

Dunyu Liu

COMPUTATIONAL GEOSCIENTIST

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Education

Texas A&M University

PHD GEOPHYSICS

College Station, TX, USA

2014 - 2018

Peking University

MS IN GEOPHYSICS

Beijing, China

2011 - 2014

Peking University

BS IN GEOPHYSICS

Beijing, China

2007 - 2011

Professional Experience

- 2021- **Computational Geoscientist**, Institute for Geophysics, The University of Texas at Austin
- 2018-2020 **Postdoctoral researcher**, Department of Geology & Geophysics, Texas A&M University
- 2014-2018 **Research and Teaching Assistant**, Department of Geology & Geophysics, Texas A&M University
- 2011-2014 **Research and Teaching Assistant**, Institute for Theoretical Geophysics, Peking University
- 2009-2011 **Undergraduate Research and Teaching Assistant**, Institute for Theoretical Geophysics, Peking University

Publications

- [16] Thirumalai, K., DiNezio, PN., Partin, JW., **Liu, D.**, Costa, K., and Jacobel, A.: Future increase in extreme El Niño supported by past glacial changes. *Nature*, <https://doi.org/10.1038/s41586-024-07984-y>, 2024
 - [15] **Liu, D.**, Puel, S., Becker, TW., Moresi, L.: Analytical and numerical models of viscous anisotropy: a toolset to constrain the role of mechanical anisotropy for regional tectonics and fault loading. *Geophys. J. Int.*, 239(2), 950–963, <https://doi.org/10.1093/gji/ggae296>, 2024
 - [14] Puel, S., Becker, TW., Villa, U., Ghattas, O., **Liu, D.**: Volcanic arc rigidity variations illuminated by coseismic deformation of the 2011 Tohoku-oki M9. *Science Adv.*, 10, 778-797, doi:10.1126/sciadv.adl4264, 2024
 - [13] Puel, S., Becker, TW., Villa, U., Ghattas, O., **Liu, D.**: An adjoint-based optimization method for jointly inverting heterogeneous material properties and fault slip from earthquake surface deformation data. *Geophys. J. Int.*, 236 (2), 778–797, <https://doi.org/10.1093/gji/ggad442>, 2024
- 2023
- [12] Xu, X., **Liu, D.**, Lavier, L.: Constraining fault damage zone properties from geodesy: A case study near the 2019 Ridgecrest earthquake sequence. *Geophys. Res. Lett.*, 50, e2022GL101692, 2023
- 2022
- [11] Puel, S., Khattatov, E., Villa, U., **Liu, D.**, Ghattas, O., Becker TW: A mixed, unified forward/inverse framework for earthquake problems: fault implementation and coseismic slip estimate. *Geophys. J. Int.*, 230 (2), 733-758, 2022
 - [10] Jiang, J. et al: Community-driven code comparisons for three-dimensional dynamic modeling of sequences of earthquakes and aseismic slip. *J. Geophys. Res. - Solid Earth*, 127(3), e2021JB023519, 2022.
 - [9] **Liu, D.**, Duan, B., Scharer, K., Yule, D.: Observation-constrained multicycle dynamic models of the southern San Andreas and the northern San Jacinto faults: addressing complexity in paleoearthquake extent and recurrence with realistic 2D fault geometry. *J. Geophys. Res. - Solid Earth*, 127(2), e2021JB023420, 2022.

2021

- [8] **Liu, D.**, Duan, B., Prush, VB, Oskin, M., Liu-Zeng, J.: Observation-constrained multicycle dynamic models of the Pingding Shan earthquake gate along the Altyn Tagh Fault. *Tectonophys.*, 814, 228948, 2021

2020

- [7] **Liu, D.**, Duan, B., Luo, B.: EQsimu, a 3-D finite element dynamic earthquake simulator for multicycle dynamics of geometrically complex faults governed by rate- and state-dependent friction. *Geophys. J. Int.*, 230 (1), 598-609, 2020.
- [6] Luo, B., Duan, B, **Liu, D.**: 3D Finite element modeling of dynamic rupture and aseismic slip over earthquake cycles on geometrically complex faults. *Bulletin of Seismological Society of America*, 110 (6), 2619-2637, 2020.

2015-2019

- [5] Zhong, S., Wan, Z., Duan, B., **Liu, D.**, Luo, B.: Do earthquake trigger mud volcanoes? A case study from the Southern margin of the Junggar Basin, NW China. *Geological J.*, 54(3), 1223-1237, 2019.
- [4] **Liu, D.**, Duan, B.: Scenario earthquake and ground motion simulations in North China: effects of heterogeneous fault stress and 3D basin structure. *Bulletin of Seismological Society of America*, 108(4), 2148-2169, 2018.
- [3] Harris, RA, Barall, M., Aagaard, B., Ma, S., Roten, D., Olsen, K., Duan, B, **Liu, D.**, et al.: A suite of exercise for verifying dynamic earthquake rupture codes. *Seis. Res. Lett.*, 89(3), 1146-1162, 2018.
- [2] Duan, B., **Liu, D.**, Yin, A: Seismic shaking in the North China Basin expected from ruptures of a possible seismic gap. *Geophys. Res. Lett.*, 44(10), 1146-1162, 2017
- [1] **Liu, D.**, Hu, C., Cai, Y.: Numerical simulation of the dynamic rupture process of the 2011 Tohoku-Oki, Japan, Mw9.0 earthquake. *Chinese J. of Geophys.*, 58(9), 3133-3143, 2015 (in Chinese)

Grants

2024-2026	Investigating Periodicities in Abyssal Hill Morphology of the Atlantic Ocean: Possible Evidence of Mantle Dynamics, Co-PI, National Science Foundation, Award 2341367	\$170,516
2022-2025	Collaborative Research: Elements: Monitoring Earth Surface Deformation with the Next Generation of InSAR Satellites: GMTSAR, took over PI after the grant was funded in 2023, National Science Foundation, Award 2209807	\$231,440
2024	Generation of Near Source Broadband Ground Motion from Physics-based Dynamic Rupture Simulations: Continuing A Group Modeling Approach towards better Characterizing Seismic Hazard for Engineering Applications, Co-PI, Southern California Earthquake Center, Award 24103	\$12,500
2023	Generation of Broadband Ground Motion from Dynamic Rupture Simulations: A Group Modeling Approach towards better Characterizing Seismic Hazard for Engineering Applications, Co-PI, Southern California Earthquake Center, Award 23121	\$19,750
2022	Evolution of ground motion characteristics over earthquake cycle timescales, PI, Southern California Earthquake Center, Award 22035	\$31,307
2022	Generation of Broadband Ground Motion from Dynamic Rupture Simulations: A Group Modeling Approach towards better Characterizing Seismic Hazard for Engineering Applications, Co-PI, Southern California Earthquake Center, Award 22043	\$16,000
2021	Generation of Broadband Ground Motion from Dynamic Rupture Simulations: A Group Modeling Approach towards better Characterizing Seismic Hazard for Engineering Applications, Co-PI, Southern California Earthquake Center, Award 21010	\$8,000