest group organizer, IRIS workshop, 2018
Community Advisor, IRIS Early Career Investigators Group, 2013
Program Committee, IRIS National Meeting, 2012
IRIS Planning Committee, 2011-2013
IRIS National Meeting Technical Program Committee, 2011-2012
IRIS Board of Directors, 2005-2008
Program for Array Studies of the Continental Lithosphere (Pascal)
 Standing Committee, 2002 – 2004
Pascal Strategic Plan Committee Chair and Workshop Organizer, 2004-2005
Global Seismic Network Committee, 1997-1999, USArray subcommittee chair, 1998
Deep Earth Observatories on the Seafloor (DEOS), IRIS GSN liaison, 1998-1999

EarthScope

EarthScope Speaker, 2013
Pre-GSA EarthScope workshop organizer, 2013
EarthScope National Meeting, Organizing Committee, 2009

Ocean Drilling Program

Lithosphere Panel, 1993-1996
Liaison to Ocean Seismic Network and International Ocean Network, 1994-1996

American Geophysical Union

Seismology Section, President, 2019-
Seismology Section, President-elect, 2017- 2018
Seismology Section, Fellows committee, 2016- 2018
Outstanding student presentation awards judge, 2016-2018
Paul Silver Award Committee, 2017-2018
Gutenberg Lecture Committee, 2014-2015
Seismology section nominating committee, chair, 2012, member, 2018
Deep Interior focus group student awards committee, 2009

Geological Society of America

Pardee Symposium convenor, 2013, National GSA, Denver

Pardee Symposium invited lecture, October 2008, National GSA, Houston
State of Colorado
Colorado Earthquake Hazard Mitigation Council, 2000-2009
Pro bono advising on earthquake seismology to COGCC and CGS
United States Geological Survey (USGS)
National Earthquake Hazard Program Review Panel, 2003
Advanced National Seismic System, Intermountain West Regional Working Group
member, Colorado Representative, 2001-2005
National Science Foundation
Panels 2006, 2011-2013 (IGERT, Geophysics)
NSF OBSIP OMO Facility Review Panel, Chair, 2015
Science Foundation Ireland
Earth Sciences Panel, 2008, 2009, 2010, 2011, 2017
Colorado School of Mines, Golden, Colorado
Visiting Committee, Department of Geophysics, Colorado School of Mines, 2006
Mentor, Colorado School of Mines Women in Geophysics Program, 2004-06
Federal Emergency Management Agency (FEMA)
QuakeSmart workshop, invited speaker, 2018
Review articles for Journal of Geophysical Research, Earth and Planetary Science Letters,
Tectonophysics, Bulletin of the Seismological Society of America, Tectonics,
Geophysical Research Letters, Physics of the Earth and Planetary Interiors, Geophysical
Journal International, Eos, Canadian Journal of Earth Sciences, Pure and Applied
Geophysics, G-cubed, Journal of Earthquake Engineering, Space Science Reviews,
Society of Exploration Geophysicists
Review proposals for NSF Geophysics, NSF IGERT, NSF Ocean Sciences, NSF EarthScope,
DOE, German Research Foundation, New Zealand Marsden Fund
Expert review
NRC Green River Power plant study 2012
Pioneer Natural Resources seismicity study 2013
Numerous external tenure and promotion evaluations

University Service, University of Colorado (past 8 years)
ARPAC internal reviewer, Physics, 2016-2017
CU Admitted students day, 2017, 2018
Arts and Sciences student welcome activity, Norlin Quad, 2018
Provost's Advisory Committee, 2016
Vice Chancellor's Advisory Committee (VCAC) 2012 – 2014
Evaluates all tenure and promotion cases for University of Colorado
Boulder Faculty Assembly Intercollegiate Athletics Committee 2009-2011
Boulder Faculty Assembly, Department of Geological Sciences representative, 2010 – 2012
Colorado Advantage Minority graduate student recruiting program, Forum, 2012, 2015

Department (Geological Sciences) and Institute (CIRES) Service (past 8 years, partial list)
CIRES Career Track Committee 2018, CIRES Visiting Fellows Committee 2017
Geology Graduate Admissions Committee 2014, 2017
Geodesy Faculty Search Committee, Chair 2015-16

Geology Curriculum committee 2012-2013, 2018-2019
GEOL Executive committee 2017-18
Colloquium Chair 2015
CIRES Faculty search committee, Cold regions climate, 2013
CIRES Associate Director for Solid Earth Sciences 2009-present
CIRES Innovative Research Program Committee 2009-2011

Invited or Visiting Lectures (since 2005, excluding conferences)

Los Alamos National Laboratory	2005
Kansas State University	2006
Michigan Tech	2007
University of New Mexico	2007
New Mexico Museum of Natural History	2007
University of Alaska at Fairbanks	2007
American Museum of Natural History	2007
Houston Museum of Natural Science	2007
Cleveland Museum of Natural History	2007
Smith College, Northhampton, Mass.	2007
California Insitute of Technology	2007
Scripps Institution of Oceanography	2007
San Diego State University	2007
University of Wyoming	2008
Southern Methodist University	2008
Colorado School of Mines	2009
University of Texas at El Paso	2009
Victoria University, Wellington, New Zealand	2010
National Universidad de Colombia sede Medellin	2011
USGS, Denver	2011
Northwestern	2013
St. Louis University	2013
University of Oklahoma	2013
University of California, Riverside	2013
University of California, San Diego	2013
Pomona College, Claremont, California	2013
Kyoto Japan Slow Slip Workshop	2014
Earthquake Research Institute, University of Tokyo, Ocean Hemisphere Research Group	2014
Institute Lecture	2014
National Research Institute for Earth Science and Disaster Prevention (NIED), Tskukuba, Japan	2014
Geological Survey of Japan (AIST), Tsukuba, Japan Institute of Earthquake and Volcano Geology	2014
Colorado Scientific Society	2015
Colorado Bar Association, Environmental Division	2015
Utrecht University, The Netherlands, Umbgrove Lecture	2015
University of Luxembourg, Luxembourg	2015

Colorado School of Mines	2015
University of Minnesota	2017
OBSIP Symposium, Plenary Speaker	2017
Colorado State University	2018
UNAVCO	2018
IRIS Workshop, Plenary Speaker	2018