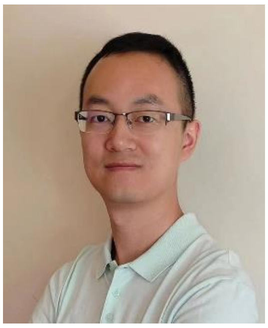
Curriculum Vitae

Jing Chen



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Employment

Sept. 2021 - Present	**Research Fellow (Postdoc)**, School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore Supervisor: Ping Tong

Education

Aug. 2016 - Jun. 2021	**Ph.D.** in Mathematics, Tsinghua University, Beijing, China Supervisor: Hao Wu
Sept. 2018 - Sept. 2019	**Visiting Ph. D**, GFZ Helmholtz Centre for Geosciences, Potsdam, Germany Supervisor: Xiaohui Yuan
Aug. 2012 - Jul. 2016	**B.S.** in Mathematics, Tsinghua University, Beijing, China

Research interests

Seismic imaging; seismic anisotropy; earthquake location; earthquake dynamics; engineering geophysics; machine learning.

Honors & Awards

2021	Excellent Paper in the Workshop of Beijing-Tianjin-Hebei Society for Computational Mathematics, Beijing Association for Computational Mathematics.
2019	The Most Concerned Academic Paper in Beijing, Beijing Association for Science and Technology.
2017	Excellent Youth Paper Award, China Society for Industrial and Applied Mathematics.
2017	Excellent Youth Paper Award, Annual Meeting of Chinese Geoscience Union.

Selected Publications

[1] **Chen, J.**, Xu, M., Bai, Y., Wu, S., Xiao, X., Hao, S., Nagaso, M., Tong, P. (2026). High normal stress promoted supershear rupture during the 2023 Mw 7.8 Kahramanmaraş earthquake. *Nature Geoscience*, 1-8.
https://doi.org/10.1038/s41561-025-01893-z
Summary: Our tomographic results reveal substantial structural variations along the Eastern Anatolian

Fault using TomoATT. The Erkenek segment, which ruptured at supershear speeds during the 2023 Mw 7.8 Kahramanmaraş earthquake, is characterized by high seismic velocity and fault-normal anisotropy. These structures indicate high normal stress and limited fluid infiltration, which are prone to inhibiting fault creep and favoring stress accumulation. In contrast, the Amanos segment, which ruptured at subshear speeds, exhibits lower velocity and fault-parallel anisotropy, indicative of substantial fluid infiltration that facilitates aseismic stress release. Overall, our findings highlight the critical role of subsurface fault structure in governing whether a fault ruptures at supershear speeds.

[2] **Chen, J.**, Nagaso, M., Xu, M., Tong, P. (2025). TomoATT: An open-source package for Eikonal equation-based adjoint-state traveltime tomography for seismic velocity and azimuthal anisotropy. *Computers and Geosciences*, 105995
https://doi.org/10.1016/j.cageo.2025.105995
Summary: We developed TomoATT, an open-source tomographic package based on the adjoint-state traveltime tomography methods, which invert absolute traveltimes and differential arrival times for seismic velocity heterogeneity and azimuthal anisotropy in regional and teleseismic settings. The package integrates accurate forward modeling, robust adjoint inversion, and efficient parallel implementation, and is publicly available at https://tomoatt.com.

[3] **Chen, J.**, Wu, S., Xu, M., Nagaso, M., Yao, J., Wang, K., Li, T., Bai, Y., Tong, P. (2023). Adjoint-state teleseismic traveltime tomography: method and application to Thailand in Indochina Peninsula. *Journal of Geophysical Research: Solid Earth*, *128*(12), e2023JB027348.
https://doi.org/10.1029/2023JB027348
Summary: We developed a teleseismic adjoint-state traveltime tomography method by incorporating a two-stage Eikonal equation to model teleseismic wavefront propagation. Application to Thailand reveals a thick lithosphere beneath the Khorat Plateau and mantle upwelling beneath its southwestern margin, providing tomographic evidence for lithospheric modification beneath the plateau.

