

VIPUL SILWAL

Mailing Address

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Contact Information

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Education

PhD candidate in Geophysics 2012-present
University of Alaska Fairbanks, USA
Thesis: Earthquake sources and wavefield simulation in Alaska.
Advisor: Dr. Carl Tape

Integrated BS and MS, Exploration Geophysics 2007-2012
Indian Institute of Technology (IIT), Kharagpur, India
Thesis: Moment Tensor Inversion in Alaska using Body and Surface Waves.
Advisor: Dr. William Mohanty and Dr. Carl Tape

Experience

Research Assistant University of Alaska Fairbanks 2012-present

- Moment tensor inversion of earthquakes and VLFs in Alaska using body waves, surface waves and polarities.
- Estimation of uncertainty in moment tensors using probabilistic approach.
- Examine effects of topography smoothing and choice of velocity model on the minimum resolvable period of the synthetic seismograms.
- Wavefield simulations in wrangell, southern and interior Alaska.
- Preparing a reference velocity model of Alaska for tomographic inversion.

Field Technician Alaska Earthquake Center Summer 2012, 2013

- Installation and maintenance of seismic stations in Alaska.

Research Assistant University of Alaska Fairbanks and IIT Kharagpur 2011-2012

- Computation of green's function and synthetics required for moment tensor inversion.
- Gained experience on working in a collaborative environment and version controlled setup.

Research Intern University of Tromso, Norway Summer 2010

- Seismicity analysis of Hakon Mosbey Mud Volcano (Barents Sea).
- Offshore field trip in Barents Sea for sedimentary coring and seismic reflection survey.

Teaching

Teaching Assistant Physics 211 Spring 2015

- Teaching Physics 211 lab, Homework help
- Coursework- Physics Teaching Seminar/Practicum

Student mentor

QingPing Yu, undergrad project on moment tensor inversion in interior Alaska.
Joshua Purba, undergrad project on moment tensor inversion in southern Alaska. (*now at University of Calgary*)

Computer Skills

Languages: Python, C, Fortran, Perl, Latex, Shell scripting
Software: MATLAB, Obspy, SPECFEM3D, GEOCUBIT, GMT, SAC
Platforms: Linux, Mac, Windows, CPU cluster, GPU cluster

Publications

11. **Silwal, V.**, C. Tape, and E. Casarotti, A seismic velocity reference model for Alaska. (*in prep*)
10. **Silwal, V.**, C. Tape, and A. Lomax, Crustal earthquakes in the Cook Inlet and Susitna regions, southern Alaska. (*in prep*)

9. Alvizuri, C., **V. Silwal**, L. Krischer, and C. Tape, Estimation of full moment tensors including uncertainties for earthquakes, volcanic events and nuclear explosions. (*in prep*)
8. Tape, C., S. Holtkamp, **V. Silwal**, Y. Kaneko, J. Hawthorne, J. P. Ampuero, N. Ruppert, K. Smith, and M. E. West, Slow-to-fast earthquake nucleation in the lower crust of central Alaska. (*Nature Geosciences, Submitted*)
7. Tape, C., A. Lomax, **V. Silwal**, J. D. Agnew and B. Brettschneider, 2017, The 1904 Ms 7.3 Earthquake in Central Alaska, Bulletin of the Seismological Society of America, Vol. 107, No. 3, pp. 1147-1174, June 2017, doi: 10.1785/0120160178.
6. **Silwal, V.** and C. Tape, 2016, Seismic moment tensor in Alaska derived from Body waves and Surface waves, Journal of Geophysical Research: Solid Earth., v. 121, doi: 10.1002/2015JB012588.
5. Tape, C., **V. Silwal**, C. Ji, L. Keyson, M.E. West, and N. Ruppert, 2015, Transtensional tectonics of the Minto Flats fault zone and Nenana basin, central Alaska, Bulletin of the Seismological Society of America, Vol. 105, No. 4, pp. 2081-2100, August 2015, doi: 10.1785/0120150055.
4. Tape, C., M. West, **V. Silwal**, and N. Ruppert, 2013, Earthquake nucleation and triggering on an optimally oriented fault, Earth and Planetary Science Letters, v. 363, p. 231- 241. doi: 10.1016/j.epsl.2012.11.060.
3. Trivedi, D. **et. al.**, 2012, Interpretation of Dune Genesis from the Sedimentological Data and Ground Penetrating Radar (GPR) Signatures: A case study from Ashirmata Dune Field, Mandvi Beach, Gujarat, India, International Journal of Geosciences, 2012, 3, 772-779, doi: 10.4236/ijg.2012.34078.
2. **Silwal, V.**, Online catalog: Seismic moment tensor catalog for southern Alaska, ScholarWorks@UA.
1. **Silwal, V.**, Online catalog: Seismic moment tensor catalog for Minto Flats fault zone (2000-2014), ScholarWorks@UA.

Other Activities	1. Seismology Brownbag talk coordinator at Geophysical Institute, UAF	2013-2014
	2. Schlumberger PETREL Seismic Visualization and Interpretation Course	2010
	3. TOTAL Well Log Analysis Course	2011

Awards	1. Earthscope National Meeting Scholarship	2017
	2. Best student poster at Alaska Geological Society Conference	2016
	3. Geophysical Society of Alaska scholarship	2015
	4. SEG scholarship	2014
	5. IRIS travel grant for IRIS Workshop	2014
	6. Geophysical Institute travel grant for AGU Fall Meeting	2013
	7. INSPIRE scholarship by the Department of Science & Technology, India	2007-2012

Research Statement

I am interested in theoretical and computational aspects of seismology. Seismology is a data-rich science with tremendous opportunities for understanding source processes and Earth structure. To pursue this I perform forward modeling of wave propagation through a media representative of Earth structure. The misfit between the synthetic thus generated and the observed data is then minimized using different approaches. The inversion technique and the applied minimization depends on many factors, such as theory underneath, linear or non-linear problem, dimensionality of the problem, and computational resources available. The uncertainty in the solution is also an integral part. For source inversion I have tried to quantify the uncertainty using Bayesian approach. These earthquake sources are the priori for the tomographic inversion. With the recent advances in high performance computing people have been able to carry out adjoint tomography at both regional and global scale. Similar effort is undergoing by us to better understand Alaska structure.

References

Dr. Carl Tape

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Dr. Mike West

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