

William E. Holt

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Professional Preparation

Ph.D. University of Arizona, Geophysics (Seismology), 1989
M.S. University of Arizona, Geophysics (Geodynamics), 1986
B.S. Northern Arizona University, (Geophysics), 1983

Appointments *Professor*, Department of Geosciences, 9/01-present.
Associate Professor, Earth and Space Sciences, SUNY-Stony Brook, 9/96-8/01
Assistant Professor, Earth and Space Sciences, SUNY-Stony Brook. 9/91-9/96 *Post-Doctoral Research Fellow*, DSIR, Geophysics Division, Wellington, NZ, 8/89-8/91

Research Interests: Kinematics and dynamics from regional to global scale, seismology, global mantle convection coupled to lithosphere dynamics, Time-dependent dynamics of the lithosphere coupled to climate

Awards: AGU Fellow, 2004, for Contributions to Understanding of Kinematics and Dynamics of the Lithosphere; Distinguished Alumni Award, University of Arizona, Department of Geosciences, 2002; NSF Faculty CAREER award: 1995 – 2000. New Zealand Ministerial Award, 1991, Kinematics of the Lithosphere.

Professional Service:

EarthScope Science Planning Committee (2024-25), EarthScope Advisory Committee 2021-2022, EarthScope Governance Planning Workshop (18 members): Fort Collins, Colorado, April 2022. Nominated to run for UNAVCO Board of Directors, 2020 election; UNAVCO Data Products Subcommittee, 2018; UNAVCO Board of Directors, Vice Chair, 2010, Chair 2011-2013; EarthScope Steering Committee member, National Science Foundation, 2006 – 2010; Fellows Committee – T-Section, AGU; National Research Council, Committee on Seismology and Geodynamics, 2003-2009; Board of Directors for UNAVCO, Inc., 2001-2003; EarthScope Plate Boundary Observatory Steering Committee, 2003-2005. Project Leader of the ILP-Project-II-8, which developed the original *Global Strain Rate Map*.

Selected Publications

H-index=47; i10-index = 72; number of citations = 8104

https://scholar.google.com/citations?hl=en&user=tBN81YkAAAAJ&view_op=list_works

Smiley, Tara M., Alireza Bahadori, E. Troy Rasbury, **William E. Holt**, and Catherine Badgley. 2024. "Tectonic Extension and Paleoelevation Influence Mammalian Diversity Dynamics in the Basin and Range Province of Western North America." *Science Advances* 10 (25): eadn6842. <https://doi.org/10.1126/sciadv.adn6842>.

Sui, S[†], Shen, W., **Holt, W.**, & Kim, J[†]. (2023). Crustal architecture across Southern California and its implications on San Andreas Fault development. *Geophysical Research Letters*, 50, e2022GL101976. <https://doi.org/10.1029/2022GL101976>

Rasbury, E.T., G. Piccione, **W.E. Holt**, W.B. Ward, Potential for constraining sequence stratigraphy and cycle stratigraphy with U-Pb dating of carbonates, *Earth-Science Reviews* Volume 243, August 2023, 104495, <https://doi.org/10.1016/j.earscirev.2023.104495>

