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EDUCATION

- 2007 - 2010 Ph.D. (Summa cum laude), Potsdam University, Potsdam, Germany. Title of the thesis: Crustal deformation source monitoring using advanced InSAR time series and time-dependent inverse modeling.
- 2001 - 2003 M.S. Geodesy, Tehran University, Tehran, Iran. Title of thesis: Wavelet-based inversion of gravity data for hydrocarbon exploration.
- 1998 - 2001 B.A. Surveying engineering, Amir-Kabir University of Technology, Tehran, Iran

PROFESSIONAL EXPERIENCE

- 8/2020- Associate professor, Virginia Tech, VA, USA
- 6/2019-8/2020 Associate professor (with tenure), Arizona State University, AZ, USA
- 1/2013 – 6/2019 Assistant professor, Arizona State University, AZ, USA
- 3/2011 - 12/2012 Postdoctoral Scholar, Univ. of California, Berkeley, USA
- 6/2010 - 3/2011 Postdoctoral Scholar, German Research Centre for Geosciences (GFZ), Potsdam, Germany
- 9/2007 - 6/2010 Geophysicist/geodesist, German Research Centre for Geosciences (GFZ), Potsdam, Germany
- 1/2005 – 8/2007 Geophysicist/geodesist, International Institute of Earthquake Engineering and seismology, (IIEES), Tehran, Iran
- 3/2003 – 12/2004 Geodesist, National Cartographic Centre (NCC), Tehran, Iran

HONORS AND AWARDS

2011	Awarded for a top young scientist, German Research Centre for Geosciences (GFZ), Potsdam, Germany
2010	Awarded PhD (Summa cum laude), University of Potsdam
2007 - 2010	Geotechnologien fellowship, Germany
2004	Awarded for a top master thesis at Tehran University
2004	First ranked student in M.S., Tehran University, Tehran, Iran
1999 - 2001	First ranked student in B.A., Amir-Kabir University of Technology, Tehran, Iran
1994 - 1998	First ranked student in high school

TEACHING ACTIVITIES

2013 - 2020	Professor and Lecturer, Arizona State University
2008 - 2009	Teaching assistant, Potsdam University, Germany
2004 - 2005	Lecturer, School of surveying engineering, Hamedan, Iran
2004 - 2006	Lecturer, Amir-Kabir University of Technology, Tehran, Iran

COURSES TAUGHT

Introduction to Statistics (2 semesters, upper graduate level, a total of ~20 students)

Radar Remote Sensing of Earth and Planetary Surfaces (2 semesters, upper graduate level, a total of ~30 students)

Crustal Deformation (4 semesters, upper graduate level, a total of ~55 students)

Introduction to Physical Geology (6 semesters, a total of ~1200 students)

Hydrogeodesy (1 semester, upper graduate level, a total of ~8 students)

ORGANIZATIONAL INVOLVEMENT AND SERVICES

- 2020-2024 NASA GRACE Science Team
- 2018 - Planning Committee, Southern California Earthquake Center
- 2018 - 2021 NASA Sea Level Change Science Team member
- 2017 NASA MEaSURES program review panelist
- 2018 NASA Early Career program review panelist
- 2016 - 2018 ASU leadership academy team member
- Following completion at the ASU level, the team is elected to proceed and received resources to develop the Earth observation program in ASU.
- 2015 - 2018 School of Earth and Space Exploration Graduate Committee
- 2017 - 2018 ASU Future H2O initiative
- 2013 - present Ph.D. technical review and qualification exam committee member (students: Barrett Salisbury, Kristina Davis, Alexandra Horne, Brett Carr, Nathan Williams, Megan Miller, Guang Zhai, Mostafa Khoshmanesh, Zac Yung-Chun Liu, Nari Miller, Hanah Kerner, Grace Carlson)
- 2013 - present Ph.D. defense committee member (students: *David Haddad, Luis Méndez-Barroso, Brett Carr, Barrett Salisbury, Megan Miller, Guang Zhai, Mostafa Khoshmanesh*)
- present Serving as referee for several ISI journals such as GRL, JGR, EPSL, RS, G3, GJI, SGG, JVGR, GRSL, P&AG, Geology, JS, Tectonics, Science, Nature...
- 2012 - 2016 American Geophysical Union session organizer, chairman, and judge
- 2010 - 2011 European Geoscience Union special session chairman
- present Member of American Geophysical Union, Seismological Society of America, Geological Society of America.

GRADUATE AND HONOR STUDENTS, MAIN ADVISER

Current

Student	Duration	Project
Grace Carlson (recipient of NASA graduate fellowship)	2017 - 2022	Remote sensing and modeling of total water storage variations in California (Ph.D.)
Sonam Sherpa	2018 - 2023	Probabilistic maps of flood hazard using SAR interferometry (Ph.D.)
Jui-Chi Lee	2019-2024	Observations, Models, and Mechanism of Spatiotemporal Interseismic Fault Creep in California

Graduated

Student	Date	Project
Megan Miller (recipient of NASA graduate fellowship and NSF fellowship)	April 2018	Remote sensing and modeling of stressed aquifers and the associated hazards (Ph.D.) Now: researcher at JPL
Guang Zhai	July 2018	Mechanical Modeling of Natural and Anthropogenic Fluid-Rock Interactions: Volcano Deformation and Induced Seismicity (Ph.D.) Now: Postdoc at ASU and UC Berkeley
Mostafa Khoshmanesh (recipient of NASA graduate fellowship)	October 2018	Mechanism of slow slip events on San Andreas fault: constraints from geodesy and seismology (Ph.D.) Now: Postdoc at Caltech

Past

Student	Duration	Project
Zac Yung-Chun Liu (MS)	2015 - 2016	Constraining the Evolution of Martian Atmosphere through Analysis of the Impact Ejecta
Alex Sedlak (Honor thesis)	2013 - 2014	Application of InSAR to Injection-Induced Deformation and Seismicity

