

Chuanming Liu

POSTDOCTORAL FELLOW

University of Texas Institute for Geophysics, The University of Texas at Austin

+1 (303)-305-8102 | ✉ chuanming.liu@jsg.utexas.edu | 🌐 <https://github.com/Chuanming-Liu> | 🎓
Chuanming Liu

Education

University of Colorado Boulder

PH.D. IN GEOPHYSICS

- Advisor: Michael Ritzwoller

Boulder, USA

2023

University of Science and Technology of China

M.S. IN GEOPHYSICS

- Advisor: Huajian Yao

China University of Geosciences

B.S. IN GEOPHYSICS

- Thesis Advisor: Yinhe Luo

Hefei, China

2017

Wuhan, China

2014

Research Interests

- Modeling isotropic and anisotropic seismic structures
- Development of seismic approaches to resolve isotropic or anisotropic structures
- Understanding the nature of seismic anisotropy in both continents and subduction zones

Awards

- 2023 **Distinguished Postdoctoral Fellows**, Jackson School of Geosciences, UT Austin
- 2021 **Outstanding Student Presentation Award**, Tectonophysics Section, AGU *New Orleans, USA*
- 2015, 2016 **Graduate Academic Scholarship**, University of Science and Technology of China *Hefei, China*
- 2015 **Outstanding Student Presentation Award**, Chinese Geophysical Society *Beijing, China*
- 2012 **Liu Guang-Ding Geophysics Scholarship**, Liu Guang-Ding Science Foundation *China*
- 2011 **National Scholarship**, Ministry of Education *China*

Research Experience

Inferring the azimuthally anisotropic pattern beneath the Alaska-Aleutian subduction zone

Apr. 2022 - 2023

- Investigated the Rayleigh wave azimuthally anisotropic pattern beneath the Alaska-Aleutian subduction zone

Inferring the oriented elastic tensor from surface wave observations and application across Alaska

May. 2019 - 2023

- Designed and developed a package for the inversion for tilted transversely isotropic model from surface wave observations
- Uncovered the seismic anisotropic properties of Alaskan continental crust

Construction of surface wave dispersion database across Alaska and Aleutian subduction zone

Jan. 2021 - May. 2022

- Constructed the comprehensive isotropic and anisotropic surface wave dispersion database of the Alaska and Aleutian subduction zone for both Rayleigh and Love waves
- OBS data processing
- Performed ambient noise two- and three-station interferometry and earthquake tomography

Constraining shallow Vs structure using resampling and smoothing receiver functions

2018 - Apr. 2019

- Investigated the inversion for shallow Vs structure using multi-frequency receiver functions

Direct inversion for the three-dimensional shear wavespeed azimuthal anisotropy based on surface-wave ray tracing: methodology and application to Yunnan, southwest China

2016 - 2018

- Designed and developed the new direct inversion method for the inversion of 3-D Vs azimuthal anisotropy from surface wave traveltime data (Open source Package: DAzimSurfTomo)
- Built the depth-dependent azimuthal anisotropy of the crust and uppermost mantle beneath Yunnan, China

Surface wave tomography with spatially varying smoothing based on continuous model regionalization

Sep. 2014 - 2015

- Improved the tomographic method, continuous regionalization, with a spatially varying smoothing scheme

Publications

C. Liu, S. Zhang, A.F. Sheehan, M.H. Ritzwoller, **Surface Wave Isotropic and Azimuthally Anisotropic Dispersion across Alaska and the Alaska-Aleutian Subduction Zone**, *J Geophys Res Solid Earth*, 2022.

T. S. Bem, C. Liu, H. Yao, S. Luo, Y. Yang, B. Liu, **Azimuthally Anisotropic Structure in the Crust and Uppermost Mantle in Central East China and Its Significance to Regional Deformation Around the Tan-Lu Fault Zone**, *J Geophys Res Solid Earth*, 2022.

Z. Zhang, H. Yao, W. Wang, C. Liu, **3-D Crustal Azimuthal Anisotropy Reveals Multi-Stage Deformation Processes of the Sichuan Basin and Its Adjacent Area, SW China**, *J Geophys Res Solid Earth*, 2022.

L. Feng, C. Liu, M. H. Ritzwoller, **Azimuthal Anisotropy of the Crust and Uppermost Mantle Beneath Alaska**, *J Geophys Res Solid Earth*, 2020.

C. Liu, H. Yao, H. Yang, W. Shen, H. Fang, S. Hu, L. Qiao, **Direct Inversion for Three-Dimensional Shear Wave Speed Azimuthal Anisotropy Based on Surface Wave Ray Tracing: Methodology and Application to Yunnan, Southwest China**, *J Geophys Res Solid Earth*, 2019.

C. Liu, H. Yao, H. Yang, W. Shen, H. Fang, S. Hu, L. Qiao, **Surface Wave Tomography with Spatially Varying Smoothing Based on Continuous Model Regionalization**, *Pure Appl Geophys*, 2017.

C. Liu, M.H. Ritzwoller, et al., **Inferring crustal and uppermost mantle seismic anisotropy of continental Alaska from surface wave observations**, *In preparation, manuscript available*, 2022.

Presentations

The Contrast of Depth-Dependent Seismic Azimuthal Anisotropy Beneath Alaska-Aleutian and Cascadia Subduction Systems

AGU FALL MEETING

Chicago, USA

Dec. 2022

Inferring crustal anisotropy across Alaska with surface wave observations (Invited)

IRIS ALASKA EARTHSCOPE SYNTHESIS

Nanaimo, Canada

Apr. 2022

Inferring crustal and uppermost mantle seismic anisotropy across Alaska with surface wave observations (AGU OPSA award)

AGU FALL MEETING

New Orleans, USA

Dec. 2021

Direct Inversion for Three-Dimensional Shear Wave Speed Azimuthal Anisotropy (Invited)

USTC SEISMOLOGY ALGORITHMS AND PROGRAMS WORKSHOP

Online

Aug. 2020

Radial and azimuthal anisotropy of the crust and uppermost mantle beneath Alaska inferred from surface waves

AGU FALL MEETING

San Francisco, USA

Dec. 2019

Assimilating New Types of Data in Inversions for Lithospheric Shear Velocity Structure

AGU FALL MEETING

Washington, D.C., USA

Dec. 2018

Direct inversion of surface wave dispersion for three-dimensional crustal azimuthal anisotropy based on frequency-dependent ray tracing

AGU FALL MEETING

San Francisco, USA

Dec. 2016

Surface wave tomography with adaptive spatial smoothing based on the continuous regionalization

CHINESE GEOSCIENCE UNION ANNUAL MEETING

Beijing, China

Oct. 2015

Teaching Experience

Teaching Assistant

Boulder, USA

UNIVERSITY OF COLORADO BOULDER

- General Physics I (2020, Spring)
- General Physics II (2019, Spring)
- Experimental Physics I (2017, Fall; 2019, Spring)

Skills

Python, Matlab, GMT, Linux Shell, Fortran, Machine learning (TensorFlow), OBS data processing

Published Code

DAzimSurfTomo: python package of direct inversion of surface wave for 3-D isotropic V_{sv} and azimuthal anisotropy
(Github badge: Starstruck)

SurfTool: python package for surface wave data processing