- Bahadori, A. †, **Holt, W.E.**, Feng, R. *et al.* (2022). Coupled influence of tectonics, climate, and surface processes on landscape evolution in southwestern North America. *Nature Communications* **13**, 4437 (2022). <https://doi.org/10.1038/s41467-022-31903-2>
- Bahadori, A. †, **Holt, W.E.**, Austermann, J. *et al.* The role of gravitational body forces in the development of metamorphic core complexes (2022). *Nature Communications* **13**, 5646 (2022). <https://doi.org/10.1038/s41467-022-33361-2>.
- Smiley, T.M., A. Bahadori †, **W.E. Holt**, T.M. Rasbury, and C. Badgley (2022). Tectonics, topography, and mammal diversity dynamics in the Basin and Range. *Nature Communications*, In revision after Review.
- Loughney, K. M.; Badgley, C.; Bahadori, A. †; **Holt, W. E.**; Rasbury, E. T. (2021). Tectonic Influence on Cenozoic Mammal Richness and Sedimentation History of the Basin and Range, Western North America. *Sci. Adv.* **2021**, 7 (45), eabh4470.
- Murray, K. D., Lohman, R. B., Kim, J., & **Holt, W. E.** (2021). An alternative approach for constraining 3D-displacements with InSAR, applied to a fault-bounded groundwater entrainment field in California. *Journal of Geophysical Research: Solid Earth*, *126*, e2020JB021137. <https://doi.org/10.1029/2020JB021137>.
- Kim, J. †, **Holt, W. E.**, Bahadori, A. †, & Shen, W. (2021). Repeating nontectonic seasonal stress changes and a possible triggering mechanism of the 2019 Ridgecrest earthquake sequence in California. *Journal of Geophysical Research: Solid Earth*, *126*, e2021JB022188. <https://doi.org/10.1029/2021JB022188>
- Kim, J. †, Bahadori, A. †, & **Holt, W.E.** (2021). Crustal strain patterns associated with normal, drought, and heavy precipitation years in California. *Journal of Geophysical Research: Solid Earth*, *126*, e2020JB019560. <https://doi.org/10.1029/2020JB019560>
- Pazzaglia, Frank J, Helen Malenda, Matthew McGavick, Cody Raup, Mark Carter, Claudio Berti, Shannon Mahan, Michelle Nelson, Tammy Rittenour, Ron Counts, Jane Willenbring, Dru Germanoski, Steve Peters, **William Holt**, (2020), River terrace evidence of tectonic processes in the eastern North American plate interior, South Anna River, Virginia, *The Journal of Geology*, Accepted Nov. 4, 2020; <https://doi.org/10.1086/712636>.
- Bahadori, A. †, **Holt, W.E.** Geodynamic evolution of southwestern North America since the Late Eocene. *Nat Commun* **10**, 5213 (2019). <https://doi.org/10.1038/s41467-019-12950-8>
- Ghosh, A. †, **Holt, W. E.**, & Bahadori, A. (2019). Role of large-scale tectonic forces in intraplate earthquakes of central and eastern North America. *Geochemistry, Geophysics, Geosystems*, *20*, 2134–2156. <https://doi.org/10.1029/2018GC008060>
- X. Wang †, **W. E. Holt**, A. Ghosh. (2019) Joint modeling of lithosphere and mantle dynamics: Sensitivity to viscosities within the lithosphere, asthenosphere, transition zone, and D" layers, *Physics of the Earth and Planetary Interiors*, *293*, doi:10.1016/j.pepi.2019.05.006.
- Kraner, M. L. †, **Holt, W. E.**, & Borsa, A. A. (2018). Seasonal nontectonic loading inferred from cGPS as a potential trigger for the M6.0 South Napa earthquake. *Journal of Geophysical Research: Solid Earth*, *123*. <https://doi.org/10.1029/2017JB015420>
- Bahadori, A. †, **Holt, W.E.**, and Rasbury, E.T., (2018), Reconstruction modeling of crustal thickness and paleotopography of western North America since 36 Ma: *Geosphere*, v. 14, no. 3, doi:10.1130/GES01604.1.
- Porter, R., Hoisch, T., and **W.E. Holt**, (2017), The role of lower-crustal hydration in the tectonic evolution of the Colorado Plateau, *Tectonophysics*, 712-713, 221-231, <http://dx.doi.org/10.1016/j.tecto.2017.05.025>
- Porter, R., Y. Liu †, and **W. E. Holt** (2016), Lithospheric records of orogeny within the continental U.S., *Geophys. Res. Lett.*, *43*, 144–153, doi:10.1002/2015GL066950.
- Ramsay, J, Kohler, M.D., Davis, P.M., Wang, X. †, **Holt, W.E.**, and Weeraratne, D.S. (2016), Anisotropy from SKS splitting across the Pacific-North America plate boundary offshore southern California, *Geophys. J. Int.* *207*, 244–258, doi: 10.1093/gji/ggw271
- Finzel, E. S., L. M. Flesch, K. D. Ridgway, **W. E. Holt**, and A. Ghosh (2015), Surface motions and intraplate continental deformation in Alaska driven by mantle flow. *Geophys. Res. Lett.*, *42*, 4350–4358. doi:10.1002/2015GL063987.
- Wang, X. †, **W. E. Holt**, and A. Ghosh † (2015), Joint modeling of lithosphere and mantle dynamics: Evaluation of constraints from global tomography models, *J. Geophys. Res. Solid Earth*, *120*, 8633–8655, doi:10.1002/2015JB012188.
- Liu, Y. †, and **W. E. Holt** (2015), Wave gradiometry and its link with Helmholtz equation solutions applied to USArray in the eastern U.S., *J. Geophys. Res. Solid Earth*, *120*, 5717 – 5746, doi:10.1002/2015JB011982.
- Holt, W. E.**, and G. Shcherbenko † (2013), Toward a Continuous Monitoring of the Horizontal Displacement Gradient Tensor Field in Southern California Using cGPS Observations from Plate Boundary Observatory (PBO), *Seism. Res. Lett.*, vol. *84*, No. 3, doi: 10785/0220130004.
- Ghosh, A. †, **W. E. Holt**, and L. M. Wen (2013), Predicting the lithospheric stress field and plate motions by joint

