

**Susan L. Bilek**

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New Mexico Institute of Mining and Technology  
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**Education:**

Ph.D. Earth Sciences/Geophysics, University of California, Santa Cruz, June 2001  
Ph.D Thesis title: *Multi-scale examination of seismogenic zone processes in circum-Pacific subduction zones*

M.S., Earth Sciences/Geophysics, University of California, Santa Cruz, June 1998.  
M.S. Thesis title: *Lower mantle heterogeneity beneath Eurasia imaged by parametric migration of shear waves*

B.S., with honors, Geosciences, minor in Economics, Penn State University, May 1996.

**Employment:**

Associate Professor, Earth and Environmental Sciences Dept., New Mexico Tech, 2008 – present

Assistant Professor, Earth and Environmental Sciences Dept., New Mexico Tech, 2003-2008

Turner Postdoctoral Fellow, Dept. Geological Sciences, University of Michigan, 2001-2003

Graduate research assistant, Earth Sciences Dept., UC Santa Cruz, 1996-2001

Geologist, USGS Earthquake Hazards Group, Menlo Park, May - August 1996.

**Recent Synergistic Activities:**

NSF MARGINS Steering Committee, 2008-2010

IRIS Global Seismographic Network Standing Committee, 2006-2009

Seismological Society of America Awards Committee (student awards chair) 2008-2010

New Mexico Tech EES Department Graduate Coordinator, 2008-2009

Associate Editor, *Seismological Research Letters*, 2005-present

Seismological Society of America Meeting Program Committee, 2007-2008

AGU Fall Meeting Program Committee Seismology Section, 2006-2007

NSF Geophysics Panel, Fall 2006

Reviewer: NSF, NERC, NNSA, Science, Nature, JGR, EPSL, BSSA, EPSL, GJI, Geology, GRL

**Current Students and Postdoctoral Associates**

John Morton, Jana Stankova-Pursley – M.S. students

Maya El-Hariri – Ph.D. student

Kimberly Schramm – post-doctoral research associate

Sarah Stanley – undergraduate research assistant

**Previous Graduate Student Advisees**

Candy Elliott, M.S., graduated 2007, now geologist with Geomatrix

**Teaching Experience:**

Earth Science 150 – Natural Hazards, NMT, 2005, 2006, 2008  
 Earth Science 448 – General Geophysics, NMT, 2006  
 Geophysics 525 – Tectonophysics, NMT, 2004, 2007  
 Geophysics 524 – Observational Earthquake Seismology, NMT, 2004, 2005, 2007  
 Geophysics/Geology 558 – Mechanics of Earthquakes and Faulting, NMT, 2006, 2007  
 Geophysics 523 – Theoretical Seismology, NMT, 2003  
 Geosciences 146 – Plate Tectonics, U. Michigan, 2002

**Professional Societies and Honors:**

2007                New Mexico Tech Distinguished Teacher Nominee  
 2001 - 2003        University of Michigan Turner Fellowship  
 2000                UC Institute of Geophysics and Planetary Physics Young Fellow  
 1996 – present    SSA and AGU member

**Recent Research Funding Record**

Dates	Project	Funding Agency	Amount
2005-2008	Finite element modeling of a subducted topographic high: Determining regional stress changes due to subducting features	NSF-Geophysics	\$132,235
2005-2008	Monitoring of Seismic Activity Near the WIPP Site	Washington TRU-Solutions (DOE)	\$370,252
2005-2007	Integrated studies of magmatic emplacement, deformation, and seismicity	Los Alamos National Lab	\$85,720
2006-2008	Examination of earthquake stress drop variations using coda waves	Los Alamos National Lab	\$35,000
2006-2007	Development and application of modern analysis techniques to determine yields of Nevada Test Site explosions using Sandia National Laboratory seismic data	Sandia University Research Program (SURP)	\$40,000
2007-2008	Development and application of modern analysis techniques to determine yields of Nevada Test Site explosions using Sandia National Laboratory seismic data, SURP program (2 <sup>nd</sup> year renewal)	Sandia University Research Program (SURP)	\$40,000
2008-2010	Characterization of subduction zone earthquake rupture parameters with respect to subduction zone complexity	NSF-Marine Geology and Geophysics	\$117,598