Emma Blackwell (MS) 2018 - 2020 Monitoring land subsidence along the coast of California

GRADUATE AND HONOR STUDENTS, SECOND ADVISER

Past

Student	Duration	Project
Alexandra Horne (2 nd adviser)	2015 - 2016	Quantifying the Hydrologic Effects of the 2010-2011 Canterbury Earthquakes
Nari Miller (2 nd adviser)	2016 - 2017	Aquifer connectivity in Dixie Valley, Nevada and across the Basin and Range
John Christoph	2017 - 2018	Concept study of a synthetic aperture radar instrument for a future mission to Io
Stephanie Sparks	2019-	Lithospheric-scale dynamics of the eastern Himalayan region

POSTDOC

Researcher	Appointment Duration
Dr. Sui Tung	2019 - 2020
Dr. Guang Zhai	2018 – 2020
Dr. Mostafa Khoshmanesh	2018 – 2019
Dr. Chandra Ojha	2016 – 2019
Dr. Jennifer Weston	2014 - 2016

INVITED TALKS AND LECTURES

2020 Virginia Tech, VA
 2019 University of Texas, Austin
 2019 Georgia Institute of Technology, Atlanta, GA
 2018 Recent Advances in Machine Learning and Computational Methods for Geoscience, Minnesota
 2018 Geological Remote Sensing Group, Boulder, Colorado
 2018 UNAVCO Science Workshop, Broomfield, Colorado
 2017 ASU Water Summit, keynote speaker and panelist
 2017 Earthscope Hydrogeodesy Workshop, San Diego, California
 2016 Carnegie Institute of Science

2016 Colorado School of Mines
 2016 Geological Society of America, Colorado
 2016 Southern California Earthquake Center Community Geodetic Model workshop
 2015 Jet Propulsion Laboratory
 2015 American Geophysical Union Fall Meeting, San Francisco
 2015 University of Arizona
 2014 NASA workshop, Reston, Virginia
 2014 University of Arizona
 2014 Massachusetts Institute of Technology
 2013 University of Arizona
 2013 Workshop on observations of sea-level rise and storminess in California, Riverside
 2013 Southern California Earthquake Center annual meeting, Palm Spring, California
 2013 Southern California Earthquake Center community fault model, California
 2013 Northern California Earthquake Hazards, US Geological Survey, California
 2012 Arizona State University
 2012 Northern California Earthquake Hazards, US Geological Survey, California
 2012 Institut de Physique du Globe, France
 2011 US Geological Survey, California
 2010 Geological Survey of Iran, Iran
 2010 CNRS, Laboratoire Magmas et Volcans, France
 2010 American Geophysical Union, Fall Meeting, San Francisco
 2010 German Center For and Space Science, Germany
 2009 European Geoscience Union, Austria

PUBLICATIONS (STUDENTS & POSTDOCS ARE HIGHLIGHTED)

Submitted/In-press

5- Zhai, G., Ojha, C. and Shirzaei, M. (2020), Model-based Correction Compared with Wavelet-based Filter for Reducing Atmospheric Delay in InSAR Time Series, IEEE Transactions on Geoscience and Remote Sensing, in review.

4- Scott, C., Bunds, M. and Shirzaei, M. (2020), Creep along the Central San Andreas Fault Imaged from Surface Fractures, Topographic Differencing, and InSAR Imagery, JGR, in review.

3- Tung, S., Zhai, G. and Shirzaei, M. (2020), Deep wastewater injection inducing largest 2020 M5 Mentone earthquake in West Texas: implications for reservoir mechanical properties and remote injectors, Geophysical Research Letters, in review.

2- Shirzaei, M. (2020 Invited), Measuring, Modeling, and Predicting Coastal Land Subsidence, Nature reviews, in preview.

1- Goebel, T. and M. Shirzaei (2020), More than 40 years of potentially induced seismicity close to the San Andreas fault in San Ardo, central California, *Seismological Research Letters*, in review.

Published

56- Carlson, G., Shirzaei, M., Ojha, C., & Werth, S. (2020). Subsidence-Derived Volumetric Strain Models for Mapping Extensional Fissures and Constraining Rock Mechanical Properties in the San Joaquin Valley, California. *Journal of Geophysical Research: Solid Earth*, 125, e2020JB019980. <https://doi.org/10.1029/2020JB019980>.

55- Blackwell, E., M. Shirzaei, C. Ojha, and S. Werth (2020), Tracking California's sinking coast from space: Implications for relative sea-level rise, *Science Advances*, 6(31), eaba4551, doi:10.1126/sciadv.aba4551.

54- Khoshmanesh, M., M. Shirzaei, and N. Uchida (2020), Deep slow-slip events promote seismicity in northeastern Japan megathrust, *Earth and Planetary Science Letters*, 540, 116261.

53- Zhai, G., M. Shirzaei, and M. Manga (2020), Elevated Seismic Hazard in Kansas Due to High-Volume Injections in Oklahoma, *Geophysical Research Letters*, 47(5), e2019GL085705.

52- Ojha, C., S. Werth, and M. Shirzaei (2020), Recovery of aquifer-systems in Southwest US following 2012-2015 drought: evidence from InSAR, GRACE and groundwater level data, *Journal of Hydrology*, 124943.

