

FU YIN

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EDUCATION

University of Science and Technology of China (USTC)

M.S. Geological Engineering

Sept. 2019 - Jun. 2022 (expected)

Percentage: 88.21/100, GPA: 3.73/4.3

Ocean University of China (OUC)

B.S. Geo-Information Science and Technology

Aug. 2015 - Jun. 2019

Percentage: 86.38/100, GPA: 3.42/4.0

RESEARCH INTERESTS

- Earthquake Source Inversion
- Ambient Noise Monitoring and Imaging
- Bayesian Inference (MCMC, reversible-jump MCMC, HMC and NUTS)
- Distributed Acoustic Sensing Technique (DAS) and High-Performance Computing (HPC)

RESEARCH EXPERIENCE

Focal Mechanism Inversion

Jan. 2019 - Jun. 2021

- Used neighbourhood algorithm and 3 misfit functions including waveform, P-polarity, and amplitude ratio to invert focal mechanism of induced earthquakes in Hutubi underground gas storage, Xinjiang.
- Developed a new method for inverting source parameters based on CAP algorithm and Markov Chain Monte Carlo (MCMC) and applied it to the 2021 M_s 6.4 Yangbi Earthquake in Yunnan.

Distributed Acoustic Sensing Technique (DAS)

Sept. 2020 - Present

- Analyzed and compared DAS signals (active source, earthquake and ambient noise) with the station signals and used higher-mode Rayleigh waves based on MF-J transform to image shallow structure in Baijiatuan, Beijing.

Noise-Based Observation of Velocity Change

Sept. 2020 - Present

- Utilized diffusion equation to determine the probability of scattering wave propagation and developed a Bayesian method for locating small variation in multiple scattering media.
- Employed ambient noise techniques to estimate relative velocity changes and monitored the changes of subsurface mechanical properties in Dayindian water reservoir, Yunnan.

OPEN-SOURCE CODE

All projects are currently ongoing.

- **SeisFlow**: a framework for processing massive seismic data based on Python and Julia. [Link](#)
- **NoiseCC**: a framework for ambient noise cross-correlation (CC) based on SeisNoise.jl in Julia. [Link](#)
- **MCMTpy**: a Python package designed for focal mechanism inversion and source parameters analysis. [Link](#)

PUBLICATIONS

3. **Fu Yin**, Meng Chen, Gregor Hillers, Baoshan Wang, and Michel Campillo. Noise-based observation of velocity changes associated with effective pressure changes induced by water level changes in Dayindian water reservoir, Yunnan Province, China. **In preparation** for Journal of Geophysical Research: Solid Earth.
2. **Fu Yin** and Baoshan Wang* (2021). MCMTpy: A Python package for source parameters inversion based on Cut-And-Paste algorithm and Markov Chain Monte Carlo. **Submitted** to Seismological Research Letter.
1. Yuhang Lei, **Fu Yin**, Heting Hong, Yulan Li, Baoshan Wang* (2021). Shallow structure imaging using higher-mode Rayleigh waves based on F-J transform in DAS observation. Chinese Journal of Geophysics, 64(12): 4280-4291, doi: 10.6038/cjg2021P0438

CONFERENCE PRESENTATIONS

5. **Fu Yin** and Baoshan Wang (2021). MCMC-MTpy: A Python package for simultaneous inversion of source location, focal mechanism, and rupture directivity. SSA 2021 Annual Meeting, 6517, Physics-based Earthquake Rupture Modeling and Strong Motion Simulations. *Poster*
4. **Fu Yin** and Baoshan Wang (2021). Distributed acoustic sensing seismic observation and shallow surface structure imaging. The 5th National Youth Geological Congress, Guiyang, China. *Oral*
3. **Fu Yin** and Baoshan Wang (2021). MCMTpy: a source parameter inversion package based on Bayesian Inference and its application to the 2021 Yangbi earthquake. Chinese Geoscience Union Fall Meeting, Zhuhai, China. *Oral*
2. **Fu Yin** and Baoshan Wang (2021). A numerical experiment for locating small variation in multiple scattering media based on MCMC method. Chinese Geoscience Union Fall Meeting, Zhuhai, China. *Poster*
1. **Fu Yin** and Baoshan Wang (2020). Inversion of focal mechanism of small earthquakes in Hutubi gas storage area by multi-objective function full waveform matching method. Chinese Geoscience Union Fall Meeting, Chongqing, China. *Oral*

TEACHING ASSISTANT

Engineering Seismology, USTC

2021 Spring

- Designed and led a campus experiment of ambient noise observation with 10 short-period stations; taught Nakamura(HVSR) and SPAC method, including theory, code and assignments.

EXPERTISE SKILLS

Seismological Tools

- SAC, PyGMT, ObsPy, TauP, Pykonal, gCAP, NoisePy, SeisIO, SeisNoise, CC-FJpy, SPECFEM2D, OpenSWPC, Frequency–Wavenumber

Programming

- Python, Julia, C++, MATLAB, Fortran, MPI, LaTeX

FIELD PRACTICE

Offshore Trip, Qingdao, China

2018 Fall

- Observed marine hydrology, meteorology, and chemistry elements with Seabird 911 CTD.

Applied Geophysical Practice, Yantai, China

2018 Summer

- Applied geophysics approaches (including seismic, electrical, and magnetic methods) to detect train piers.

Seismic Observation Based on DAS Technique, Beijing, China

2020 Fall

- Installed 23 short-period stations (EPS), 47 short-period stations (Smartsolo), and 8 broadband stations around the 1-km optical cable.

Downhole Seismic Observation Based on DAS Technique, Hefei, China

2021 Spring

- Installed 36 short-period stations (Z-land) around the 400-m optical cable.

SELECTED AWARDS

- Outstanding Academic Report Nomination Award and Outstanding Academic Poster Award of the 2nd Engineering Postgraduate Academic Forum, USTC. *Link-1. Link-2* 2021
- First-class Scholarship for Academics, USTC. 2020 2021
- Science and Technology Achievement Award, OUC. 2018
- 1st place at 5th Applied Geophysical Skills Competition, OUC. 2018
- Second-class award at the 15th Extracurricular Academic Science and Technology Works Competition, Shandong Association for Science and Technology. [top 3%] 2017
- Outstanding Volunteer, People's Government of Shandong. 2016