

# Dongdong Tian

## Postdoctoral Research Associate

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## Education

- 2018 **Ph.D** in Geophysics, University of Science and Technology of China, Hefei, China
- 2012 **B.S.** in Geophysics, University of Science and Technology of China, Hefei, China

## Employment

- 08/2018 – present **Postdoctoral Research Associate**, Michigan State University, East Lansing, MI, USA

## Research Interests

- Structure of the Earth's Deep Interior
- Mechanisms of Small Seismic Events (Microseisms, Nuclear Explosions, Collapses)
- Numerical Simulation of Wave Propagation in Complex Media
- Full Waveform Inversion
- Seismic Interferometry

## Professional Societies & Activities

- 2012 – present Member of the [American Geophysical Union \(AGU\)](#)
- 2013 – present Author of the [SeisMan](#) blog (popular among Chinese young seismologists)
- 2016 – 2018 Research assistant and database manager for [China Seismological Reference Model](#)
- 2016 – present Founder and primary contributor of [GMT China Community](#)
- 2017 – present Peer-reviewer of scientific journals: *Geophysical Research Letters* (1), *Seismological Research Letters* (2), *Review of Scientific Instruments* (1), *Journal of Open Source Software* (2)
- 2018 – present Core developer of the [Generic Mapping Tools \(GMT\)](#) and [PyGMT](#)
- 2018 – 2019 Judge for the Outstanding Student Paper Award, AGU Fall Meeting
- 2019 – 2020 Instructor, the UNAVCO Short Course “The Generic Mapping Tools for Geodesy”
- 2019 Instructor, Workshop SCIWS4: “[Become a Generic Mapping Tools Contributor Even If You Can't Code](#)”, 2019 AGU Fall Meeting

## Awards & Honors

- 2018 President Award, Chinese Academy of Science, China [top 1%]
- 2018 Outstanding Graduate Student, University of Science and Technology of China, China [top 15%]
- 2017 Outstanding Student Paper Award, 2017 Annual Meeting of Chinese Geoscience Union, China
- 2017 National Scholarship for Doctoral Students, Ministry of Education, China [top 5%]
- 2014 Kwang-Hua Scholarship, Kwang-Hua Education Foundation, China
- 2010 Kwang-Hua Scholarship, Kwang-Hua Education Foundation, China
- 2009 Outstanding Volunteer, University of Science and Technology of China, China

## Peer-reviewed Publications

\*corresponding author, #co-first author.

- 12. Wei, S. S., Shearer, P. M., Lithgow-Bertelloni, C., Stixrude, L., **Tian, D.** (2020). Oceanic plateau of the Hawaiian mantle plume head subducted to the uppermost lower mantle. *Science*, *accepted*
- 11. **Tian, D.**, Lv, M., Wei, S. S., Dorfman, S. M. & Shearer, P. M. (2020). Global variations of Earth's 520- and 560-km discontinuities. *Earth and Planetary Science Letters*, 552, doi:[10.1016/j.epsl.2020.116600](https://doi.org/10.1016/j.epsl.2020.116600)
- 10. Wessel, P., Luis, J., Uieda, L., Scharroo, R., Wobbe, F., Smith, W. H. F., & **Tian, D.** (2019). The Generic Mapping Tools Version 6. *Geochemistry, Geophysics, Geosystems*, 20. doi:[10.1029/2019GC008515](https://doi.org/10.1029/2019GC008515)
- 9. Yao, J., **Tian, D.**, Sun, L., & Wen, L. (2019). Temporal change of seismic Earth's inner core phases: inner core differential rotation or temporal change of inner core surface?. *Journal of Geophysical Research: Solid Earth*, 124, 6720–6736. doi:[10.1029/2019JB017532](https://doi.org/10.1029/2019JB017532)
- 8. Fan, W., Wei, S.S., **Tian, D.**, McGuire J.J., & Wiens D.A. (2019). Complex and diverse rupture processes of the 2018 Mw 8.2 and Mw 7.9 Tonga-Fiji deep earthquakes. *Geophysical Research Letters*, 46(5), 2434–2448. doi:[10.1029/2018GL080997](https://doi.org/10.1029/2018GL080997)
- 7. Yao, J., **Tian, D.** #, Lu, Z., Sun, L., & Wen, L. (2018). Triggered seismicity after North Korea's 3 September 2017 nuclear test. *Seismological Research Letters*, 89(6), 2085–2093. doi:[10.1785/0220180135](https://doi.org/10.1785/0220180135)
- 6. Yao, J., **Tian, D.** #, Sun, L., & Wen, L. (2018). Source characteristics of North Korea's 3 September 2017 nuclear test. *Seismological Research Letters*, 89(6), 2078–2084. doi:[10.1785/0220180134](https://doi.org/10.1785/0220180134)
- 5. **Tian, D.**, Yao, J., & Wen, L. (2018). Collapse and earthquake swarm after North Korea's 3 September 2017 nuclear test. *Geophysical Research Letters*, 45(9), 3976–3983. doi:[10.1029/2018GL077649](https://doi.org/10.1029/2018GL077649)
- 4. Wen, L., **Tian, D.**, & Yao, J. (2018). Seismic structure and dynamic process of the Earth's inner core and its boundary. *Chinese Journal of Geophysics*, 61(3), 803–818. doi:[10.6038/cjg2018L0500](https://doi.org/10.6038/cjg2018L0500) [in Chinese]
- 3. **Tian, D.**, & Wen, L. (2017). Seismological evidence for a localized mushy zone at the Earth's inner core boundary. *Nature communications*, 8, 165. doi:[10.1038/s41467-017-00229-9](https://doi.org/10.1038/s41467-017-00229-9)
- 2. Chen, X., **Tian, D.**, & Wen, L. (2015). Microseismic sources during hurricane sandy. *Journal of Geophysical Research: Solid Earth*, 120(9), 6386–6403. doi:[10.1002/2015JB012282](https://doi.org/10.1002/2015JB012282)
- 1. Zhang, M., **Tian, D.**, & Wen, L. (2014). A new method for earthquake depth determination: stacking multiple-station autocorrelograms. *Geophysical Journal International*, 197(2), 1107–1116. doi:[10.1093/gji/ggu044](https://doi.org/10.1093/gji/ggu044)

