

# Dongdong Tian

## Postdoctoral Research Associate

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## Education

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| 2018 | <b>Ph.D</b> in Geophysics<br>University of Science and Technology of China, Hefei, China |
| 2012 | <b>B.S.</b> in Geophysics<br>University of Science and Technology of China, Hefei, China |

## Employment

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| 08/01/2018 – present | <b>Postdoctoral Research Associate</b><br>Michigan State University, East Lansing, MI, USA |
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## 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

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| 2012 – present | Member of the <a href="#">American Geophysical Union (AGU)</a>  |
| 2016 – 2018    | Research assistant and database manager for <a href="#">China Seismological Reference Model</a>   |
| 2016 – present | Founder and primary contributor of <a href="#">GMT China Community</a>  |
| 2017 – present | Peer-reviewer of scientific journals: <ul style="list-style-type: none"><li>• <i>Geophysical Research Letters</i> (1)</li><li>• <i>Seismological Research Letters</i> (2)</li><li>• <i>Review of Scientific Instruments</i> (1)</li></ul> |
| 2018 – present | Core developer of the <a href="#">Generic Mapping Tools (GMT)</a> and <a href="#">PyGMT</a>   |
| 2018           | Judge for the Outstanding Student Paper Award, AGU Fall Meeting   |
| 2019           | Instructor, <a href="#">the 2019 UNAVCO Short Course “The Generic Mapping Tools for Geodesy”</a>  |

## 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.

- 9. Yao, J., **Tian, D.**, Sun, L., & Wen, L. 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*, doi:[10.1029/2019JB017532](https://doi.org/10.1029/2019JB017532). *in press*.
- 8. Fan, W., S.S. Wei, **Tian, D.**, J.J. McGuire, and D.A. Wiens. (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.**<sup>#</sup>, 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.**<sup>#</sup>, 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 submitted/under revision

- 1. Wessel, P., Luis, J., Uieda, L., Scharroo, R., Wobbe, F., Smith, W. H. F., & **Tian, D.**, The Generic Mapping Tools, Version 6. *submitted to Geochemistry, Geophysics, Geosystems*.

## Papers in Preparation

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

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.

## 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).