[4] **Chen, J.**, Chen, G., Nagaso, M., Tong, P. (2023). Adjoint-state traveltime tomography for azimuthally anisotropic media in spherical coordinates. *Geophysical Journal International*, *234*(1), 712-736.
https://doi.org/10.1093/gji/ggad093
Summary: This work develops an Eikonal equation-based adjoint-state traveltime tomography method for imaging velocity heterogeneity and azimuthal anisotropy using local P-wave traveltimes. The utilization of spherical coordinates naturally accounts for the Earth's curvature. A second-order fast sweeping method is also proposed to accurately solve the anisotropic Eikonal equation for synthetic traveltimes.

[5] Chen, G., **Chen, J.** (co-first author), Tape, C., Wu, H., Tong, P. (2023). Double-difference adjoint tomography of the crust and uppermost mantle beneath Alaska. *Journal of Geophysical Research: Solid Earth*, *128*(1), e2022JB025168.
https://doi.org/10.1029/2022JB025168
Summary: We applied wave equation-based double-difference adjoint tomography to image crustal and uppermost mantle velocity heterogeneity beneath Alaska. The results reveal a low-velocity anomaly at 95-125 km beneath the Wrangell Volcanic Field, which is interpreted as a slab gap that transports mantle materials feeding the volcanic cluster.

[6] **Chen, J.**, Chen, G., Wu, H., Yao, J., Tong, P. (2022). Adjoint tomography of Northeast Japan revealed by common-source double-difference travel-time data. *Seismological Research Letters*, *93*(3), 1835-1851.
https://doi.org/10.1785/0220210317
Summary: We developed a workflow for applying wave equation-based double difference adjoint tomography to realistic imaging problems, and apply it to northeastern Japan. The results reveal low-

velocity magmatism beneath the volcano arc, the high-velocity subducting Pacific slab, and high-velocity cold and try mantle wedges, demonstrating the effectiveness of the double-difference adjoint tomography method.

Full Publication List

[29] Li, T., **Chen, J.**, Yang, X., Tong, P. (2026). Leveraging local depth phases for improved hypocenter analysis and discovery of a thick seismogenic zone in Ridgecrest, California, *Journal of Geophysical Research: Solid Earth, 131*, e2025JB032083.
https://doi.org/10.1029/2025JB032083

[28] **Chen, J.**, Xu, M., Bai, Y., Wu, S., Xiao, X., Hao, S., Nagaso, M., Tong, P. (2026). High normal stress promoted supershear rupture during the 2023 Mw 7.8 Kahramanmaraş earthquake. *Nature Geoscience*, 1-8.
https://doi.org/10.1038/s41561-025-01893-z

[27] Wang, D., **Chen, J.**, Wu, S., Li, T., Bai, Y., Gao, Y., Tong, P. (2025). Adjoint-state attenuation tomography: Method and application to northern New Zealand. *Journal of Geophysical Research: Solid Earth*, *130*(11), e2025JB031822.
https://doi.org/10.1029/2025JB031822

[26] Wang, D., **Chen, J.**, Hao, S., Tong, P. (2025) A novel fast sweeping method for computing the attenuation operator t^* in absorbing media, *Geophysical Journal International, 243,* ggaf381.
https://doi.org/10.1093/gji/ggaf381

[25] Zhang, B., Tan, H., Xiao, X., Wang, D., Bai, Y., Li, T., Hao, S., **Chen, J.**, Yao, J., Bao, X., Tong, P. (2025). Crustal structure and seismogenic environment for the January 2025 Mw 7.1 southern Tibet (Dingri) earthquake. *Journal of Geophysical Research: Solid Earth*, *130*(11), e2025JB032001.
https://doi.org/10.1029/2025JB031822

