

Wenyuan Fan

Institute of Geophysics and Planetary Physics
Scripps Institution of Oceanography, UC San Diego
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RESEARCH INTERESTS

I am interested in seismic source processes like earthquakes and environmental seismic events. My research aims to understand earthquake behaviors and abnormal slip events using novel imaging techniques, dense seismic arrays, numerical modeling, and both onshore and offshore geophysical data collection.

Key Words: Earthquake seismology, Array Seismology, Environmental Seismology, Marine Geophysics, Earthquake Source Kinematic and Dynamic Processes, Earthquake Interaction and Triggering, Waveform Modeling, Subduction Zones

EDUCATION

University of California, San Diego, **Ph.D.** (Geophysics) 2017

Peking University, **M.S.** (Geophysics) 2011

Peking University, **B.S.** 2008

RESEARCH POSITIONS

Associate Professor of Geophysics 07/2023–present
Assistant Professor of Geophysics 07/2020–06/2023
Scripps Institution of Oceanography
University of California, San Diego, La Jolla, CA 92093

Assistant Professor of Geophysics 01/2019–06/2020
Florida State University, Tallahassee, FL 32306

Postdoctoral Scholar 09/2017–12/2018
Woods Hole Oceanographic Institution, Woods Hole, MA 02543

AWARDS

AGU Keiiti Aki Early Career Award 2022
NSF CAREER Award 2022
James Postdoctoral Scholar Funds for Research 2018
2017 China Scholarship Council Award 2018
Woods Hole Oceanographic Institution Postdoctoral Scholarship 2017
Lamont-Doherty Earth Observatory Postdoctoral Fellowship (declined) 2017
AGU Outstanding Student Paper Award (2016) 2017
Founder Scholarship, Peking University 2010
Second Prize, Graduate Student Fellowship, Peking University 2010
First Prize, Graduate Student Fellowship, Peking University 2008-2009
Undergraduate Research Fellowship, Peking University 2007
Second Prize, Geophysical Scholarship of Chinese Academy of Sciences 2006-2007

FUNDING

NSF Funds:
OCE-MG&G #1833279, Collaborative Research: Capturing 4D Variations in Stress,

Slip, and Fault-Zone Material Properties: The 2019-2021 Gofar Transform Fault Earthquake Prediction Experiment (Co-PI) 2018

OPP-ANS #1838464, Collaborative Research: Using seismic tremor to constrain seasonal variations in subglacial hydrology at the bed of the Greenland ice sheet (Co-PI) 2019

EAR-PH #2022441, Collaborative Research: Investigating the role of dynamic strain fields in earthquake triggering processes by simulating full wavefield with 3D seismic velocity structures (PI) 2020

EAR-PH #2143413, CAREER: Using seismic sources to probe megathrust fault conditions (PI) 2022

USGS Funds:

USGS Award #2022-0010, Development of New Tools to Measure Global Earthquake Source Properties Using Teleseismic Observations (Co-PI) 2022

SCEC Funds:

SCEC Award #20115, Resolving Finite Source Attributes of Moderate Magnitude Earthquakes of the 2019 Ridgecrest Earthquake Sequence (PI) 2020

SCEC Award #21055, Resolving finite source attributes of moderate and small magnitude earthquakes of the 2019 Ridgecrest earthquake sequence (PI) 2021

WHOI Internal Funds:

Developing a Seafloor Geodetic Surveying Capability for AUVs (Co-PI) 2018

FSU Internal Funds:

Provost's Faculty Travel Grant 2019

Arts and Sciences Dean's Faculty Travel Award 2019

Student Funds:

