

Yuan-Kai Liu

Postdoctoral Scholar
Doerr School of Sustainability | Geophysics
Stanford University
359 Mitchell Earth Sciences
Stanford, CA 94305

liuyk@stanford.edu
<https://yuankailiu.github.io>
[Google Scholar](#)

Education

- 2019 – 2025 PhD, Geophysics (minor in Computational Science and Engineering)
California Institute of Technology (Caltech)
Thesis: [Space Geodetic Constraints on Plate Motion, Fault Creep, and Megathrust Coupling](#)
Advised by Mark Simons, Zachary Ross
- 2016 – 2018 MSc, Earth Science & Engineering
King Abdullah University of Science and Technology (KAUST), Saudi Arabia
Thesis: [Ground deformation related to caldera collapse and ring-fault activity](#)
Advised by Sigurjón Jónsson
- 2010 – 2015 BSc, Geological Sciences
BEng, Civil Engineering, National Taiwan University, Taiwan

Research Interests

Radar and GNSS spaceborne geodesy, Seismic cycle, Lithospheric deformation, Inverse problem, Seismicity

Appointments

- 2025 – present Postdoctoral Scholar, Stanford University
+ Live Analysis of Volcanic Activity with SAR (NASA MEaSURES project)
+ Multi-sensor soil moisture and groundwater storage monitoring (Taking the Pulse of the Watershed)
- 2019 – 2025 Graduate Research, Caltech Seismological Laboratory, Caltech
- 2016 – 2018 Graduate Research, Crustal Deformation and InSAR Group, KAUST (Saudi Arabia)
- 2014 – 2015 Research Assistant, Institute of Earth Sciences, Academia Sinica (Taiwan)
- 2014 Visiting Student, Department of Earth Sciences, Tohoku University
- 2013 Project Intern, Carbon Capture and Storage Project, Taiwan Power Company
- 2012 Project Intern, Institute of Earth Sciences, Academia Sinica

Fellowships and Awards

- 2022 J. Yang Scholarship, Caltech, \$15,000
- 2019 – 2020 Caltech C Scholarship, Caltech, \$5,000
- 2019 – 2020 Division of Geological and Planetary Sciences Fellowship, Caltech
- 2017 Outstanding Student Poster Award (OSPP), European Geosciences Union
- 2016 – 2018 Graduate Program Fellowship in Earth Science and Engineering, KAUST
- 2014 National Taiwan University Dean's Award
- 2012 National Taiwan University Undergraduate Scholarship
- 2012 National Taiwan University Presidential Award

Teaching and Mentorship

2023	Mentor of Caltech Seismolab Earthquake Fellows: High school summer program
2022	Mentor of Caltech WAVE Fellows: 1 undergraduate summer research
2021	Mentor of Caltech SURF Fellows: 1 undergraduate summer research
2021 – 2022	TA at Caltech: Ge 271 – Dynamics of Seismicity (Zachary Ross) Ge 167 – Tectonic Geodesy (Mark Simons) Ge 193 – Imaging Radar and Applications (Howard Zebker)
2014 – present	Science communication in geophysics, Archilife Research Foundation, Taiwan
2012 – 2014	Middle School Science and Math tutor

Services

2022 – present	Journal Reviewer: Nature Communications Earth & Environment (Nature) Geophysical Research Letters (AGU) Journal of Geophysical Research Solid Earth (AGU) Earth and Planetary Science Letters (Elsevier)
2021 – 2022	Organizing Committee, Caltech Seismological Laboratory Seminar
2021	Student Poster Judge: Southern California Earthquake Center Meeting

Publications and Presentations

* Corresponding author, † Contributed equally

- [10] **Liu, Y.-K.** *, Mallick, R., & Simons, M. (in prep). From Lima to Santiago, inference of interseismic loading along the Peru-Chile megathrust.
- [9] **Liu, Y.-K.** *, Yunjun, Z., & Simons, M. (in prep). Constraining the extension and interseismic coupling along the southern Dead Sea Transform.
- [8] Liang, C. *, Li, X., Wang Y., Liu, Z., Simons, M., Fielding, E. J., **Liu, Y.-K.**, Yun, S.-H. (in review). Evaluating ALOS-2 L-Band InSAR Observations of Tectonic Motion in the Western United States. IEEE JSTARS.
- [7] **Wilding, J.** *, Wang, T., Liu, Y.-K., & Ross, Z. E. (in review). Cascading magmatic unrest and aseismic faulting in the Aegean Sea enabled by elastic stress relay. Science Advances.
- [6] **Pereiaslov, L.** *, Ragon, T., Liu, Y.-K., Bato, M. G., Govorcin, M., Fielding, E., & Simons, M. (in review). Bayesian co- and post-seismic slip model of the 2023 Mw 8.0 and Mw 7.9 Türkiye-Syria earthquake doublet from geodetic data. Bulletin of the Seismological Society of America.
- [5] **Liu, Y. -K.***, Yunjun, Z., & Simons, M. (2025). Inferring tectonic plate rotations from InSAR time series. Geophysical Research Letters, 52(12), e2025GL115137.
<https://doi.org/10.1029/2025GL115137>
- [4] Stephenson, O. L.†, **Liu, Y.-K.**†*, Yunjun, Z., Simons, M., Rosen, P., & Xu, X. (2022). The impact of plate motions on long-wavelength InSAR-derived velocity fields. *Geophysical Research Letters*, 49, e2022GL099835. <https://doi.org/10.1029/2022GL099835>