51- Hamlington, B. D., A. S. Gardner, E. Ivins, J. T. M. Lenaerts, J. T. Reager, D. S. Trossman, E. D. Zaron, S. Adhikari, A. Arendt, A. Aschwanden, B. D. Beckley, D. P. S. Bekaert, G. Blewitt, L. Caron, D. P. Chambers, H. A. Chandanpurkar, K. Christianson, B. Csatho, R. I. Cullather, R. M. DeConto, J. T. Fasullo, T. Frederikse, J. T. Freymueller, D. M. Gilford, M. Giroto, W. C. Hammond, R. Hock, N. Holschuh, R. E. Kopp, F. Landerer, E. Larour, D. Menemenlis, M. Merrifield, J. X. Mitrovica, R. S. Nerem, I. J. Nias, V. Nieves, S. Nowicki, K. Pangaluru, C. G. Piecuch, R. D. Ray, D. R. Rounce, N.-J. Schlegel, H. Seroussi, M. Shirzaei, W. V. Sweet, I. Velicogna, N. Vinogradova, T. Wahl, D. N. Wiese, and M. J. Willis (2020), Understanding of Contemporary Regional Sea-Level Change and the Implications for the Future, *Reviews of Geophysics*, 58(3), e2019RG000672, doi:10.1029/2019rg000672.

50- Sherpa, S. F., M. Shirzaei, C. Ojha, S. Werth, and R. Hostache (2020), Probabilistic Mapping of August 2018 Flood of Kerala, India, Using Space-Borne Synthetic Aperture Radar, *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 13, 896-913.

49- Carlson, G., Shirzaei, M., Werth, S., Zhai, G., and Ojha, C. (2020). Seasonal and long-term groundwater unloading in the Central Valley modifies crustal stress. *Journal*

of *Geophysical Research: Solid Earth*, 125, e2019JB018490.
<https://doi.org/10.1029/2019JB018490>

48- Zhai, G., M. Shirzaei, M. Manga, and X. Chen (2019), Pore-pressure diffusion, enhanced by poroelastic stresses, controls induced seismicity in Oklahoma, *Proceedings of the National Academy of Sciences*, 201819225, doi:10.1073/pnas.1819225116.

47- Shirzaei, M., C. Ojha, S. Werth, G. Carlson, and E. R. Vivoni (2019), Comment on "Short-lived pause in Central California subsidence after heavy winter precipitation of 2017" by K. D. Murray and R. B. Lohman, *Science Advances*, 5(eaav8038).

46- Shirzaei, M., M. Manga, and G. Zhai (2019), Hydraulic properties of injection formations constrained by surface deformation, *Earth and Planetary Science Letters*, 515, 125-134, doi:<https://doi.org/10.1016/j.epsl.2019.03.025>.

45- Miller, M. M., and M. Shirzaei (2019), Land subsidence in Houston correlated with flooding from Hurricane Harvey, *Remote Sensing of Environment*, 225, 368-378, doi:<https://doi.org/10.1016/j.rse.2019.03.022>.

44- Ojha, C., S. Werth, and M. Shirzaei (2019), Groundwater Loss and Aquifer System Compaction in San Joaquin Valley During 2012–2015 Drought, *Journal of Geophysical Research: Solid Earth*, 124(3), 3127-3143.

43- Khoshmanesh, M., and M. Shirzaei (2018), Episodic creep events on the San Andreas Fault caused by pore pressure variations, *Nature Geoscience*, doi:10.1038/s41561-018-0160-2.

42- Ojha, C., M. Shirzaei, S. Werth, D. F. Argus, and T. G. Farr (2018), Sustained Groundwater Loss in California's Central Valley Exacerbated by Intense Drought Periods, *Water Resources Research*, 54, doi:10.1029/2017WR022250.

41- Guang, Z., and M. Shirzaei (2018), Fluid Injection and Time-Dependent Seismic Hazard in the Barnett Shale, Texas, *Geophysical Research Letters*, 45, doi:10.1029/2018GL077696.

40- Khoshmanesh, M., and M. Shirzaei (2018), Multiscale dynamics of aseismic slip on Central San Andreas Fault. *Geophysical Research Letters*, 45. <https://doi.org/10.1002/2018GL077017>.

39- Shirzaei, M. and R. Bürgmann (2018), Global climate change and local land subsidence exacerbate inundation risk to the San Francisco Bay Area. *Science Advances*, 4, eaap9234.

It is highlighted by [New York Times](#), [Wired](#), [ScienceDaily](#), and more than 20 other media outlets.

38- Zhai, G., and Shirzaei, M. (2017). 3-D modeling of irregular volcanic sources using sparsity-promoting inversions of geodetic data and boundary element method. *Journal of Geophysical Research: Solid Earth*, 122. <https://doi.org/10.1002/2017JB014991>.

37- Miller, M. M., Shirzaei, M., and Argus, D. (2017). Aquifer mechanical properties and decelerated compaction in Tucson, Arizona. *Journal of Geophysical Research: Solid Earth*, 122. <https://doi.org/10.1002/2017JB014531>.

36- Shirzaei, M., R. Bürgmann, and E. J. Fielding (2017), Applicability of Sentinel-1 Terrain Observation by Progressive Scans multitemporal interferometry for monitoring slow ground motions in the San Francisco Bay Area, *Geophysical Research Letters*, 44, doi:10.1002/2017GL072663.

35- Wang C.-Y., M. Manga, M. Shirzaei, M. Weingarten, and L.-P. Wang (2017), Induced Seismicity in Oklahoma Affects Shallow Groundwater, *Seismol. Res. Lett.*, doi:10.1785/0220170017.

34- Manga, M., C. Y. Wang, and M. Shirzaei (2016), Increased stream discharge after the 3 September 2016 M-w 5.8 Pawnee, Oklahoma earthquake, *Geophysical Research Letters*, 43(22), 11588-11594, doi:10.1002/2016gl071419.

33-Shirzaei, M., W. L. Ellsworth, K. F. Tiampo, P. J. González, and M. Manga (2016), Surface uplift and time-dependent seismic hazard due to fluid injection in eastern Texas, *Science*, 353(6306), 1416-1419, doi:10.1126/science.aag0262.