[24] Chen, C., **Chen, J.**, Luo, B., Jin, S., Wu, H. (2025). A numerical algorithm with linear complexity for multi-marginal optimal transport with L^1 cost. *CSIAM Transactions on Applied Mathematics*.
https://doi.org/10.4208/csiam-am.SO-2024-0025

[23] **Chen, J.**, Nagaso, M., Xu, M., Tong, P. (2025). TomoATT: An open-source package for Eikonal equation-based adjoint-state traveltime tomography for seismic velocity and azimuthal anisotropy. *Computers and Geosciences*, 105995
https://doi.org/10.1016/j.cageo.2025.105995

[22] Wu, S., **Chen, J.**, Tong, P. (2025). Seismic azimuthal anisotropy of New Zealand revealed by adjoint-state traveltime tomography. *Earth and Planetary Science Letters*, *660*, 119362.
https://doi.org/10.1016/j.epsl.2025.119362

[21] Bai, Y., Hao, S., Xie, J., Xu, M., Xiao, X., **Chen, J.**, Chey, C.F., Wang, D., Tong, P. (2025). Geothermal potential in Singapore explored with non-invasive seismic data. *Engineering Geology*, *348*, 107968.
https://doi.org/10.1016/j.enggeo.2025.107968

[20] Chen, G., **Chen, J.**, Li, T., Xu, M., Zhao, Q., Tong, P. (2025). Adjoint-state reflection traveltime tomography for velocity and interface inversion with its application in central California near Parkfield. *Journal of Geophysical Research: Solid Earth*, *130*(1), e2024JB029918.
https://doi.org/10.1029/2024JB029918

[19] Xu, M., Hao, S., **Chen, J.**, Zhang, B., Tong, P. (2025). SurfATT: High-performance package for adjoint-state surface-wave travel-time tomography. *Seismological Research Letters*, *96*(4), 2638-2646.
https://doi.org/10.1785/0220240206

[18] Zhang, X., Song, X., **Chen, J.**, Zhang, L., Tong, P., Li, Y. (2025). The P-wave velocity and azimuthal anisotropy structure of southeastern margin of the Tibetan Plateau from adjoint-state traveltime tomography. *Science China Earth Sciences*, *68*(3), 702-719.
https://doi.org/10.1007/s11430-024-1504-x

[17] Xu, M., Wang, K., **Chen, J.**, He, J., Liu, Q., Liu, Y., Huang, Z., Tong, P. (2025). Multilevel mechanisms driving intraplate volcanism in Central Mongolia revealed by adjoint waveform tomography of receiver function and ambient noise data. *Earth and Planetary Science Letters*, *650*, 119137. https://doi.org/10.1016/j.epsl.2024.119137

[16] Wang, D., Hao, S., **Chen, J.**, Song, G., Tong, P. (2025). Imaging complex structures of the Los Angeles Basin via adjoint-state travel-time tomography. *Bulletin of the Seismological Society of America*, *115*(1), 228-247. https://doi.org/10.1785/0120240035

[15] Hao, S., **Chen, J.**, Xu, M., Tong, P. (2024). Topography-incorporated adjoint-state surface wave traveltime tomography: Method and a case study in Hawaii. *Journal of Geophysical Research: Solid Earth*, *129*(1), e2023JB027454. https://doi.org/10.1029/2023JB027454

[14] Liao, Q., Wang, Z., **Chen, J.**, Bai, B., Jin, S., Wu, H. (2024). Fast Sinkhorn II: Collinear triangular matrix and linear time accurate computation of optimal transport. *Journal of Scientific Computing*, *98*, 1. https://doi.org/10.1007/s10915-023-02403-2

[13] **Chen, J.**, Wu, S., Xu, M., Nagaso, M., Yao, J., Wang, K., Li, T., Bai, Y., Tong, P. (2023). Adjoint-state teleseismic traveltime tomography: method and application to Thailand in Indochina Peninsula. *Journal of Geophysical Research: Solid Earth*, *128*(12), e2023JB027348. https://doi.org/10.1029/2023JB027348