## Publications:

1. \*Stankova-Pursley, J., **S.L. Bilek**, C.A. Rowe, and R.C. Aster, Characteristics of the October 2005 microearthquake swarm and reactivation of seismic swarms over decade-scale time periods near Socorro, New Mexico, *Bull. Seismo. Soc. Am.*, *98*, 93-105, 2008.
2. **Bilek, S.L.** and E.R. Engdahl, Rupture characterization and relocation of aftershocks for the 1994 and 2006 tsunami earthquakes in the Java subduction zone, *Geophys. Res. Lett.*, *34*, L20311, doi:10.1029/2007GL031357, 2007.
3. **Bilek, S.L.**, Using earthquake rupture variations along the Sumatra-Andaman subduction system to examine fault zone variations, *Bull. Seismo. Soc. Am.*, *97*, S62-S70, 2007.
4. Geist, E.L., V.V. Titov, D. Arcas, F. Pollitz, and **S.L. Bilek**, Implications of the December 26, 2004 Sumatra-Andaman earthquake on tsunami forecast and assessment models for great subduction zone earthquakes, *Bull. Seismo. Soc. Am.*, *97*, S249-S270, 2007.
5. **Bilek, S.L.**, K. Satake, K. Sieh, Introduction to the Special Issue on the 2004 Sumatra-Andaman earthquake, *Bull. Seismo. Soc. Am.*, *97*, S1-S5, 2007.
6. **Bilek, S.L.**, Influence of subducting topography on earthquake rupture, in *The Seismogenic Zone of Subduction Thrust Faults*, ed. T.Dixon and C.Moore, Columbia University Press, pg. 123-146, 2007.
7. Lay, T. and **S.L. Bilek**, Anomalous earthquake ruptures at shallow depths on subduction zone megathrusts, in *The Seismogenic Zone of Subduction Thrust Faults*, ed. T.Dixon and C.Moore, Columbia University Press, pg. 476-511, 2007.
8. Geist, E.L., **S.L. Bilek**, D. Arcas, C.E. Synolakis, V.V. Titov, D.H. Oppenheimer, Differences in tsunami generation between the December 26, 2004 and March 28, 2005 Sumatra earthquakes, *Earth, Planets, Space*, *58*, 185-193, 2006.
9. **Bilek, S.L.** and C. Lithgow-Bertelloni, Stress changes in the Costa Rica subduction zone due to the 1999  $M_w=6.9$  Quepos earthquake, *Earth Planet. Sci. Lett.*, *230*, 97-112, 2005.
10. Lay, T., H. Kanamori, C.J. Ammon, M. Nettles, R. Aster, S.L. Beck, **S.L. Bilek**, M.R. Brudzinski, R. Butler, H. DeShon, G. Ekstrom, K. Satake, S. Sipkin, and S.N. Ward, The great Sumatra-Andaman earthquake of December 26, 2004, *Science*, *308*, 1127-1133, 2005.
11. **Bilek, S.L.**, C.P. Conrad, and C. Lithgow-Bertelloni, Slab pull, slab weakening, and their relationship to deep intra-slab seismicity, *Geophys. Res. Lett.*, *32*, L14305, doi:10.1029/2005GL022922, 2005.
12. **Bilek, S.L.**, T. Lay, and L.J. Ruff, Radiated seismic energy and earthquake source duration variations from teleseismic source time functions for shallow subduction zone thrust earthquakes, *J. Geophys. Res.*, *109*, B09308, doi:10.1029/2004JB003039, 2004.
13. Conrad, C.P., **S.L. Bilek**, C. Lithgow-Bertelloni, Great earthquakes and slab-pull: Interaction between seismic coupling and plate-slab coupling, *Earth Planet. Sci. Lett.*, *218*, 109-122, 2004.
14. DeShon, H.R., S.Y. Schwartz, **S.L. Bilek**, L.M. Dorman, J.M. Protti, V. Gonzalez, E.R. Flueh, and T.H. Dixon. Seismogenic zone structure of the southern Middle America Trench, Costa Rica, *J. Geophys. Res.*, *108*, 2491, doi:10.1029/2002JB002294, 2003.