- *Highlighted by:* [ScientificAmerican](#), [NewScientist](#), [TexasMonthly](#), [CIRES](#), [ScienceDaily](#), [TheChemicalEngineer](#), [Futurism](#), [KERA](#), [COMET](#), [ScienceNews](#), [CanadianUnderWriter](#)

32- Zhai, G., and M. Shirzaei (2016), Spatiotemporal model of Kīlauea's summit magmatic system inferred from InSAR time series and geometry-free time-dependent source inversion, *Journal of Geophysical Research: Solid Earth*, doi:10.1002/2016JB012953.

31- Whipple K.X., M. Shirzaei, K. Hodges, and J.R. Arrowsmith (2016) 2015 Gorkha Earthquake Provokes Reassessment of Mountain Building Processes in the Himalaya, *Nature Geoscience*, DOI: 10.1038/NGEO2797.

30- Weston, J., and M. Shirzaei (2016), Combining GPS and repeating earthquakes for high-resolution analysis of subduction zone coupling, *Tectonophysics*, S0040-1951(15)00636-8, doi:10.1016/j.tecto.2015.11.009.

29- Khoshmanesh, M., M. Shirzaei, and R. M. Nadeau (2015), Time-dependent model of aseismic slip on the central San Andreas Fault from InSAR time series and repeating earthquakes, *Journal of Geophysical Research, Solid Earth*, 120, doi:10.1002/2015JB012039.

28- Miller, M. M., and M. Shirzaei (2015), Spatiotemporal characterization of land subsidence and uplift in Phoenix using InSAR time series and wavelet transforms, *Journal of Geophysical Research, Solid Earth*, 120, doi:10.1002/2015JB012017.

- *It is highlighted by [European Space Agency](#), [KJZZ](#), [AZ central](#), [SESE news](#), [12 NEWS](#).*

27- Turner, R. C., M. Shirzaei, R. M. Nadeau, and R. Bürgmann (2015), Slow and Go: Pulsing Slip Rates on the Creeping Section of the San Andreas Fault, *Journal of Geophysical Research, Solid Earth*, 120, doi:10.1002/2015JB011998.

26- Shirzaei, M., M. L. Rudolph, and M. Manga (2015), Deep and shallow sources for the Lusi mud eruption revealed by surface deformation, *Geophysical Research Letters*, 42, doi:10.1002/2015GL064576.

25-Shirzaei, M. (2015) A seamless multitrack multitemporal InSAR algorithm, *Geochem. Geophys. Geosyst.*, 16, doi:10.1002/2015GC005759.

24-Zakšek, K., L. Pick, M. Shirzaei, and M. Hort (2015), Thermal monitoring of volcanic effusive activity: the uncertainties and outlier detection, *Geological Society, London, Special Publications*, 426, doi:10.1144/SP426.2.

23- Shirzaei, M., Bürgmann, R., Uchida, N., Hu, Y., Pollitz, F., Matsuzawa, T. (2014) Seismic versus aseismic slip: Probing mechanical properties of the northeast Japan subduction zone. *Earth and Planetary Science Letters*, doi: 10.1016/j.epsl.2014.08.035.

22- Walter, T. R., M. Shirzaei, A. Manconi, G. Solaro, A. Pepe, M. Manzo, and E. Sansosti (2014), Possible coupling of Campi Flegrei and Vesuvius as revealed by InSAR time series, correlation analysis and time-dependent modeling, *Journal of Volcanology and Geothermal Research*, 280, 104-110, doi:10.1016/j.jvolgeores.2014.05.006.

21- Chaussard, E., R. Bürgmann, M. Shirzaei, E. J. Fielding, and B. Baker (2014), Predictability of hydraulic head changes and characterization of aquifer-system and fault properties from InSAR-derived ground deformation, *Journal of Geophysical Research, Solid Earth*, 119, doi:10.1002/2014JB011266.

20- Nikolaeva, E., T.R. Walter, M. Shirzaei, and J. Zschau (2014) Landslide observation and volume estimation in central Georgia based on L-band InSAR, *Nat. Hazards Earth Syst. Sci.*, 14, 675-688, doi:10.5194/nhess-14-675-2014.

19-Shirzaei, M., Bürgmann, R. and Taka' aki, T. (2013), Implications of recent asperity failures and aseismic creep for time-dependent earthquake hazard on the Hayward fault, *Earth and Planetary Science Letters*, doi:10.1016/j.epsl.2013.04.024.

18-Shirzaei, M. Walter, T. R., and Bürgmann, R. (2013), Coupling of Hawaiian volcanoes during mantle-driven surge, *Geophysical Research Letters*, doi: 10.1002/grl.50470.

- *It is highlighted by [Science](#), Wigginton, N. S. (2013), Hawaii's Deep Plumbing System, *Science*, 340(6134), 788, doi:10.1126/science.340.6134.788-a*

17- Rudolph, M. L., Shirzaei, M., and Manga, M. (2013), Source evolution of the Lusi mud eruption from surface deformation, *Geophysical Research Letters*, DOI: 10.1002/grl.50189.

- *It is highlighted by [ScienceNEWS](#), and [BBC](#)*

16- Shirzaei, M., and R. Bürgmann (2013), Time-dependent model of creep on the Hayward fault from joint inversion of 18 years of InSAR and surface creep data, *Journal of Geophysical Research*, doi: 10.1002/jgrb.50149.

15- Shirzaei, M., R. Bürgmann, J. Foster, T. R. Walter, and B. A. Brooks (2013), Aseismic deformation across the Hilina fault system, Hawaii, revealed by wavelet analysis of InSAR and GPS time series, *Earth and Planetary Science Letters*, 376, 12-19, doi:10.1016/j.epsl.2013.06.011.