[12] Tong, P., Li, T., **Chen, J.**, Nagaso, M. (2024). Adjoint-state differential arrival time tomography. *Geophysical Journal International*, *236*(1), 139-160. https://doi.org/10.1093/gji/ggad416

[11] Xu, M., Wang, K., **Chen, J.**, Yu, D., Tong, P. (2023). Receiver function adjoint tomography for three-dimensional high-resolution seismic array imaging: methodology and applications in southeastern Tibet. *Geophysical Research Letters*, *50*(19), e2023GL104077. https://doi.org/10.1029/2023GL104077

[10] Li, Z., Tang, Y., **Chen, J.**, Wu, H. (2023). On quadratic Wasserstein metric with squaring scaling for seismic velocity inversion. *Numerical Mathematics: Theory. Methods and Applications, 16*, 277-297. https://doi.org/10.4208/nmtma.OA-2022-0111

[9] **Chen, J.**, Chen, G., Nagaso, M., Tong, P. (2023). Adjoint-state traveltime tomography for azimuthally anisotropic media in spherical coordinates. *Geophysical Journal International*, *234*(1), 712-736. https://doi.org/10.1093/gji/ggad093

[8] Zhou, D., **Chen, J.**, Wu, H., Yang, D., Qiu, L. (2023). The Wasserstein-Fisher-Rao metric for waveform based earthquake location. *Journal of Computational Mathematics*, *41*(3), 437-457. https://doi.org/10.4208/jcm.2109-m2021-0045

[7] Chen, G., **Chen, J.**, Tape, C., Wu, H., Tong, P. (2023). Double-difference adjoint tomography of the crust and uppermost mantle beneath Alaska. *Journal of Geophysical Research: Solid Earth*, *128*(1), e2022JB025168. https://doi.org/10.1029/2022JB025168

[6] Liao, Q., **Chen, J.**, Wang, Z., Bai, B., Jin, S., Wu, H. (2022). Fast Sinkhorn I: An O (N) algorithm for the Wasserstein-1 metric. *Communications in Mathematical Sciences, 20,* 2053-2067. https://doi.org/10.4310/CMS.2022.v20.n7.a11

[5] **Chen, J.**, Chen, G., Wu, H., Yao, J., Tong, P. (2022). Adjoint tomography of Northeast Japan revealed by common-source double-difference travel-time data. *Seismological Research Letters*, *93*(3), 1835-1851. https://doi.org/10.1785/0220210317

[4] **Chen, J.**., Kufner, S. K., Yuan, X., Heit, B., Wu, H., Yang, D., Schurr, B., Kay, S. (2020). Lithospheric delamination beneath the southern Puna plateau resolved by local earthquake tomography. *Journal of Geophysical Research: Solid Earth*, *125*(10), e2019JB019040. https://doi.org/10.1029/2019JB019040

[3] **Chen, J.**, Jing, H., Tong, P., Wu, H., Yang, D. (2020). The auxiliary function method for waveform based earthquake location. *Journal of Computational Physics*, *413*, 109453. https://doi.org/10.1016/j.jcp.2020.109453

[2] **Chen, J.**, Chen, Y., Wu, H., Yang, D. (2018). The quadratic Wasserstein metric for earthquake location. *Journal of Computational Physics*, *373*, 188-209. https://doi.org/10.1016/j.jcp.2018.06.066

[1] Wu, H., **Chen, J.**, Huang, X., Yang, D. (2018). A new earthquake location method based on the waveform inversion. *Communications in Computational Physics, 23*, 118-141. https://doi.org/10.4208/cicp.OA-2016-0203

Professional Services

Reviewers of *Journal of Geophysical Research: Solid Earth (1), Geophysical Journal International (2), Tectonophysics (1), Science China Earth Sciences (1), Engineering Applications of Artificial Intelligence (1), Bulletin of the Seismological Society of America (1), Journal of Computational Mathematics (1), Computers and Geosciences (1), Journal on Numerical Methods and Computer Applications (1).*