15. **Bilek, S.L.**, S.Y. Schwartz, and H.R. DeShon. Control of seafloor roughness on earthquake rupture behavior, *Geology*, 31, 455-458, 2003.
16. **Bilek, S.L.** and L.J. Ruff, Analysis of the June 23, 2001 Mw=8.4 Peru underthrusting earthquake and its aftershocks, *Geophys. Res. Lett.*, 29(20), 1960, doi:10.1029/2002GL015543, 2002.
17. **Bilek, S.L.** and T. Lay, Tsunami earthquakes possibly widespread manifestations of frictional conditional stability, *Geophys. Res. Lett.*, 29(14), 1673, doi:10.1029/2002GL015215, 2002.
18. Geist, E.L. and **S.L. Bilek**, Effect of depth-dependent shear modulus on tsunami generation along subduction zones, *Geophys. Res. Lett.*, 28, 1315-1318, 2001.
19. **Bilek, S.L.** and T. Lay, Depth dependent rupture properties in Circum-Pacific subduction zones, *GeoComplexity and the Physics of Earthquakes*, AGU Geophys. Monograph 120, 165-186, 2000.
20. **Bilek, S.L.** and T. Lay, Comparison of depth dependent fault zone properties in the Japan trench and Middle America trench, *Pure and Applied Geophysics*, 154, 433-456, 1999.
21. **Bilek, S.L.** and T. Lay, Rigidity variations with depth along interplate megathrust faults in subduction zones, *Nature*, 400, 443-446, 1999.
22. **Bilek, S.L.** and T. Lay, Variation in interplate fault zone properties with depth in the Japan subduction zone, *Science*, 281, 1175-1178, 1998.
23. **Bilek, S.L.** and T. Lay, Lower mantle heterogeneity beneath Eurasia imaged by parametric migration of shear waves, *Physics of the Earth and Planetary Interiors*, 108, 201-218, 1998.
24. Brocher, T.M., **S.L. Bilek**, R.W. Clayton, G.S. Fuis, and D.A. Okaya, Stacked wide-angle recordings of air-gun signals from the 1994 Los Angeles Region Seismic Experiment (LARSE), California, *USGS Open File Report 97-132*, 1997.

**Recent Abstracts (2006-2008):**

1. **Bilek, S.L.**, H.R. DeShon, and E.R. Engdahl, Are “slow” events common regions of tsunami earthquakes?, SSA Annual Meeting, April 2007.
2. **Bilek, S.L.**, A.V. Newman, J. Morton, R.C. Aster, C.A. Rowe, G.T. Farmer, Comparison of seismicity patterns and uplift in the Socorro Magma Body region, central New Mexico, SSA Annual Meeting, April 2007.
3. **Bilek, S.L.**, C.E. Elliott, and C. Lithgow-Bertelloni, Triggered seismicity in the Nicoya Peninsula region of Costa Rica due to the 1990 Nicoya Gulf earthquake, SSA Annual Meeting, April 2007.
4. \*Stankova-Pursley, J., **S.L. Bilek**, W.S. Phillips, and A.V. Newman, Analysis of apparent stress, Mw distribution, and scaling relationships for subduction zone earthquakes along the Nicoya Peninsula, Costa Rica, SSA Annual Meeting, April 2007.
5. Schramm, K., **S.L. Bilek**, and R. Abbott, Nuclear-test yield determination of NTS events using data from the Leo Brady seismic network, SSA Annual Meeting, April 2007.

