

## 田小川 (Tian, Xiaochuan)

Postdoctoral research fellow at Department of Earth & Environmental Sciences, Boston College

email: x.tian@bc.edu; website: magmaxt.github.io

### RESEARCH INTERESTS

---

Tectonics and magmatism at plate boundaries and during formation of large igneous provinces.

### EDUCATION

---

- |           |  |
|-----------|--|
| 2015-2021 | <b>Columbia University</b> , New York, NY, USA<br><i>M.A., M.Phil. &amp; Ph.D. in Earth Sciences</i><br>Advisor: Dr. W. Roger Buck |
| 2013-2015 | <b>University of Memphis</b> , Memphis, TN, USA<br><i>M.Sc. in Geophysics</i><br>Advisor: Dr. Eunseo Choi                          |
| 2009-2013 | <b>Sun Yat-sen University</b> , Guangzhou, Guangdong, China<br><i>B.Sc. in Geology</i>   |

### ACADEMIC APPOINTMENTS

---

- |              |  |
|--------------|--|
| 2021-current | <b>Postdoctoral Research Fellow</b> , Boston College                 |
| 2015-2019    | <b>Graduate Research &amp; Teaching Fellow</b> , Columbia University |
| 2013-2015    | <b>Graduate Research Assistant</b> , University of Memphis           |

### AWARDS AND FUNDS

---

- |           |   |
|-----------|---|
| 2023-2024 | <b>National Science Foundation Awards EAR-1855430:</b> \$236,345<br><i>“Collaborative Research: Voyage to the bottom of Arcs: interplay between water, deformation, and lower crustal stability”</i> (Funded by the project. Principal investigator: Veronique Le Roux, Emily Chin and Mark Behn) →link                                     |
| 2021-2023 | <b>National Science Foundation Awards OCE-1928776:</b> \$304,473<br><i>“Collaborative Research: Tectono-magmatic Controls on the Origin and Evolution of Mid-Ocean Ridge Segmentation at Slow-to-Intermediate Spreading Rates - Top down or bottom up”</i> (Funded by the project. Principal investigator: Mark Behn and Garrett Ito) →link |
| 2017-2020 | <b>National Science Foundation Awards OCE-1654745:</b> \$319,977<br><i>“Evaluating mechanisms for the formation, propagation and evolution of volcanic rifts and margins”</i> (Participated in proposal writing. Principal investigator W. Roger Buck) →link  |
| 2017      | <b>National Science Foundation Awards OCE-1658072:</b> \$179,333<br><i>“Fully three-dimensional numerical models for along-axis variations in magmatic and tectonic processes at slow-spreading mid-ocean ridges”</i> (Funded by the project; mentored PhD student Hao Lu. Principal investigator: Eunseo Choi) →link                       |
| 2015-2020 | <b>Columbia University Dean’s Fellow:</b> \$409,515<br>The highest honor conferred upon entering graduate students in the Department of Earth and Environmental Sciences  |

## PUBLICATIONS

---

### PEER-REVIEWED JOURNAL ARTICLES

- Schierjott, J. C., Ito, G., Behn, M. D., **Tian, X.**, Morrow, T., Kaus, B. J., & Escartín, J. (2023). How transform fault shear influences where detachment faults form near mid-ocean ridges. *Scientific Reports*, 13(1), 9259. → link
- Tian, X.**, & Buck, W. R. (2022). Intrusions induce global warming before continental flood basalt volcanism. *Nature Geoscience*. 15, 417–422. →link
- Tian, X.**, & Buck, W. R. (2019). Lithospheric Thickness of Volcanic Rifting Margins: Constraints from Seaward Dipping Reflectors. *Journal of Geophysical Research: Solid Earth*, 124(4), 3254-3270. →link
- Tian, X.**, & Choi, E. (2017). Effects of Axially Variable Diking Rates on Faulting at Slow Spreading Mid-Ocean Ridges. *Earth and Planetary Science Letters*, 458, 14-21. →link

### MANUSCRIPTS UNDER REVIEW

- Tian, X.**, Behn M., Ito G., Schierjott J., Kaus B., Popov A., Magmatism Controls Global Oceanic Transform Fault Topography, under review (minor revision) at *Nature Communications*. →link

### MANUSCRIPTS IN PREPARATION

- Tian, X.**, & Buck, W. R. How Lower Crustal Flow Controls the Topography of Volcanic Plateaux, submitting to *Earth and Planetary Science Letters*.
- Tian, X.**, Behn M., Gruber B., Chin E., Le Roux V., Olive J.A. Crustal Delamination Induced Finite Strain, Rock Fabrics and Seismic Anisotropy: Constraints and Insights from Geodynamic Models, in prep.

