

Tian, Xiaochuan (田小川)

Summa and Awwiller Postdoctoral Fellow
Department of Earth and Planetary Sciences, UC Davis

RESEARCH INTERESTS

How Earth's materials *move* across spheres and *deform* across scales by integrating *interdisciplinary* fields with **Geodynamic** modeling.

EDUCATION

2015-2021 *Ph.D. in Geophysics*, **Columbia University**, Advisor: W. Roger Buck
2013-2015 *M.Sc. in Geophysics*, **University of Memphis**, Advisor: Eunseo Choi
2009-2013 *B.S. in Geology*, **Sun Yat-sen University**, Advisor: Gu Cheng

ACADEMIC APPOINTMENTS

2024-Present **Summa and Awwiller Postdoctoral Fellow**, UC Davis. With: Magali Billen & Mike Oskin
2021-2024 **Postdoctoral Research Fellow**, Boston College. With: Mark Behn & Garrett Ito
2015-2019 **Graduate Research & Teaching Fellow**, Columbia University
2013-2015 **Graduate Research Assistant**, University of Memphis

PUBLICATIONS

Peer-reviewed journal articles

Tian, X., Behn, M.D., Ito, G., Schierjott, J. C., Kaus, B. J., Popov, A. (2024). Magmatism controls global oceanic transform fault topography. ***Nature Communications***, 15, 1914. →link
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 or in preparation

Tian, X., & Buck, W. R. Contrasting Topography of Continental Large Igneous Provinces: Crucial Role of Crustal Rheology and Intrusion Dynamics, under review at ***Earth and Planetary Science Letters***.
Tian, X., & Billen, M. I. Ubiquitous partitioning at global subduction zones. submitting to ***Science***
Tian, X., Janin A., Fraters M., Behn M., Gruber B., Chin E., Urann B., Le Roux V. Numerical simulations of clinopyroxene fabric development under laboratory and natural conditions. Submitting to ***JGR***
Tian, X., Behn M., Gruber B., Chin E., Le Roux V. Crustal Delamination Induced Finite Strain and Rock Fabrics: Constraints and Insights from Arclogite Samples and 3D Numerical Models, in prep.

AWARDS AND FUNDS

2024-2026 **Lori Summa and David Awwiller Postdoctoral Research Fellowship: \$313,875**
“Ups and Downs of Northern California Forearc”- a multidisciplinary geology/geodynamics project focusing on dynamics of forearc deformation in Northern California (Collaborate with Michael Oskin and Magali Billen. **PI: Xiaochuan Tian**). →link
2025-2026 **Statewide California Earthquake Center Awards SCEC-25188: \$25,056**

email: equtian@ucdavis.edu

website: magmaxt.github.io

- 2024 *“Numerical Simulations of the Change in Stress-State Inboard of the Mendocino Triple Junction”* (Co-PI: M. Oskin and M. Billen. **PI: Xiaochuan Tian**) →link
- 2024 **AGU 2024 Tectonophysics Caregiver Awards: \$500**
- 2017-2020 **National Science Foundation Awards OCE-1654745: \$319,977**
“Evaluating mechanisms for the formation, propagation and evolution of volcanic rifts and margins” (Contributed to proposal writing. PI: W. Roger Buck). →link
- 2017 **National Science Foundation Awards OCE-1658072: \$179,333**
“Fully three-dimensional numerical models for along-axis variations in magmatic and tectonic processes at slow-spreading mid-ocean ridges” (Funded by the project; mentored PhD student Hao Lu. PI: Eunseo Choi). →link
- 2015-2020 **Columbia University Dean’s Fellow: \$409,515**
 The highest honor conferred upon entering graduate students in the Department of Earth and Environmental Sciences.

PRESENTATIONS

TALKS (*: invited)

- *Tian, X., Deformation across scales: from plate boundaries to lab experiments, UC Davis, 2024-11-15
- Tian, X., Deformation across scales: from plate boundaries to lab experiments, SZ4Grads, 2024-10-30
- *Tian, X., Deformation across scales: from plate boundaries to lab experiments, Boston College, 2024-09
- Tian, X., Behn M., Ito G., Schierjott J., Kaus B., Popov A, Magmatism Controls Global Oceanic Transform Fault Topography, AGU Fall Meeting, 2023-12.
- *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, University of Memphis, 2017-07.

POSTERS

- Tian, X., Janin A., Fraters M., Behn M., Gruber B., Chin E., Urann B., Le Roux V. Numerical simulations of clinopyroxene fabric development under laboratory and natural conditions. AGU Fall Meeting, 2024 Dec.
- 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 U. of Memphis.

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-Present Manuscript Reviewer: *Nature Communications, Geology, Geophysical Research Letters, Journal of Geophysical Research, Tectonophysics, Geochemistry, Geophysics, Geosystems, Seismica.*

2022-Present Proposal Reviewer: *National Science Foundation, NSF-NERC.*

2025-Present Executive Committee Member, SZ4Grads

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

June 2017 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 Photoelasticity.

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