CIDER Summer Program 2017

SSA Annual Meeting Travel Grants 2017

SCEC-ERI Summer School Travel Award 2014-2016

SIO Department Graduate Student Excellence Travel/Research Award 2015-2016

NMEM2015 Travel Award 2015

USArray Short Course Travel Award 2013,2017

CIG/QUEST/IRIS Joint Workshop Travel Award 2013

MENTEES

Postdoctoral Scholars: Haoran Meng (09/2019-09/2021); Jianhua Gong (02/2021-12/2022); Tianze Liu (01/2021-01/2023); Zhe Jia (06/2022-present)

Ph.D. Students: Nicolas DeSalvio (09/2021-present); Ian Vandevent (09/2021-present); W.C. Jeremy Wong (09/2021-present); Jing Ci Neo (09/2020-present); Harrison Burnett (07/2023-present)

MS Students: Xinyu Luo (09/2019-09/2022)

Visiting Scholars: Ryo Okuwaki (09/2019-12/2019; 11/2022-12/2022)

Undergraduate Students: Cameron Wang (01/2021–10/2021); Harrison Burnett (01/2022–07/2023); Jeffrey Nguyen (01/2023–03/2023); Grace Atkisson (01/2023–06/2023)

**INVITED
TALKS**

2023 (5): Colorado School of Mines, Golden, CO, USA; USGS, Golden, Co, USA; University of Tsukuba, Tsukuba, Ibaraki, Japan; UC Berkeley, Berkeley, CA, USA; Sandia National Labs

2022 (4): GeoPRISMS Workshop: Structure and Deformation at Plate Boundaries, Hawaii, USA; Geological Survey of Canada - Pacific seminar; University of Washington, Seattle, WA, USA; Hewett Club Speaker Series, UCR, Riverside, California, USA

2021 (7): U of Toronto Mississauga, Mississauga, Ontario, Canada; The Chinese University of Hong Kong, Hong Kong, China; Marine Seismology Symposium; COSEG, National Academies of Sciences, Engineering, and Medicine; UC Santa Cruz, Santa Cruz, CA, USA; Rift2Ridge GeoPRISMS Workshop, USC, Los Angeles, CA, USA

2020 (9): UNC-Wilmington, Wilmington, NC, USA; Georgia Institute of Technology, Atlanta, GA, USA; University of Oregon, Eugene, OR, USA; The Ohio State University, Columbus, OH, USA; USGS, Moffett Field, CA, USA; Zhejiang University, Zhoushan, Zhe Jiang, China; University of Washington, Seattle, WA, USA; SIO, UC San Diego, La Jolla, CA, USA; UTIG, UT Austin, Austin, TX, USA

2019 (4): UNC-Chapel Hill, Chapel Hill, NC, USA; Institute of Geology and Geophysics, CAS, Beijing, China; China University of Geosciences, Wuhan, Hu Bei, China; USTC, Hefei, An Hui, China

2018 (5): University of Michigan, Ann Arbor, MI, USA; 2018 IRIS Workshop, Albuquerque, NM, USA; University of Miami, Miami, FL, USA; WHOI, Woods Hole, MA, USA; Florida State University, Tallahassee, FL, USA

2017 (4): T047, 2017 AGU, New Orleans, USA; MIT, Boston, MA, USA; Stony Brook University, Stony Brook, NY, USA; UC Santa Cruz, Santa Cruz, CA, USA

2016 (4): Caltech, Pasadena, CA, USA; Harvard University, Cambridge, MA, USA; Brown University, Providence, RI, USA; LDEO, Columbia University, Palisades, NY, USA

2015 (1): Earthquake Science Summer School, Lake Yamanakako, Japan

SERVICE

Professional Service: AGU Fall Meeting Program Committee (FMPC, 2022–present); Faulting and Earthquake Cycles (FEC) working group, SZ4D (2022–present); UCSD representative for EarthScope Consortium (2022–present)

SIO/UCSD Service: Geophysics Curricular Revision Committee (2020); Geophysics Curricular Group Virtual Open House Organizer (2020,2021); SIO Virtual Open House Coordinator (2021,2022); GP Admission co-chair (2021–present); DAC (2021–present); Member of the SIO Faculty Associate Representative Assembly of the UCSD Academic Senate;

