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Department of Earth and Environmental Sciences
Tulane University
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EDUCATION

PhD	Stanford University, Geophysics	Jan 2020
	Advisor: Simon Klemperer	
	Thesis title: Post-Critical <i>SsPmp</i> and its Applications	
BS	Peking University, Geophysics	Jul 2013

PROFESSIONAL APPOINTMENTS

2026–present	Assistant Professor Department of Earth and Environmental Sciences Tulane University
2023–2026	Research Associate III Department of Geology and Geophysics Woods Hole Oceanographic Institution Advisor: Robert Sohn
2020–2023	Postdoctoral Scholar Institute of Geophysics and Planetary Physics Scripps Institution of Oceanography, UC San Diego Advisor: Peter Shearer

HONORS AND AWARDS

Weston Howland Jr. Postdoctoral Scholarship	2022
Global competition, fewer than one award to geophysics each year Woods Hole Oceanographic Institution	
Green Postdoctoral Scholarship	2019
Global competition, two awardees each year Scripps Institution of Oceanography, UC San Diego	
AGU Outstanding Student Paper Award (OSPA)	2019
Tectonophysics Section, American Geophysical Union	
AGU Outstanding Student Paper Award (OSPA)	2015

Tectonophysics Section, American Geophysical Union

Stanford Graduate Fellowship

2014

University-wide competition, 3-year fellowship

Stanford University

RESEARCH INTERESTS

I am interested in using seismological techniques to study:

- Reactive fluid transport during active peridotite alteration
- Melt and fluid transport in magmatic and hydrothermal systems
- Lithospheric discontinuities and their relation to deep fluid and melt transport

PUBLICATIONS

Peer-reviewed Articles

- [12] **Liu, T.**, Liang, C., Aiken, J. M., Wu, W., & Sohn, R. (2026). Enigmatic harmonic tremor in the Samail Ophiolite, Oman: Evidence for subsurface gas flow. *Journal of Geophysical Research: Solid Earth*, 131, <https://doi.org/10.1029/2025JB033691>
- [11] **Liu, T.**, Chin, E. J., & Shearer, P. M., (2023). Strong Physical Contrasts across Two Mid-lithosphere Discontinuities beneath the Northwestern United States: Evidence for Cratonic Mantle Metasomatism. *AGU Advances*, 4, <https://doi.org/10.1029/2023AV001014>.
- [10] Hao, S., Shearer, P. M., & **Liu, T.**, (2023). The upper-mantle structure beneath Alaska imaged by teleseismic S-wave reverberations. *Journal of Geophysical Research*, 128, <https://doi.org/10.1029/2023JB026667>
- [9] **Liu, T.**, Gong, J., Fan, W., & Lin, G. (2023). In-situ V_p/V_s ratio reveals fault zone material variation at the westernmost Gofar transform fault, East Pacific Rise. *Journal of Geophysical Research*, 128, <https://doi.org/10.1029/2022JB025310>
- [8] **Liu, T.**, & Shearer, P. M. (2022). Likely P-to-S Conversion at the Core-Mantle Boundary Extracted from Array Processing of Noise Records. *Geophysical Research Letters*, 49(7), <https://doi.org/10.1029/2021GL097034>
- [7] Klemperer, S. L., Zhao, P., Whyte, C. J., Darrah, T. H., Crossey, L. J., Karlstrom, K. E., **Liu, T.**, Winn, C., Hilton, D., & Ding, L. (2022). Limited underthrusting of India below Tibet: $^3\text{He}/^4\text{He}$ analysis of thermal springs locates the mantle suture in continental collision. *Proceedings of the National Academy of Sciences*, 119(12), <https://doi.org/10.1073/pnas.2113877119>
- [6] **Liu, T.** & Shearer, P. M. (2021). Complicated lithospheric structure beneath the contiguous US revealed by teleseismic S reflections, *Journal of Geophysical Research*, 126(5), <https://doi.org/10.1029/2020JB021624>

- [5] **Liu, T.**, Klemperer, S. L., Yu, C. & Ning, J. (2020). Post-critical *SsPmp* and its applications to Virtual Deep Seismic Sounding (VDSS)—3: back-projection imaging of the crust–mantle boundary in a heterogeneous lithosphere, theory and application, *Geophysical Journal International*, 223(3), <https://doi.org/10.1093/gji/ggaa332>
- [4] Sleep, N. & **Liu, T.** (2020). Nonlinear suppression of high-frequency S waves by the near-field velocity pulse with reference to the 2002 Denali earthquake, *Journal of Geophysical Research*, 125(1), <https://doi.org/10.1029/2019JB018386>
- [3] **Liu, T.**, Klemperer, S. L., Ferragut, G., & Yu, C. (2019). Post-critical *SsPmp* and its applications to Virtual Deep Seismic Sounding (VDSS)—2: 1-D imaging of the crust/mantle and joint constraints with receiver functions., *Geophysical Journal International*, 219(2), <https://doi.org/10.1093/gji/ggz370>
- [2] **Liu, T.**, Klemperer, S. L., Yu, C., & Ning, J. (2018). Post-critical *SsPmp* and its applications to Virtual Deep Seismic Sounding (VDSS)—1: sensitivity to lithospheric 1-D and 2-D structure. *Geophysical Journal International*, 215(2), <https://doi.org/10.1093/gji/ggy307>
- [1] Tao, K., **Liu, T.**, Ning, J., & Niu, F. (2014). Estimating sedimentary and crustal structure using wavefield continuation: theory, techniques, and applications. *Geophysical Journal International*, 197(1), <https://doi.org/10.1093/gji/ggt515>