## **Papers in Preparation**

4. **Tian, D.**, Wang, W. & Wei, S. S. Source spectra and stress drop of deep earthquakes in the Tonga subduction zone.
3. **Tian, D.**, & Wen, L. Improved relative moment tensor inversion method and applications to clusters of small earthquakes.
2. **Tian, D.**, & Wen, L. Three types of Earth's inner core boundary.
1. **Tian, D.**, & Wen, L. Simulating wave propagation in a faulted medium using a 3D finite difference method.

## **Meeting Abstracts**

16. **Tian, D.**, Wang, W. & Wei, S. S. (2019) Source spectra and stress drop of deep earthquakes in the Tonga subduction zone. Abstract S13C-0458 presented at 2019 AGU Fall Meeting, San Francisco, CA, USA.
15. **Tian, D.**, Wei, S. S., & Shearer, M. P. (2019) Global variations of the 520-km discontinuity. Presented at Gordon Research Conference: Interior of the Earth, South Hadley, MA, USA.
14. **Tian, D.**, Wei, S. S., & Shearer, M. P. (2018) Global variations of the 520-km discontinuity. Abstract DI31C-0024 presented at 2018 AGU Fall Meeting, Washington, DC, USA.
13. **Tian, D.**, Yao, J., & Wen, L. (2017). Collapse and earthquake swarm after North Korea's 3 September 2017 nuclear test. Abstract S43H-2968 presented at 2017 AGU Fall Meeting, New Orleans, LA, USA.
12. **Tian, D.**, & Wen, L. (2017). Three types of Earth's inner core boundary. Abstract DI33B-0404 presented at 2017 AGU Fall Meeting, New Orleans, LA, USA.
11. Yao, J., **Tian, D.**, & Wen, L. (2017). High-precision location, yield and tectonic release of North Korea's 3 September 2017 nuclear test. Abstract S43H-2967 presented at 2017 AGU Fall Meeting, New Orleans, LA, USA.
10. Yao, J., **Tian, D.**, Sun, L., & Wen, L. (2017). Temporal change of seismic Earth's inner core phases: Inner core differential rotation or temporal change of inner core surface? Abstract DI33B-0405 presented at 2017 AGU Fall Meeting, New Orleans, LA, USA.
9. **Tian, D.**, & Wen, L. (2017). Seismological evidence for a localized mushy zone at the Earth's inner core boundary. Presented at Gordon Research Conference: Interior of the Earth, South Hadley, MA, USA.
8. Yao, J., **Tian, D.**, Sun, L., & Wen, L. (2017). Temporal change of seismic Earth's inner core phases: Inner core differential rotation or temporal change of inner core surface? Presented at Gordon Research Conference: Interior of the Earth, South Hadley, MA, USA.
7. **Tian, D.**, & Wen, L. (2016). Seismic structures of the Earth's inner core boundary beneath the Bearing sea and Mexico. Abstract DI43A-2657 presented at 2016 AGU Fall Meeting, San Francisco, CA, USA.
6. **Tian, D.**, & Wen, L. (2015). Varying seismic property of the Earth's inner core boundary. Abstract DI33A-2606 presented at 2015 AGU Fall Meeting, San Francisco, CA, USA.
5. **Tian, D.**, & Wen, L. (2014). Seismic study on the properties of the Earth's inner core boundary. Abstract DI31B-4269 presented at 2014 AGU Fall Meeting, San Francisco, CA, USA.