Journal Reviewer: Geophysical Research Letters, Geophysical Journal International, Bulletin of the Seismological Society of America, Journal of Geophysical

Research: Solid Earth, Tectonophysics, Pure and Applied Geophysics, Journal of Seismology, Progress in Earth and Planetary Science, Solid Earth, Nature Communication, Earth and Planetary Science Letters, Nature Geoscience, GJI Express, AGU Advances, Journal of Glaciology, Seismological Research Letters, Geochemistry, Geophysics, Geosystems, Science Advances

Proposal Reviewer: National Science Foundation (NSF), Deutsche Forschungsgemeinschaft (DFG), National Research and Development Agency (ANID)

Meeting Activities: 2017–2020, AGU, Convener; 2017,2021 SSA Convener

Community Involvements: Organization Committee, Queer Engineers, Scientists, and Technical Professionals (QuEST) at U.C. San Diego (2015–2017)

PUBLICATIONS

43. Jia, Z., Z. Jin, M. Marchandon, T. Ulrich, A.A. Gabriel, **W. Fan**, P. M. Shearer, X. Zou, J. Rekoske, F. Bulut, A. Garagon, and Y. Fialko, The complex dynamics of the 2023 Kahramanmaraş, Turkey, Mw 7.8–7.7 earthquake doublet, *Science*, doi: 10.1126/science.adi0685, 2023.
42. **Fan W.**, Combining Love and Rayleigh waves in detecting and locating seismic sources, *Geophys. J. Int.*, doi: 10.1093/gji/ggad250, 2023.
41. DeSalvio, N. D. and **W. Fan**, Ubiquitous earthquake dynamic triggering in southern California, *J. Geophys. Res.: Solid Earth*, doi: 10.1029/2023JB026487, 2023.
40. Shearer, P. M. and **W. Fan**, Space–Time Asymmetry in Earthquake Pairs along the Central San Andreas Fault: Evidence for Small Earthquake Links at Long Distances, *The Seismic Record*, doi: 10.1785/0320230002, 2023.
39. Liu, T., J. Gong, **W. Fan**, and G. Lin, In-situ V_p/V_s ratio reveals fault-zone material variation at the westernmost Gofar transform fault, East Pacific Rise, *J. Geophys. Res.: Solid Earth*, doi: 10.1029/2022JB025310, 2023.
38. Luo, X., **W. Fan**, and Y. Fialko, A joint seismic and space-based investigation of the 2016 Lamplugh Glacier and 2017 Wrangell Mountains (Alaska) landslides, *J. Geophys. Res.: Earth Surface*, doi: 10.1029/2022JF006903, 2023.
37. Shearer, P. M., H. Meng, and **W. Fan**, Earthquake detection using a nodal array on the San Jacinto fault in California: Evidence for high foreshock rates preceding many events, *J. Geophys. Res.: Solid Earth*, doi: 10.1029/2022JB025279, 2022.
36. Gong, J. and **W. Fan**, Seismicity, fault architecture, and slip mode of the westernmost Gofar transform fault, *J. Geophys. Res.: Solid Earth*, doi: 10.1029/2022JB024918, 2022.
35. Neo, J.C., **W. Fan**, Y. Huang, and D. Dowling, Frequency-difference backprojection of earthquakes, *Geophys. J. Int.*, doi: 10.1093/gji/ggac323, 2022.