14- Bathke, H., H. Sudhaus, E. P. Holohan, T. R. Walter, and M. Shirzaei (2013), An active ring fault detected at Tendürek volcano by using InSAR, *Journal of Geophysical Research, Solid Earth*, 118, 4488–4502, doi:10.1002/jgrb.50305.

13- Zakšek, K M. Shirzaei, and Hort, M. (2013), Constraining the uncertainties of volcano thermal anomaly monitoring using a Kalman Filter technique. *Geological Society of London*. 380, doi: 10.1144/SP380.5.

12- Shirzaei, M. (2013), A wavelet-based multitemporal DInSAR algorithm for monitoring ground surface motion, *Geoscience and Remote Sensing Letters*, doi: 10.1109/LGRS.2012.2208935.

11- Shirzaei, M., and R. Bürgmann (2012), Topography correlated atmospheric delay correction in radar interferometry using wavelet transforms, *Geophysical Research Letters*, 39, L01305, doi:10.1029/2011GL049971.

10- Shirzaei, M, R. Bürgmann, O. Oncken, T. R. Walter, P. Victor, and O. Ewiak (2012), Response of crustal faults to megathrust earthquakes cycle: InSAR evidence from Mejillones Peninsula, northern Chile, *Earth and Planetary Science Letters*, 333–334 (2012) 157– 164. doi.org/10.1016/j.epsl.2012.04.001

9- Shirzaei, M., T. R. Walter, H. R. Nankali, and E. Holohan (2011), Gravity-driven deformation of Damavand volcano detected through InSAR time series, *Geology*, 39, 3, 251–254; doi: 10.1130/G31779.1.

- *It is highlighted by [GSA press](#)*

8- Shirzaei, M., and T. R. Walter (2011), Satellite orbital error reduction using wavelet-based robust regression applied to InSAR deformation data, IEEE Transactions on Geoscience and Remote Sensing., 49(11), doi: 10.1109/TGRS.2011.2143419.

7- Bathke, H., Shirzaei, M., and T. R. Walter (2011), Inflation and deflation at the steep-sided Llaima stratovolcano (Chile) detected by using InSAR, Geophysical Research Letters, VOL. 38, L10304, doi:10.1029/2011GL047168.

6- Shirzaei, M., and T. R. Walter (2010), Time-dependent volcano source monitoring using InSAR time series: A combined Genetic Algorithm and Kalman Filter approach, Journal of Geophysical Research, 115, B1042, doi:10.1029/2010JB007476.

5- Walter, T. R., M. Manzo, A. Manconi, G. Solaro, R. Lanari, M. Motagh, H. Woith, S. Parolai, M. Shirzaei, J. Zschau, S. Baris, A. and Ansal (2010), Satellite Monitoring of Hazards: A focus on Istanbul, Turkey. Eos, Transactions, American Geophysical Union, 91, 36, 313-314, doi: 10.1029/2010EO360001.

4- Wauthier C., A. Oyen, P. Marinkovic, V. Cayol, J. Fernández, P. Gonzalez, R. F. Hanssen, F. Kervyn, N.d'Oreye, M. Shirzaei, and T. R. Walter (2009), L-band and C-band InSAR Studies of African Volcanic Areas. IGARSS (2) 2009: 210-213, doi: 10.1109/IGARSS.2009.5418043.

3- Shirzaei, M., and T. R. Walter (2009), Randomly Iterated Search and Statistical Competency (RISC) as powerful inversion tools for deformation source modeling: application to volcano InSAR data, Journal of Geophysical Research, 114, B10401, doi:10.1029/2008JB006071.

2- Ruch, J., A. Manconi, G. Zeni, G. Solaro, A. Pepe, M. Shirzaei, T. R. Walter, and R. Lanari (2009), Stress transfer in the Lazufre volcanic area, Central Andes, Geophysical Research Letters, 36, L22303, doi:22310.21029/22009GL041276.

1- Exupéry Team (2008), Managing volcanic unrest: The mobile volcano fast response system, paper presented at Use of Remote Sensing Techniques for Monitoring Volcanoes and Seismogenic Areas, Napoli, Italy, doi: 10.1109/USEREST.2008.4740358.

Conference Papers

Tung, S., G. Zhai, and M. Shirzaei (2019), Investigating Impact of Local Hydrogeology and Tectonics on Physics-based Induced Earthquake Forecast Models, American Geophysical Union.

Carlson, G., M. Shirzaei, S. Werth, G. Zhai, and C. Ojha (2019), Integrating Groundwater Storage Change Into Terrestrial Water Storage Change Estimates and

Crustal Stress Change Calculations in California Using InSAR, GPS, and GRACE, American Geophysical Union.

Sherpa, S., S. Werth, M. Shirzaei, K.X. Whipple, and S.N. Bhanja, and A. Mukherjee (2019), Climate Sensitivity of the Glacier Mass Budget of High Mountain Asia Based on Satellite Gravimetry, American Geophysical Union.

Khoshmanesh, M., M. Shirzaei, and N. Uchida (2019), Deep slow-slip events promote seismicity in the northeastern Japan subduction zone, American Geophysical Union.

Zhai, G., M. Shirzaei, and M. Manga (2019), Long-distance impact of fluid injection in Oklahoma on induced seismicity in Kansas using hydromechanical and nucleation models, American Geophysical Union.

Sherpa, S. F., M. Shirzaei, C. Ojha, and S. Werth (2019), An Unsupervised Probabilistic Method for Large Scale Flood Mapping: Exploring Full Archive of Sentinel-1A/B Satellites over India, and Iran, American Geophysical Union.

Ojha, C., M. Shirzaei, and S. Werth (2019), Investigating impact of recent droughts on San Joaquin Valley aquifer-system using 10 years of InSAR observations, American Geophysical Union.