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- Ghosh, A. †, **W. E. Holt**, Plate Motions and Stresses from Global Dynamic Models, *Science* **335**, 838 (2012), DOI: 10.1126/science.1214209.
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- Davis, J. L., Y. Fialko, **W. E. Holt**, M. M. Miller, S. E. Owen, and M. E. Pritchard (Eds.), (2012), *A Foundation for Innovation: Grand Challenges in Geodesy*, Report from the Long-Range Science Goals for Geodesy Community Workshop, UNAVCO, Boulder, Colorado, 79 pp., 2012
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- Klein, E. C., L. M. Flesch, **W. E. Holt**, and A. J. Haines (2009), Evidence of long-term weakness on seismogenic faults in western North America from dynamic modeling, *J. Geophys. Res.*, **114**, doi:10.1029/2007JB005201.
- Ghosh †, A., W. E. Holt, L. Wen, A. J. Haines, and L. M. Flesch (2008), Joint modeling of lithosphere and mantle dynamics elucidating lithosphere-mantle coupling, *Geophys. Res. Lett.*, **35**, L16309, doi:10.1029/2008GL034365.
- Flesch, L., **W. E. Holt**, A.J. Haines, L. Wen, B. Shen-Tu, The Dynamics of Western North America: Stress Magnitudes and the Relative Role of Gravitational Potential Energy, Plate Interaction at the Boundary, and Basal Traction, *Geophys. Jour. Int.*, **169**, 866-896, 2007.
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- Kreemer, C †, **W.E. Holt**, and A. J. Haines, An integrated global model of present-day plate motions and plate boundary zones, *Geophys. J. Int.*, **154**(1), 8-34, 2003.
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†Ph.D. student or post-doc supervised by William Holt

††Undergraduate Student supervised by William Holt

Doctoral Advisors: Terry C. Wallace, Clem Chase, Randy Richardson (University of Arizona)

Post-Doctoral Advisor: Tim Stern (Victoria University of Wellington)

Thesis Advisor and Post-Doctoral Sponsor: Bingming Shen-Tu (Air Worldwide), Valentina Bruno (National Institute of Geophysics and Volcanology, Rome, Italy), Corné Kreemer (University of Nevada, Reno), Lucy Flesch (Purdue University), Shelly Bernard-Johnson (Industry); Brian Hahn (Industry), Elliot Klein (Air Worldwide, Industry), Lada Dimitrova (Oregon St), Attreyee Ghosh (USC, Stony Brook, Indian Institute of Sciences), Daniel Hernandez (Teacher, Brooklyn, NY), Yuanyuan Liu (Stony Brook), Gina Shcherbenko (Stony Brook); Xinguo Wang (Chinese Academy of Sciences); Huiyu Yang (Stony Brook University); Jinhai Zhang (Chinese Academy of Sciences), Ali Bahadori (SB), Jey Kim (SB), Lajhon Campbell (SB).

Total Graduate Students Advised (Primary Only): 18; Total Post-Doctoral Scholars Advised: 5

Synergistic Activities

- (1) Project Leader of the ILP-Project-II-8, which developed the original Global Strain Rate Map (Kreemer et al., 2000; 2003), with the original interactive site at www.world-strain-map.org.

Worked with Lou Estey and Chuck Meertens at UNAVCO to make all models available on Jules Verne Voyager map tool (<http://jules.unavco.org/>).

- (2) Helped in the development of the Geodesy Grand Challenges document: Davis, J. L., Fialko, Y., Holt, W. E., Miller, M. M., Owen, S. E., & Pritchard, M. E. (2012). A foundation for innovation: grand challenges in geodesy. In *Report from the Long-Range Science Goals for Geodesy Community Workshop, UNAVCO (Boulder, CO)*.
- (3) Served on UNAVCO Board of Directors as Chair (2011-2013) and helped in the development of the successful GAGE proposal to NSF. Served as Vice Chair in 2010, with entire service period of two consecutive terms. Also served on UNAVCO Board of Directors as a founding member in 2001-2003.