34. **Fan, W.**, R. Okuwaki, A. J. Barbour, Y. Huang, G. Lin, and E. S. Cochran, Fast rupture of the 2009 Mw 6.9 Canal de Ballenas earthquake in the Gulf of California dynamically triggers seismicity in California, *Geophys. J. Int.*, 10.1093/gji/ggac059, 2022.
33. **Fan, W.**, A. J. Barbour, J. J. McGuire, Y. Huang, G. Lin, E. S. Cochran, and R. Okuwaki, Very low frequency earthquakes in between the seismogenic and tremor zones in Cascadia?, *AGU Advances*, 10.1029/2021AV000607, 2022.
32. Gong, J., **W. Fan**, and R. Parnell-Turner, Microseismicity indicates atypical small-scale plate rotation at the Quebrada transform fault system, East Pacific Rise, *Geophys. Res. Lett.*, 10.1029/2021GL097000, 2022.
31. Okuwaki, R. and **W. Fan**, Oblique convergence causes both thrust and strike-slip ruptures during the 2021 M 7.2 Haiti earthquake, *Geophys. Res. Lett.*, doi: 10.1029/2021GL096373, 2022.
30. Okuwaki, R., S. Hicks, T. Craig, **W. Fan**, S. Goes, T. Wright, and Y. Yagi, Illuminating a Contorted Slab with a Complex Intraslab Rupture Evolution during the 2021 Mw 7.3 East Cape, New Zealand Earthquake, *Geophys. Res. Lett.*, doi: 10.1029/2021GL095117, 2021.
29. Lin, G., V. A. Huerfano, and **W. Fan**, Crustal architecture of Puerto Rico using body-wave seismic tomography and high-resolution earthquake relocation, *Seismol. Res. Lett.*, doi: 10.1785/0220210223, 2021.
28. Meng, H. and **W. Fan**, Immediate foreshocks indicating cascading rupture developments for 527 M 0.9 to 5.4 Ridgecrest earthquakes, *Geophys. Res. Lett.*, doi: 10.1029/2021GL095704, 2021.
27. Okuwaki, R., **W. Fan**, M. Yamada, H. Osawa, and T.J. Wright, Identifying landslides from continuous seismic surface waves: a case study of multiple small-scale landslides triggered by Typhoon Talas, 2011, *Geophys. J. Int.*, doi:/10.1093/gji/ggab129, 2021.
26. **Fan, W.**, A. J. Barbour, E. S. Cochran, and G. Lin, Characteristics of frequent dynamic triggering of microearthquakes in Southern California, *J. Geophys. Res.*, doi: 10.1029/2020JB020820, 2020.
25. **Fan, W.**, J. J. McGuire, and P. M. Shearer, Abundant spontaneous and dynamically triggered submarine landslides in the Gulf of Mexico, *Geophys. Res. Lett.*, doi: 10.1029/2020GL087213, 2020.
24. ten Brink, U., Y. Wei, **W. Fan**, J. Granja-Bruña, and N. Miller, Mysterious tsunami in the Caribbean Sea following the 2010 Haiti earthquake possibly generated by dynamically triggered early aftershocks, *Earth Planet. Sci. Lett.*, doi: 10.1016/j.epsl.2020.116269, 2020.
23. **Fan, W.**, J. J. McGuire, C. D. de Groot-Hedlin, M. A.H. Hedlin, S. Coats, and J. W. Fiedler, Stormquakes, *Geophys. Res. Lett.*, 46(22), 12909-12918, doi:

- 10.1029/2019GL084217, 2019.
22. Neely, J. S., Y. Huang, and **W. Fan**, Earthquake rupture characteristics along a developing transform boundary, *Geophys. J. Int.*, 219(2), 1237-1252, doi: 10.1093/gji/ggz357, 2019.
 21. **Fan, W.**, S. S. Wei, D. Tian, J. J. McGuire and D. A. Wiens, Complex and diverse rupture processes of the 2018 Mw 8.2 and Mw 7.9 Tonga–Fiji deep earthquakes, *Geophys. Res. Lett.*, 46(5), 2434-2448, doi: 10.1029/2018GL080997, 2019.
 20. **Fan, W.**, C. D. de Groot-Hedlin, M. A.H. Hedlin, and Z. Ma, Using surface waves recorded by a large mesh of three-element arrays to detect and locate disparate seismic sources, *Geophys. J. Int.*, 215(2), 942-958, doi: 10.1093/gji/ggy316, 2018.
 19. **Fan, W.** and J. J. McGuire, Investigating microearthquake finite source attributes with IRIS Community Wavefield Demonstration Experiment in Oklahoma, *Geophys. J. Int.*, 214(2), 1072-1087, doi: 10.1093/gji/ggy203, 2018.
 18. **Fan, W.** and P. M. Shearer, Coherent seismic arrivals in the P-wave coda of the 2012 Mw 7.2 Sumatra earthquake: water reverberations or an early aftershock?, *J. Geophys. Res.*, 123(4), 3147-3159, doi: 10.1002/2018JB015573, 2018.
 17. **Fan, W.**, D. Bassett, J. Jiang, P. M. Shearer, and C. Ji, Rupture evolution of the 2006 Java tsunami earthquake and the possible role of splay faults, *Tectonophysics*, 721, 143-150, doi: 10.1016/j.tecto.2017.10.003, 2017.
 16. **Fan, W.** and P. M. Shearer, Investigation of back-projection uncertainties with M6 earthquakes, *J. Geophys. Res.*, 122(10), 7966-7986, doi: 10.1002/2017JB014495, 2017.
 15. **Fan, W.** and P. M. Shearer, Local near instantaneously dynamically triggered aftershocks of large earthquakes, *Science*, 353, 1133-1136, doi: 10.1126/science.aag0013, 2016.
 14. **Fan, W.**, P. M. Shearer, C. Ji, and D. Bassett, Multiple branching rupture of the 2009 Tonga–Samoa earthquake, *J. Geophys. Res.* 121(8), 5809-5827, doi:10.1002/2016JB012945, 2016.
 13. Mai, P. M., D. Schorlemmer, M. Page, J.-P. Ampuero, K. Asano, M. Causse, S. Custodio, **W. Fan**, G. Festa, M. Galis, et al., The earthquake-source inversion validation (SIV) project, *Seismol. Res. Lett.* 87(3), 690-708, doi:10.1785/0220150231, 2016.
 12. **Fan, W.** and P. M. Shearer, Fault interactions and triggering during the 10 January 2012 Mw 7.2 Sumatra earthquake, *Geophys. Res. Lett.*, 43, 1934-1942, doi:10.1002/2016GL067785, 2016.