Shirzaei, M. M. Khoshmanesh, C. Ojha, G. Carlson, S. Werth, S. F. Sherpa, E. Blackwell, G. Zhai (2019), Unprecedented crop loss due to 2019 Midwest US flood quantified from Space, American Geophysical Union.

Carlson, G., M. Shirzaei, S. Werth, G. Zhai, C. Ojha (2019), How we use deformation data above large aquifer systems to understand climatic and anthropologically-driven stress and seismicity fluctuations in California, American Geophysical Union.

Blackwell, E., M. Shirzaei, C. Ojha, S. Werth (2019), Flood hazards along the coast of California due to vertical land motion and sea level rise, American Geophysical Union.

Taira, T., M. Khoshmanesh, and M. Shirzaei (2019), Time-dependent model of creep and associated seismic hazard on the Hayward-Rodgers Creek System, American Geophysical Union.

Shirzaei, M., Manga, M., Zhai, G. (2019) Hydraulic Properties of Injection Formations in Eastern Texas Constrained by Surface Deformation. Seismological Society of America, Seattle, WA.

Sherpa, S. F., Shirzaei, M., and Werth, S. (2018) Probabilistic Mapping of Water Bodies Using Space-borne Synthetic Aperture Radar, American Geophysical Union.

Carlson, G., Shirzaei, M., Ojha, C., and Werth, S. (2018) The Effect of Aquifer Compaction and Groundwater Unloading on Crustal Stress Change in California During the 2007-2010 Drought, American Geophysical Union.

Argus, D., Shirzaei, M., and Peltier, W. R. (2018) Subsidence along the Gulf and Atlantic coast of the United States exacerbates ocean inundation of the land produced by sea-level rise, American Geophysical Union.

Shirzaei M., Khoshmanesh, M., M., Weston, (2018) Periodic Slow Slip Events and Their Interactions with Megathrust Earthquakes on Northeast Japan Subduction Zone, American Geophysical Union.

Zhai, G. and Shirzaei M. (2018) Physics-Based Forecasting of Time, Magnitude, and Probability of Induced Earthquakes in Oklahoma, American Geophysical Union.

Lee, J., Liu, Z. Y., and Shirzaei, M. (2018) Depth variations of fault friction parameter derived from dynamic modeling of GPS afterslip associated with the 2003 Mw 6.5 Chengkung earthquake in eastern Taiwan, American Geophysical Union.

Khoshmanesh, M. and Shirzaei, M. (2018) Slow Slip Events on the San Andreas Fault Caused by Episodic Pore Pressure Elevation, American Geophysical Union.

Ojha, C., Shirzaei, M., and Werth, S. (2018) Land Subsidence, Groundwater Loss and Aquifer Storage Reduction in California's Central Valley During 2007-2010 and 2012-2016 Droughts, American Geophysical Union.

Shirzaei, M., R. Bürgmann, and E. J. Fielding (2017), Sentinel-1 TOPS Multitemporal Interferometry for Monitoring Slow Ground Motions Associated with Tectonic and Hydrological Processes, American Geophysical Union.

Miller, M.M. and Shirzaei, M. (2017), Halting Land Subsidence in Tucson, Arizona: Examining the Poroelastic Response to Artificial Recharge (Invited), American Geophysical Union.

Miller, M.M. and Shirzaei, M. (2017), The impact of local land subsidence and global sea-level rise on flood severity in Houston-Galveston caused by Hurricane Harvey, American Geophysical Union.

Ojha, C., Shirzaei, M. Werth, S. and Argus, D. (2017), Investigating Groundwater Depletion and Aquifer Degradation in Central Valley California from Space, American Geophysical Union.

Zhai, G. and Shirzaei M. (2017), Investigating the relationship between seismicity and fluid injection in the Barnett Shale, Texas using coupled poroelastic model and surface deformation data, American Geophysical Union.

Khoshmanesh, M. and Shirzaei M. (2017), Creep avalanches on San Andreas Fault and their underlying mechanism from 19 years of InSAR and seismicity, American Geophysical Union.

Lee, J., Mu, C., Huang, W., Liu, Z., and Shirzaei, M. (2017) Geological and mechanical properties on the 3-D fault patch of the rapid creeping Chihshang Fault: a plate suture between Luzon arc and Eurasia in eastern Taiwan (Invited) , American Geophysical Union.

Ojha, C., Shirzaei, M. et al. (2016), Quantifying large scale deformation and aquifer properties over Central Valley, California using a combination of InSAR, GPS and hydraulic head level data, American Geophysical Union.

Khoshmanesh, M. and Shirzaei M. (2016), Compaction-induced elevated pore pressure and creep pulsing in California faults, American Geophysical Union.

Miller, M.M. and Shirzaei, M. (2016), Stress dependence of hydraulic properties: case studies from US and New Zealand, American Geophysical Union.

Zhai, G. and Shirzaei M. (2015), Sparsity-promoting inversion for modeling of irregular volcanic deformation source, American Geophysical Union.

Argus, D. F. and M. Shirzaei (2016) Sustained Changes in Water Storage in the Western U.S: Toward a Determination Integrating GPS, GRACE, (and InSAR), American Geophysical Union.

Shirzaei, M., (2016), Surface uplift and time-dependent seismic hazard due to fluid-injection: Case studies from Texas and Kansas, Geological Society of America.

Shirzaei, M., Ellsworth, W., Tiampo, K. and Gonzalez, P. (2015), Surface uplift and time-dependent seismic hazard due to fluid-injection in eastern Texas, American Geophysical Union.

Weston, J. and Shirzaei M. (2015), Updated Long Term Fault Slip Rates and Seismic Hazard in the Central Alborz, Iran: New Constraints From InSAR and GPS, American Geophysical Union.