- [3] **Liu, Y.-K.***, Ross, Z. E., Cochran, E. S., & Lapusta, N. (2022). A unified perspective of seismicity and fault coupling along the San Andreas Fault. *Sci. Adv.***8**, eabk1167(2022).
<https://doi.org/10.1126/sciadv.abk1167>
- [2] Aldaajani, T., Simons, M., Yunjun, Z., Bekaert, D., Almalki, K.A., **Liu, Y.-K.** Using InSAR Time Series to Monitor Surface Fractures and Fissures in the Al-Yutamah Valley, Western Arabia. *Remote Sens.* **2022**, *14*, 1769. <https://doi.org/10.3390/rs14081769>
- [1] **Liu, Y.-K.**, Ruch, J., Vasyura-Bathke, H., & Jónsson, S. (2019). Influence of ring faulting in localizing surface deformation at subsiding calderas. *Earth and Planetary Science Letters*, *526*, 115784.
<https://doi.org/10.1016/j.epsl.2019.115784>

Invited Talks:

American Geophysical Union, Fall Meeting, New Orleans, 2025.

Title: Inferring Tectonic Plate Rotations from InSAR time series

Active Tectonics and Earthquake Hazards,

Lecture guest seminar, Middlebury College in Vermont, 2024

Title: A unified perspective of seismicity and fault coupling along the San Andreas Fault

American Geophysical Union, Fall Meeting, Chicago, 2022.

Title: The Impact of Plate Motions on Long-wavelength InSAR-derived velocity fields

Southern California Earthquake Hazards Assessment,

USGS Pasadena, Weekly Meeting, 2022.

Title: [A unified perspective of seismicity and fault coupling along the San Andreas Fault](#)

Conference Abstracts:

Decadal Interseismic Loading of the Peru-Chile Subduction Zone using wide-area InSAR coverage and Bayesian Inference

Liu, Y.-K., Pereiaslov, L., Mallick, R., Simons, M.

SZ4D Science Community Meeting, 2026 April, Long Beach, CA.

Inferring Tectonic Plate Rotations from InSAR time series

Liu, Y.-K., Yunjun, Z., Simons, M.

American Geophysical Union (AGU), 2025 Fall Meeting, New Orleans, CA.

[High-Resolution Interseismic Deformation of the Southern Dead Sea Transform Fault](#)

Liu, Y.-K., Yunjun, Z., Zheng, Y., Liang, C., Alotaibi, T., Simons, M.

American Geophysical Union (AGU), 2023 Fall Meeting, San Francisco, CA.

[Imaging Deformation Processes along the Southern Dead Sea Transform using 8 years of InSAR](#)

Liu, Y.-K., Stephenson, O. L., Yunjun, Z., Simons, M.

GAGE/SAGE 2023 Community Science Workshop, Pasadena, CA.

[The Impact of Plate Motions on Long-Wavelength InSAR-Derived Velocity Fields](#)

Liu, Y.-K., Stephenson, O. L., Yunjun, Z., Simons, M., Rosen, P., & Xu, X.

American Geophysical Union (AGU), 2022 Fall Meeting, Chicago, IL.

[High-Resolution Interseismic Deformation of the Southern Dead Sea Transform Fault](#)

Liu, Y.-K., Stephenson, O. L., Yunjun, Z., Simons, M.

American Geophysical Union (AGU), 2022 Fall Meeting, Chicago, IL.

[A unified perspective of seismicity and fault coupling along the San Andreas Fault](#)

Liu, Y.-K., Ross, Z. E., Cochran, E. S., Lapusta, N.

American Geophysical Union (AGU), 2021 Fall Meeting, New Orleans, LA.

[A unified perspective of seismicity and fault coupling along the San Andreas Fault](#)

Liu, Y.-K., Ross, Z. E., Cochran, E. S., Lapusta, N.

Poster #089, SCEC Contribution #11496. 2021 SCEC Annual Meeting, Palm Springs, CA.

[The problem of ghost magma chambers under calderas](#)

Liu, Y.-K., Ruch, J., Vasyura-Bathke, H., Jonsson, S.

Cities on Volcanoes 10 Meeting (2018), Naples, Italy.

[Ring-fault activity at subsiding calderas studied from analogue experiments and numerical modeling](#)

Liu, Y.-K., Ruch, J., Vasyura-Bathke, H., Jonsson, S.

American Geophysical Union (AGU), 2017 Fall Meeting, New Orleans, LA.

[Contemporaneous ring fault activity and surface deformation at subsiding calderas studied using analogue experiments](#)

Liu, Y.-K., Ruch, J., Vasyura-Bathke, H., Jonsson, S.

European Geosciences Union (EGU), General Assembly 2017, Vienna, Austria.

Numerical simulation study of Changhua and Chelungpu faults earthquake scenarios,
Lin, C.-H., T.-C. Lin, Y.-R. Chang, **Y.-K. Liu**, S.-J. Lee, Twin of Chi-Chi earthquake?
2012 Undergraduate summer project, Academia Sinica, Taiwan.

Software & Libraries

- [4] [Python Plate Motion Model \(PyPMM\)](#). Liu et al.
- [3] [Miami InSAR Time-series software in Python \(MintPy\)](#). Yunjun et. al., 2019
- [2] [Interferometric synthetic aperture radar Scientific Computing Environment \(ISCE\)](#). Rosen et. al., 2012
- [1] [Python-based Atmospheric Phase Screen estimation \(PyAPS\)](#). Jolivet et al., 2011