Mentored 17 high school students during the summer and throughout school year to develop successful research projects. Some have been awarded as Intel Semi-finalists, (2008 - Robert Kamininski; 2011- Susan Wu, 2012 -Ben Pleat; 2012 -Julia Zhuang), Regeneron Science Talent search semi-finalist (2016 – Rubin Smith), Regeneron Science Talent search semi-finalist (2019 – Julia Grossman). Regeneron Science Talent search finalist (2021 – Yash Narayan), Rebecca Cho, 2021 - won 1st place in the Earth and Environmental Sciences category in the International Science and Engineering Fair in Atlanta as well as the H. Robert Horvitz Prize. (2023 – Bradley Kelton, Regeneron STS Semi-Finalist), Julie Cai (AGU Abstract Presentation), Razvan Verde.

Recent/Current Funding:

(1) Project/Proposal Title: Collaborative Research: Integrating Fluorspar Ages and Geophysical Models to Constrain the Timing and Mechanisms of the Collapse of the Cordillera in SW North America, FRES NSF Program

Total Award Amount: \$933,459

PI: William Holt; Co-PIs: Weisen Shen

Total Award Period Covered: 48 months 9/1/2023 – 8/31/2027.

(2) Project/Proposal Title: Collaborative Research: Integrating tectonics, climate, and mammal diversity
Source of Support: NSF – IES Program

Total Award Amount: \$483,651

PI: William Holt; Co-PIs: Emma Troy Rasbury, Daniel Davis

Total Award Period Covered: 36 months 8/31/2018 – 8/31/2022 (no-cost extension to 8/31/23 Granted)

(3) Title: Analysis of climate-related stress changes in the Western U.S. inferred from satellite-based data and its correlation with seismicity - (FINESST – Future Investigators in NASA Earth and SPACE Science and Technology)

PI: William Holt

Source of Support: NASA

Total Award: \$134,508 (36 months) 8/31/2019 – 8/31/22. (No-cost extension granted to 8/31/23)

(4) Title: COLLABORATIVE RESEARCH: Parsing the influence of climate and tectonics on Miocene ecosystems and faunal evolution in the East African Rift, Kenya

co-PI: William Holt

Source of Support: NSF (FRES Program) (48 Months) 1/1/2021 – 12/31/2024

Total Award: \$597,457

(5) Title: Using a Joint Analysis of GPS and InSAR data to resolve time-dependent crustal strain evolution within the plate boundary zone of western North America
Source of Support: NASA
PI: William Holt (Stony Brook University); Co-I: Adrian Borsa (UCSD)
Total Award: \$577,834

(6) 2022 SCEC Proposal
Title: Joint Inversion of GNSS and InSAR Data for Continuous 3-D Velocity and Strain Rate Fields in Southern California
Source of Support: SCEC/USC
Total Award Amount: \$22,000
Total Award Period: 02/01/22-04/23/23
Role in the Project: PI

(7) Project/Proposal Title: Instantaneous stress state of the lithosphere of S. California: A synthesis of geophysical and compositional products of SCEC
Source of Support: SCEC
Total Award Amount: \$25,000
Total Award Period: 02/01/21-01/31/22
Role in the Project: co-PI

(8) Project/Proposal Title: A Seismic Nodal Array Investigation to the Turkana Basin Kenya
Source of Support: OVRP
Total Award Amount: \$50,000
Total Award Period: 02/01/21-01/31/23 (no-cost extension)
Role in the Project: co-PI

(9) 2024 SCEC Proposal: A Statewide California 3-D Velocity and Strain Rate Field from Joint Inversion of GNSS and InSAR Data
Source of Support: USC/SCEC (1 year) 1/31/2024 – 12/31/2024
PI: William Holt
Total Award: \$24,477, Acad: 0.0 Sumr: 0.0 mo.

(10) The Prescott Paleochannel as a Key Test for Miocene Drainage Reversal in the Arizona Transition Zone
Source of Support: American Chemical Society Petroleum Research Fund, 2/1/2025- 8/31/2027
PI: William Holt
Total Award: \$125,000, Acad: 0.0 Sumr: 0.5 mo.