Williams, N., Shirzaei, M. (2015), Inverse Modeling of Wrinkle Ridge Structures on the Moon and Mars, American Geophysical Union.

Shirzaei, M. and M. Manga (2015), Deep and shallow sources for the Lusi mud eruption revealed by surface deformation, American Geophysical Union.

Miller, M.M. and Shirzaei, M. (2015), Spatiotemporal distribution of strain field and hydraulic conductivity at the Phoenix valley basins, constrained using InSAR time series and time-dependent models, American Geophysical Union.

Khoshmanesh, M. and Shirzaei M. (2015), Creep avalanches on the Central San Andreas Fault: Clues and Causes, American Geophysical Union.

Liu, Z.Y. and M. Shirzaei (2015), Constraining planetary atmospheric density: application of heuristic search algorithms to aerodynamic modeling of impact ejecta trajectories, American Geophysical Union.

Zhai, G. and Shirzaei M. (2015), 4D map of the Kilauea summit shallow magmatic system constrained by InSAR time series and geometry-free inversions, American Geophysical Union.

Miller, M.M., and Shirzaei, M. (2014), Spatiotemporal Characterization of Aquifers Using InSAR Time Series and Time-dependent Poroelastic Modeling in Phoenix, Arizona, American Geophysical Union.

Horne, A. and M. Shirzaei (2014), Quantifying the Hydrologic Effects of the 2010-2011 Canterbury Earthquakes, American Geophysical Union.

Weston, J. and M. Shirzaei (2014), Mechanisms Behind Aseismic Slip Pulsing on the Northeast Japan Subduction Zone: Insights from Time-Dependent Modelling of GPS and Repeating Earthquakes, American Geophysical Union.

Zhai, G. and M. Shirzaei (2014), Time-dependent deformation source model of Kilauea volcano obtained via InSAR time series and inversion modeling, American Geophysical Union.

Khoshmanesh, M. and M. Shirzaei (2014), Time-dependent Model of Aseismic slip on the Central San Andreas Fault from InSAR Time Series and Repeating Earthquakes, American Geophysical Union.

Shirzaei, M., Rudolph, M.L. and Manga, M. (2014) Time-dependent source model of the Lusi mud volcano, American Geophysical Union.

Turner, R.C. and M. Shirzaei (2014), Slow and Go: Pulsing Slip Rates on the Creeping Section of the San Andreas Fault, American Geophysical Union.

Hodges K.V., Whipple, K.X., Kirby, E., Arrowsmith, R., and Shirzaei M. (2014), Modification of the Himalayan orogenic wedge by late Cenozoic southwestward flow of Tibet, American Geophysical Union.

Chaussard, E., Bürgmann, R., Shirzaei, M. (2014), Predictability of Hydraulic Head Changes and Characterization of Aquifer-System and Fault Properties from InSAR-Derived Ground Deformation, American Geophysical Union.

Williams, N.R., Bell J.F., Robinson, M.S., Shirzaei, M. (2014) Fault Dislocation Modeling of Tectonic Landforms in Mare Frigoris, American Geophysical Union.

Manga, M., Rudolph, M.L., Tingay, M.R., Davies, R., Wang, C.Y., Shirzaei, M. and Fukushima, Y. (2013) The Lusi mud eruption was not triggered by an earthquake, American Geophysical Union.

Shirzaei, M., Bürgmann, R. and Foster, J.H. (2013) Spatiotemporal monitoring and modeling of Hawaiian volcanoes using multitemporal InSAR, American Geophysical Union.

Chaussard, E., Bürgmann, R., Shirzaei, M. and Baker, B. (2013) Long-term and seasonal ground deformation in the Santa Clara Valley, California, revealed by multi decadal InSAR time series, American Geophysical Union.

Miller, M.M. and Shirzaei, M. (2013) Spatiotemporal monitoring and modeling of land subsidence in Phoenix using InSAR, GPS and gravity time series, American Geophysical Union.

Shirzaei, M., R. Burgmann, F. F. Pollitz; N. Uchida and T. Matsuzawa, (2012), Stress-guided time-dependent afterslip model of the 11 March 2011 Tohoku earthquake obtained from joint analysis of the GPS time series and repeating, American Geophysical Union.

Rudolph, M., M. Shirzaei, M. Manga, and Y. Fukushima, (2012), Source evolution and longevity of the Lusi mud eruption, Indonesia, American Geophysical Union.

Bathke. H., H. Sudhaus, T. R. Walter and M. Shirzaei, (2012), A new method for subsampling large InSAR data sets, American Geophysical Union.

Shirzaei, M. and R. Bürgmann (2012), Aseismic faulting of the south flank of Kilauea revealed by wavelet analysis of InSAR and GPS time series. American Geophysical Union, Chapman conference, Hawaii.

Shirzaei, M. and R. Bürgmann (2011), Spatiotemporal model of aseismic slip on the Hayward fault inferred from joint inversion of geodetic and seismic data time series, American Geophysical Union.

Shirzaei, M. T.R. Walter, (2010), The 12 Jan 2010, Haiti earthquake affected by aseismic fault creep, American Geophysical Union.

Shirzaei, M. T.R. Walter, (2010), Damavand volcano spreading detected by advanced InSAR time series, European Geoscience Union.

Shirzaei, M., and T.R. Walter (2010), Near real-time inverse source modeling and stress filed assessment: the requirement of a volcano fast response system, European Geoscience Union.

Shirzaei, M., and T.R. Walter (2010), Dynamic influence of volcanic activity at Mauna Loa, Hawaii, on earthquake occurrence in Kaoiki investigated via time-dependent source modeling and static stress transfer, European Geoscience Union.

Shirzaei, M. and T.R. Walter (2009), Deformation interplay at Hawaii Island, American Geophysical Union.