## PRESENTATIONS

---

### *TALKS* (\*: invited)

- \***Tian, X.**, Behn M., Ito G., Schierjott J., Kaus B., Popov A, Magmatism Controls Global Oceanic Transform Fault Topography, MGG Lecture Series, University of Rhode Island, 2023-10-06.
- Tian, X.**, & Buck, W. R., Effects of Large Igneous Province Magmatism on Earth's Structure and Climate, CIDER research talk, University of California, Berkeley, 2023-07-13.
- \***Tian, X.**, Behn M., Ito G., Schierjott J., Kaus B., Popov A, Magmatism Controls Oceanic Transform Fault Topography, G&G Department Seminar, Woods Hole Oceanographic Institution, 2023-06-06.
- Tian, X.**, & Behn M., Ito G., Schierjott J., Kaus B., Popov A., Modes of oceanic transform fault topography. AGU Fall Meeting, 2022-12.
- \***Tian, X.**, & Buck, W. R., Intrusions induce global warming before continental flood basalt volcanism. AGU Fall Meeting, 2022-12.
- \***Tian, X.**, & Buck, W. R., Intrusions induce global warming before continental flood basalt volcanism. University of Memphis, 2022-09-30
- Tian, X.**, & Buck, W. R. Constraints on the Lithospheric Strength at Volcanic Rifted Margins from the Geometry of Seaward Dipping Reflectors Using Analytic and Numerical Models. AGU Fall Meeting, 2017-12.
- \***Tian, X.**, & Buck, W. R. Seaward Dipping Reflectors at Rifted Margins: Formation Mechanism and Implications for Lithospheric Strength during Incipient Rifting. Seminar at the Center for Earthquake Research and Information, Memphis University, 2017-07.

### *POSTERS*

- Tian, X.**, & Buck, W. R. Lower crustal flow and the generation of high versus low volcanic plateaus. AGU Fall Meeting, 2018-12.
- Tian, X.**, & Buck, W. R. The Role of Magmatic and Volcanic Loads in Generating Seaward Dipping Reflector Structures on Volcanic Rifted Margins. AGU Fall Meeting, 2016-12.

Buck, W. R., & Tian, X. Reconciling Mantle Plume Initiation of Continental Breakup with the Inferred Direction of Rift Propagation. AGU Fall Meeting, 2016-12.

Tian, X., Choi, E. & Buck, W. R. 3D Numerical Models of the Effect of Diking on the Faulting Pattern at Incipient Continental Rifts and Steady-State Spreading Centers. AGU Fall Meeting, 2015-12.

Tian, X. & Choi, E. 3D Numerical Models for Along-axis Variations in Diking. AGU Fall Meeting, 2014-12.

---

#### FIELD AND SEAGOING EXPERIENCE

**Peru, 2019.** 12-day Storke Memorial multi-disciplinary field trip. Andean culture; Tectonics & earthquakes; Mountain building and the Altiplano; Marine life; Terrestrial biodiversity; El Nino/La Nina; Coastal upwelling & productivity; Arc volcanism; Rainbow mountain; Tropical glaciers; Desert and sand dunes; Coastal geomorphology ;

**Atlantic Ocean, 2018.** 35-day RV Atlantis cruise. Western North Atlantic Survey. Multi-channel seismic and multi-beam sonar data acquisition, processing, visualization. Principal Investigators: Mitch Lyle and Gregory Mountain. (NSF OCE-1656960)

**Azores, 2017.** 11-day field trip focusing on Volcanology.

**Basin and Range, 2016.** 9-day field trip on normal faulting at Basin and Range.

**North Kentucky, 2014.** 3-day field work: deployed seismic stations of Center for Earthquake Research and Information

**Memphis, 2013.** Field work: conducted electricity, gravity and seismology surveys near Memphis University.

---

#### TEACHING EXPERIENCE

##### **COLUMBIA UNIVERSITY**

*Teaching Assistant* (delivered guest lectures, designed and led lab experiments, held office hours, and graded problem sets, papers, and exams) for the following courses:

2019            *Earth: Origin, Evolution, Processes and Future.*

2018            *Earth's Environmental Systems: Solid Earth.*

2016            *Geodynamics.*

---

#### SERVICE AND OUTREACH

2019-2023      Manuscript Reviewer: *Geophysical Research Letters, Journal of Geophysical Research, Tectonophysics, Geochemistry, Geophysics, Geosystems.*  
Proposal Reviewer: *National Science Foundation, NSF-NERC*

2019 July        Invited intern lecture on "*Modeling Interactions of Magma and Tectonics*" at Lamont-Doherty Earth Observatory.

2017 June        Volunteer for lava flow demonstrations at the World Science Festival, NYU.

2015-2018       Assist in Exhibitions at Lamont-Doherty Earth Observatory Open House: Demonstrate analog models using gelatin: Mantle Plume induced Rifting; Mantle Plume upwelling; Visualizing stress patterns due to faults and flexure with Photo-elasticity.

2014 Dec.        AGU Fall Meeting session chair. T43A: *Three-Dimensional Observations and Models of Lithospheric Extension*