4. Chen, X., **Tian, D.**, & Wen, L. (2013). Seismic tracking of hurricane sandy. Abstract S11A-2296 presented at 2013 AGU Fall Meeting, San Francisco, CA, USA.
3. **Tian, D.**, & Wen, L. (2013). Regional topography variation of Earth's inner core boundary. Abstract DI23A-2282 presented at 2013 AGU Fall Meeting, San Francisco, CA, USA.
2. Zhang, M., **Tian, D.**, & Wen, L. (2013). A new method for earthquake determination: stacking multiple-station autocorrelograms. Abstract S51A-2301 presented at 2013 AGU Fall Meeting, San Francisco, CA, USA.
1. **Tian, D.**, & Wen, L. (2012). Simulating wave propagation in a faulted medium using a 3D finite difference method. Abstract S43A-2458 presented at 2012 AGU Fall Meeting, San Francisco, CA, USA.

## Talks

7. **Tian, D.** Global variations of the 520-km discontinuity. *2nd Annual Earth and Environmental Sciences Student Research Symposium*, Department of Earth and Environmental Sciences, Michigan State University, East Lansing, MI, USA. Feb. 23, 2019. **[5 minutes lightning talk]**
6. **Tian, D.** Collapse and earthquake swarm after North Korea's 2017 nuclear test. *Institute of Geology and Geophysics, Chinese Academy of Sciences*, Beijing, China. Jun. 15, 2018.
5. **Tian, D.** Seismological evidence for a localized mushy zone at the Earth's inner core boundary. *Institute of Geology and Geophysics, Chinese Academy of Sciences*, Beijing, China. Jun. 15, 2018. **[invited]**
4. **Tian, D.** Fine-scale structure of the Earth's inner core boundary and aftershocks of North Korea's 2017 nuclear test. *Institute of Earthquake Forecasting, China Earthquake Administration*, Beijing, China. Jun. 14, 2018.
3. **Tian, D.** Seismological evidence for a localized mushy zone at the Earth's inner core boundary. *2017 Annual Meeting of Chinese Geoscience Union (CGU)*, Beijing, China. Oct. 17, 2017. **[invited]**
2. **Tian, D.** Getting started with GMT in 60 minutes. *Workshop on Analysis and Applications of Crustal Deformation Data*, Wuhan, China. Sep. 21, 2016. **[invited]**
1. **Tian, D.** Seismic study on the properties of the Earth's inner core boundary. *China Earthquake Networks Center*, Beijing, China. Jun. 30, 2016. **[invited]**

## Field Experience

- **LEEP** (Lake Erie Earthquake exPeriment), 10/12/2018 – 10/16/2018, install 8 broadband seismic stations around Lake Erie.

## Open Source Software

\*Year indicates when the project was started. All projects are currently ongoing.

- 2014 **HinetPy** – A python package to request and process seismic waveform data from Hi-net.  
<https://github.com/seisman/HinetPy/>

## **Expertise & Skills**

<b>Languages</b>	Mandarin Chinese, English.
<b>Driving</b>	Michigan Driver License.
<b>Programming</b>	C, Python, Fortran, Perl, Shell, MPI, LaTeX.
<b>Seismological Tools</b>	SAC, GMT, SOD, ObsPy, TauP.
<b>Waveform modeling</b>	Reflectivity Method, Finite Difference Method, Generalized Ray Theory, GRT-FD Hybrid method.
<b>Others</b>	gCAP (moment tensor inversion), Match&Locate (Small event detection and location), hk (receiver function).