Hao Zhang

PhD Candidate · Geophysics

3651 Trousdale Pkwy, Los Angeles, CA 90089

+1 213-255-6653 | hzhang63@usc.edu | zhsess.github.io

Acedemic Qualifications

University of Southern California *Los Angeles, CA*

PhD in Geophysics (In Progress) *2021 - present*

- Advisor: John E. Vidale and Yehuda Ben-Zion

Peking University *Beijing, China*

BS in Geophysics *2016 - 2020*

- Thesis: Frequency-Bessel Transform Method to Extract Higher-Mode Rayleigh Dispersion Curves
- Research Advisor: Xiaofei Chen

Professional Experience

2021 - Now **Research Assistant**, University of Southern California

2020 - 2021 **Research Assistant**, Institue of Geophysics, China Earthquake Administration (CEA)

Journal Publications

In preparation

[10] **Zhang, H.** and Jordan, T. H., Searching for Slow Precursors to Megathrust Earthquakes

[9] **Zhang, H.** and Vidale, J. E., High-frequency energy radiation controlled by the rupture complexity

[8] Wu, B., Li, B, **Zhang, H**., Huang, S. and Li, G., Nearfield Strong-motion of the 2023 M7.8 Kahramanmaraş Earthquake and Implications for High-frequency Radiation Mechanisms

[7] **Zhang, H.** and Barbot, S., Thermobaric controls on metagreywacke friction and implications for megathrust dynamics

Under review

[6] **Zhang, H.**, Vidale, J. E. and Wang W., Aftershocks on the planar rupture surface of the deep-focus Mw 7.9 Bonin Islands earthquake (*Under review for The Seismic Record*)

[5] Zhang, S., Houston, H., Wang, B. and **Zhang, H.**, Mapping of absolute stresses around two California earthquakes reveals a very weak crust (*Under review for Nature Geo.*)

Published

[4] **Zhang, H.**, Vidale, J. E. and Wang W., 2024. Scattering evidence for an ancient subducted slab using the unique raypath P*PKP, *Geophys. Res. Lett.*, **51**, e2024GL110130, doi: 10.1029/2024GL110130

[3] **Zhang, H.** and Ben-Zion, Y., 2024. Enhancing regional seismic velocity model with higher-resolution local results using sparse dictionary learning, *J. Geophys. Res.*, **129**, e2023JB027016, doi: 10.1029/2023JB027016

[2] **Zhang, H.**, Meng, H. and Ben-Zion, Y., 2023. Lateral variations across the Southern San Andreas Fault Zone revealed from analysis of traffic signals at a dense seismic array, *Geophys. Res. Lett.*, **50**, e2023GL103759, doi: 10.1029/2023GL103759

[1] Wang, L., Zhou, Y., Zhou, S. and **Zhang H.**, 2023. Detection of Fault Zone Head Waves and the Fault Interface Imaging in the Xianshuihe-Anninghe Fault Zone (Eastern Tibetan Plateau). *Geophys. J. Int.*, **234**(2), 1000-1100, doi: 10.1093/gji/ggad131

Prizes, Awards, and Grants

2023 **Earth Sciences Graduate Student Research Award**, University of Southern California *$ 3,000*

2020 **Distinguished Graduate**, Peking University
Distinguished Graduate, Beijing City

2019 **Outstanding Researech Award**, Peking University

2017 **May Fourth Scholarship**, Peking University
Merit Student, Peking University

Talks and Conference Contributions

**Presentations related to published works are omitted*

Invited Talks

July 2023. *Enhancing regional seismic velocity model with higher-resolution local results using sparse dictionary learning*. Peking University, Beijing, China.

Conference/Workshop Talks

December 2019. *CPPC: A New Method to Detect and Pick the Fault Zone Head Wave Arrivals and its Application in Xiaojiang Fault Zone of West-Southern China*. AGU Fall meeting, San Francisco, CA.

Conference/Workshop Posters

September 2024. **Zhang, H.** and Vidale, J. E., *High-frequency energy radiation controlled by the rupture complexity*. SCEC Annual Meeting, Palm Springs, CA.

Teaching

2022 **Crises of a Planet**, Teaching Assistant *USC*
2019 **The Earth Gravity Field**, Teaching Assistant *PKU*

Outreach & Professional Development

Professional Service

2024 **Lithospheric Dynamics Seminar**, Organizer *USC*

Project Involvement

China Array Aiming to fulfill the systematic broadband seismic observations covering the whole mainland area of China with an average inter-station spacing from around 30 to 60 km, China Array is run with a multi-stage process and comprised of seven geographic regions based on China tectonics. I attended the planning and deployment of China Array in Inner Mongolia and Northeast China in 2019.

FaultScan This project aims at revolutionizing our ability to directly observe transient deformation within the core of active faults and provide unprecedented accuracy in the detection of earthquake precursors. I attended the deployment and maintaince of a dense 2D seismic array targeting the San Jacinto Fault from 2021 to 2024. This project is in collaboration with Florent Brenguier (ISTerre), Yehuda Ben-Zion (USC) and Frank Vernon (UCSD).

Rock Frictional Experiment We seek to characterize the frictional properties of subduction system to better understand the controls on the behavior of slow slip events, tremors and large thrust earthquakes and build a frictional database for the community. We colloected representative rock samples from the Catalina Schist and conducted systematic velocity-step experiments under various tempreture and effective normal stress conditions. This project is in collaboration with Sylvain Barbot (USC).

Skills and Technical

Generalization Theory: Mathematical Physics, Theoretical Physics, Probability and Statistics, Machine Learning

Programming Language: Python, MATLAB, C/C++, R, Fortran, Julia

Experimental Skill: Seismic fieldwork (deployment, maintence and data management), Laboratory experiments