11. Melgar, D., **W. Fan**, S. Riquelme, J. Geng, C. Liang, M. Fuentes, G. Vargas, R. M. Allen, P. M. Shearer, E. J. Fielding, Slip segmentation and slow rupture to the trench during the 2015, Mw8.3 Illapel, Chile earthquake, *Geophys. Res. Lett.*, 43, 961-966, doi:10.1002/2015GL067369, 2016.
10. Denolle, M. A., **W. Fan**, and P. M. Shearer, Dynamics of the 2015 M7.8 Nepal earthquake, *Geophys. Res. Lett.*, 42, 7467-7475, doi:10.1002/2015GL065336, 2015.
9. **Fan, W.** and P. M. Shearer, Detailed rupture imaging of the 25 April 2015 Nepal earthquake using teleseismic P waves, *Geophys. Res. Lett.*, 42, 7467-7475, doi:10.1002/2015GL064587, 2015.
8. **Fan, W.**, Y. Chen, Y. Tang, Sn Zhou, Y. Feng, H. Yue, H. Wang, G. Jin, S. Wei, Y. Wang, Z. Gai, and J. Ning, Crust and upper mantle velocity structure of the eastern Tibetan plateau and adjacent regions from ambient noise tomography, *Chinese J. Geophys.* (in Chinese), 58(5), 1568-1583, doi:10.6038/cjg20150510, 2015.
7. **Fan, W.**, P. M. Shearer, and P. Gerstoft, Kinematic earthquake rupture inversion in the frequency domain, *Geophys. J. Int.* 199, 1138–1160, doi:10.1093/gji/ggu319, 2014.
6. Yue, H., Y. Chen, E. Sandvol, J. Ni, T. Hearn, S. Zhou, Y. Feng, Z. Ge, A. Trujillo, Y. Wang, G. Jin, M. Jiang, Y. Tang, X. Liang, S. Wei, H. Wang, **W. Fan**, and Z. Liu, Lithospheric and upper mantle structure of the northeastern Tibetan Plateau, *J. Geophys. Res.*, 117, B05307, doi:10.1029/2011JB008545, 2012.
5. Tang, Y., Y. Chen, H. Wang, S. Zhou, J. Ning, Y. Yang, Z. Ding, R. Liu, Y. Feng, P. Li, C. Yu, S. Wei, and **W. Fan**, Ambient noise tomography in north China craton, *Chinese J. Geophys.*, (in Chinese), 54(8), 2011-2022, doi:10.3969/j.issn.0001-5733.2011.08.008, 2011.
4. Tang, X., **W. Fan.**, Y. Feng., Y. Tang., Y. J. Chen, and L. Zhu, Phase velocity tomography of Rayleigh wave in Xinjiang from ambient noise, *Chinese J. Geophys.* (in Chinese), 54(8), 2042-2049, doi:10.3969/j.issn.0001-5733.2011.08.011, 2011.
3. Jiang, M., S. Zhou, E. Sandvol, X. Chen, X. Liang, Y. Chen, and **W. Fan**, 3-D lithospheric structure beneath southern Tibet from Rayleigh-wave tomography with a 2-D seismic array, *Geophys. J. Int.* 185, 593-608, doi:10.1111/j.1365-246X.2011.04979.x, 2011.
2. Wei, S., Y. Chen, E. Sandvol, S. Zhou, H. Yue, G. Jin, T. Hearn, M. Jiang, H. Wang, **W. Fan**, Z. Liu, Z. Ge, Y. Wang, Y. Feng, and J. Ni, Regional earthquakes in northern Tibetan Plateau: Implications for lithospheric strength in Tibet, *Geophys. Res. Lett.*, 37, L19307, doi:10.1029/2010GL044800, 2010.

1. Tang, Y., Y. Feng, Y. Chen, S. Zhou, J. Ning, S. Wei, P. Li, C. Yu, and **W. Fan**, Receiver function analysis at Shanxi Rift, *Chinese J. Geophys.*, (in Chinese) 53(9), 2102-2109, doi:10.3969/j.issn.0001-5733.2010.09.010, 2010.

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|-----------------|---|--------------|
| TEACHING | Lecturer, Graduate, SIOG 227c, Advanced Seismology II, UCSD | 2023–present |
| | Lecturer, Undergraduate, SIO 161, Seismology, UCSD | 2022–present |
| | Lecturer, Undergraduate/graduate, Introduction to Geophysics, FSU | 2020 |
| | Lecturer, Undergraduate, Introductory Earth Science, FSU | 2019 |
| | Guest lecturer, Graduate, Seismic interferometry, SDSU | 2015 |
| | TA, Undergraduate, Seismological Experiment Practice Course, PKU | 2010 |
| | TA, Undergraduate, Introduction to Earthquakes, PKU | 2010 |
| | TA, Undergraduate, Methods of Mathematical Physics, PKU | 2009 |

AFFILIATIONS American Geophysical Union (AGU)
 Seismological Society of America (SSA)
 Southern California Earthquake Center (SCEC)

FIELD WORK Greenland, subglacial tremor, 20 days in total
 Gofar cruise, R/V Atlantis, 30 days in total
 KCT nodal experiment, 3 days in total
 LEEP (Lake Erie Earthquake Project), 7 days in total.
 North China craton array project, 35 days in total.
 Necessarray project, 16 days in total.
 INDEPTH IV project, 15 days in total.