MENTORING EXPERIENCES

Gabriel Ferragut , IRIS summer intern from North Dakota State University	2017
• Work on <i>SsPmp</i> amplitude variation and crustal structure of the Slave Craton • Publish a coauthored paper on <i>Geophysical Journal International</i> • Ferragut was admitted to graduate program in earth science at the University of Oregon	
Dylan Salam , military veteran, SURF summer intern from Arizona State University	2021
• Work on imaging lithospheric discontinuities beneath the Midcontinent Rift with teleseismic-S reverberations.	
Nic Donnellan and Joel Hurtado , military veterans, interns from San Diego Mesa College.	2022
• Work on understanding the waveforms of the 2019 Ridgecrest Earthquake	

TEACHING EXPERIENCES

Journey to the Center of the Earth , teaching assistant	2019
• ~20 students enrolled, ~50% undergraduate • Grade homework and hold discussion sessions • Help design the final project of creating a new Wikipedia article	
Reflection Seismology , teaching assistant	2017
• ~15 students enrolled, ~20% undergraduate • Grade homework and hold discussion sessions • Give one lecture on <i>Applications of Shear Waves in Seismic Explorations</i>	
Introductory Seismology , teaching assistant	2015
• ~15 students enrolled, ~80% undergraduate • Grade homework and hold discussion sessions • Give one lecture on <i>Earthquakes and Tectonics</i>	

FIELDWORK EXPERIENCES

Geodetic campaign in Salton Trough, Southern California	2020
• Attend as a team member • Measure deformation across the San Andreas Fault using GPS	
Second geochemical-sampling expedition to the Tibet Plateau	2016
• Attend as a team member • Sample fluids from thermal springs for He^3/He^4 and other geochemical analyses	
Seismic cruise offshore Catalina Island, Southern California	2015
• Attend as a team member • Use seismic chirps to image submerged paleo-shorelines and terraces	
First geochemical-sampling expedition to the Tibet Plateau	2014
• Attend as the team leader • Sample fluids from thermal springs for He^3/He^4 and other geochemical analyses • First He^3/He^4 samples in the interior of the plateau outside the north-south trending rifts	

ACADEMIC SERVICES

Primary convener, Session DI010: Interdisciplinary studies of the lithosphere-asthenosphere system, AGU Fall Meeting, 2021

Article reviewer for *Science Advances*, *Nature Communications*, *The Seismic Record*, *Geophysical Research Letters*, *Journal of Geophysical Research: Solid Earth*, *Geophysical Journal International*, *Geochemistry*, *Geophysics*, *Geosystems*, *Physics of Earth and Planetary Interior*, *Seismica*, *Seismological Research Letters*, *Communications Earth & Environment*, and *Earth and Space Science*

Proposal reviewer for the National Science Foundation

SELECTED PRESENTATIONS AND INVITED LECTURES

“New Frontiers in Geological Hydrogen Exploration Using Seismology” at the Department of Earth and Environmental Sciences, Tulane University, March 2026

“Seismic and borehole-acoustic observations of free-gas migration and tensile fracture growth during low-temperature peridotite alteration” at the Earth Resource Laboratory, MIT, February 2026

“Seismic Evidence for Sustained Gas Migration in a Serpentinizing Aquifer”, Oral presentation at the American Geophysical Union Fall Meeting, December 2025

“Spatial-temporal Evolution of In-situ V_p/V_s Ratio in the Gofar Transform Fault Zone, East Pacific Rise”, Oral presentation at Seismological Society of America Annual Meeting, December 2022

“Post-critical $SsPmp$ and its applications” Invited talk at the Department of Geophysics, Peking University, December 2020

“An intermediate bulk crustal composition of the Slave Craton: Is it a surprise?” Oral presentation at American Geophysical Union Fall Meeting, December 2019.

“Post-critical $SsPmp$ and its applications in Virtual Deep Seismic Sounding (VDSS)” Invited talk at Earth Resource Laboratory, MIT, April 2019.

“Lithospheric structure of Ordos, China: Evidence from Virtual Deep Seismic Sounding (VDSS)” Oral presentation at the American Geophysical Union Fall Meeting, December 2014.