Shirzaei, M. and T.R. Walter (2009), WabInSAR: a new wavelet-based InSAR time series technique applied to volcanic and tectonic areas, American Geophysical Union.

Shirzaei, M. and T.R. Walter (2008), InSAR time series shows multiple deformation and interaction of gravitational spreading, intrusion, and compaction on Hawaii Island, European Geoscience Union.

Shirzaei, M. and T.R. Walter (2008), New wavelet-based InSAR time series (WAB-InSAR) technique eliminating atmospheric and topographic artifact using wavelet transforms and lead to accurate saptio-temporal deformation filed mapping, European Geoscience Union.

Shirzaei, M. T.R. Walter, M. Motagh, A. Golamzadeh, and F. Yamini-Fard (2008), Hybrid inversion of InSAR deformation and aftershock data to precise source modeling of the 2005 Qeshm island earthquake (Iran), European Geoscience Union.

Shirzaei, M. and T.R. Walter (2008) Wavelet based SBAS approach for InSAR time series: an application to volcanotectonic activities associated with OI DoinyoLengaivolcano and nearby, International Association of Volcanology and Chemistry of the Earth's Interior.

Shirzaei, M., T.R. Walter, M. Motagh, A. Golamzadeh, and F. Yamini-Fard (2007) Precise source modeling of the 2005 Qeshm Island earthquake (Iran), using joint inversion of surface deformation and aftershock data, Fringe workshop.

Shirzaei, M., T.R. Walter, M. Motagh, A. Manconi, and R. Lanari (2007) Inversion of InSAR data via Genetic Algorithm and Simulated Annealing methods-first results from the Campi-Flegrei volcanic region, Fringe workshop.

Shirzaei. M. and Mokhtari. M. (2006) Review on application of GPS in geodynamics and Earthquake prediction, 12th Geophysics conference of Iran.

Shirzaei. M., Mansouri. B. and M. Shinozuka (2006) Multiresolution Analysis of Satellite Optical Images for Damage Detection using Wavelet Transform, 4th International Workshop on Remote Sensing for Disaster Response 25-26th September 2006, Cambridge, UK.

DEVELOPED SOFTWARE

	Description
WabInSAR	Wavelet-based InSAR time series toolbox for multi-temporal analysis of radar data
MT-WabInSAR	Wavelet-based InSAR time series toolbox for multi-track multi-temporal analysis of radar data
MST-WabInSAR	Wavelet-based InSAR time series toolbox for multi-sensor, multi-track multi-temporal analysis of radar data
WabOrbC	Wavelet-based robust regression tool for correcting the effect of orbital error in repeat pass interferometry
WabTCADC	Wavelet-based method for topography correlated atmospheric delay correction in repeat pass interferometry
RISC-GA-KF	Heuristic tool for optimizing a variety of dynamic geophysical problems
RISC-SA/GA	Heuristic confident tool for optimizing a variety of static geophysical problems

GRANTS

Current and past (Total = \$4,367,921)

#	Title	Agency	Duration	Fund	Shirzaei %	Role
1	Application of InSAR and modeling to investigate time-dependent seismic hazard associated with wastewater injection	USGS	5/1/15-4/30/17	\$46,608	100%	PI
2	Origin of hydrologic responses to earthquakes: constraints from New Zealand, Taiwan, Chile, and the USA	NSF	4/15/14-4/31/18	\$101,852	100%	PI
3	Time-dependent creep model of the central creeping section of the San Andreas Fault from 21 years of InSAR, GPS and repeating earthquakes	NSF	5/1/14-4/30/18	\$262,322	100%	PI
4	Remote sensing of land subsidence and hydrological properties across Arizona	NASA	7/1/16-8/31/18	\$100,000	100%	PI

5	Mechanism of slow slip events on San Andreas fault: constraints from geodesy and seismology	NASA	7/15/17-8/31/18	\$100,000	100%	PI
6	Time-dependent model and underlying mechanism of creep rate variations on the Hayward Fault	USGS	1/1/18-12/31/18	\$70,591	100%	PI
7	Remote sensing of water mas budget variations in California	NASA	1/1/17-1/1/20	\$550,000	50%	Co-I
8	Observations, Models, and Mechanism of Spatiotemporal Interseismic Fault Creep in California.	NSF	8/1/17-7/31/20	\$335,189	100%	PI
9	Understanding and Predicting Coastal Sea Level Variability Around the United States	NASA	8/22/17-8/21/20	\$961,457	80%	PI
10	Physics-based Operational Induced Earthquake Forecasting: Process Understanding and Hazards Mitigation	DOE	9/1/2018-9/1/2021	\$997,107	100%	PI
11	Time-series analysis of fault creep rates within the Salton Trough of the Southern San Andreas Fault constrained from a decade of repeat-pass NASA UAVSAR radar imagery	SCEC	03/15/19-03/15/20	\$27,795	-	Co-I
12	Improved Resolution and Sampling of Total Water Storage Changes Through Data Fusion	NASA	01/01/2020-01/01/2024	\$715,000	50%	Co-I
13	Investigating the relationship between hydrologic loading and fault creep: A case study on the Salton Sea and southern San Andreas Fault	NASA	01/08/2020-01/08/2022	\$100,00	100%	PI

Pending (Total = \$2,037,000)

#	Title	Agency	Fund	Shirzaei %	Role
1	Remote Sensing of Surface-/Ground-water In the Mekong & Irrawaddy Region	NASA	\$700,000	50%	Co-I
2	Remote Sensing of Land Subsidence and Aquifer Dynamics in Four Corners States	NASA	\$567,000	100%	PI
3	Improving Urban and Agricultural Resilience through Remote Sensing of Land Subsidence and Flooding Extent	NASA	\$770,000	100%	PI