6. **Bilek, S.L.**, Seismicity along the South American subduction zone: Large earthquakes, tsunamis, and subduction zone complexity, (INVITED) Fall AGU meeting, Dec. 2007
7. Schramm, K.A., **S.L. Bilek**, and R.E. Abbott, Analysis of modern techniques for nuclear-test yield determination of NTS events using data from the Leo Brady Seismic Network, Fall AGU meeting, Dec. 2007.
8. \*Stankova-Pursley, J., **S.L. Bilek**, W.S. Phillips, and A.V. Newman, Spatial variability in apparent stress for subduction zone earthquakes along the Nicoya Peninsula, Costa Rica, Fall AGU meeting, Dec. 2007.
9. Engdahl, E.R., H.R. DeShon, **S.L. Bilek**, A. Villasenor, and C.H. Thurber, Assessment of well-constrained seismicity and focal mechanism data in the Andaman-Sumatra-Java subduction systems, Fall AGU meeting, Dec. 2007.
10. **Bilek, S.L.**, J. Stankova, and C. Elliott, Seismogenic Zone Heterogeneity along the Central America Subduction Zone, SubFac-SEIZE Costa Rica 2007 Workshop, June 2007
11. **Bilek, S.L.**, and E.R. Engdahl, Tsunamigenic earthquakes in the Java subduction zone: Rupture Characterization and relocation of aftershocks for the 1994 and 2006 earthquakes, Seismological Society of America Meeting, 2007.
12. \*Schramm, K.A., S. Stein, E.A. Okal, **S.L. Bilek**, A.V. Newman, Oceanic transform earthquakes: Not predominantly slow, Seismological Society of America Meeting, 2007.
13. \*Morton, J.J., **S.L. Bilek**, R. Aster, C.A. Rowe, Waveform cross-correlation of earthquake clusters to determine loci of active processes within the Socorro Seismic Anomaly, New Mexico, New Mexico Geological Society Meeting, 2007.
14. \*Stankova-Pursley, J., **S.L. Bilek**, W.S. Phillips, A.V. Newman, Stress drop estimates based on coda wave measures for earthquakes along the Nicoya Peninsula, Costa Rica, Spring AGU meeting, 2007.
15. \*Elliott, C.E., **S.L. Bilek**, C. Lithgow-Bertelloni, Examining stress changes due to subducting topography and variable rheology in the Middle America Trench at Nicoya Gulf, Costa Rica, Spring AGU meeting, 2007.
16. **Bilek, S.L.**, J. Stankova, and C. Elliott, Seismogenic Zone Heterogeneity along the Central America Subduction Zone, SubFac-SEIZE Costa Rica 2007 Workshop, 2007.
17. **Bilek, S.L.**, Examining along-strike variations within seismogenic zones using source characteristics of subduction zone earthquakes, (INVITED) AGU Fall Meeting, 2006.
18. Newman, A.V. and **S.L. Bilek**, Rupture and energy characteristics of the July 17, 2006 tsunami earthquake near the Java trench, AGU Fall Meeting, 2006.
19. \*Stankova, J., **S.L. Bilek**, R. Aster, C. Rowe, Characteristics of the October 2005 microearthquake swarm in the Socorro region, New Mexico, AGU Fall Meeting, 2006.

20. \*Elliott, C.E., **S.L. Bilek**, C. Lithgow-Bertelloni, Influence of viscoelastic relaxation on triggered seismicity due to March 25, 1990 Nicoya Gulf, Costa Rica earthquake, AGU Fall Meeting, 2006.
21. Newman, A.V. and **S.L. Bilek**, The relation between shallow subduction thrust rupture and tsunami generation: Examples from Sumatran and other tsunamigenic earthquakes, AGU Western Pacific Geophysics Meeting, July 2006.
22. **Bilek, S.L.**, Using earthquake rupture variations along the Sumatra-Andaman subduction system to examine fault zone variations, Seismological Society of America Meeting, 2006.
23. \*Morton, J.J., **S.L. Bilek**, R. Aster, C.A. Rowe, A.V. Newman, Interdisciplinary determination of active magmatic processes of the Socorro Magma Body, central New Mexico, New Mexico Geological Society Spring meeting, 2006.
24. \*Stankova, J. and **S.L. Bilek**, Characterizing the October 2005 Socorro New Mexico earthquake swarm, New Mexico Geological Society Spring meeting, 2006.

\*student 1<sup>st</sup> author