Haiyang Liao

M.S. in NJU, applying for Ph.D. program in Seismology in the US

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Education

- **M.S. in Geological Engineering** Sept. 2022 - June 2025 (expected)
  Nanjing University (US News Ranking: 98), Nanjing, China
  - Thesis (in preparation): *Urban karst collapse monitoring technology based on fiber-optic distributed acoustic sensing (DAS)* - Advisor: Professor, Dan Zhang
- **B.S. in Geology** Sept. 2018 - June 2022
  Anhui University, Hefei, China
  - Thesis: *Application of Ground Penetrating Radar (GPR) in surface collapse detection of solid waste deposits in landfill* - Advisor: Associate Professor, Qifeng Yin

Research

Interests

- **Environmental Seismology**
- **Urban Near-Surface and Time-Lapse Imaging**
- **Ambient Seismic Field Interferometry**
- **DAS Seismology and Interdisciplinary Applications**

Experience and Projects

- **Shallow Subsurface Cavity Detection** May 2024 - Present
  - Deployed fiber optic cables near campus wells to validate cavity detection with DAS.
  - Studied lateral detection ranges using the three-station interferometry method.
- **Optical Fiber Cable Coupling Methods Study** May 2024 - Present
  - Installed fiber optic cables on campus with different coupling methods to compare imaging effects.
- **Software Development for Surface Wave Imaging** Apr 2024 - Aug 2024
  - Developed software for monitoring ground collapses using surface waves.
- **Karst Fracture Zone Detection in Mufu Mountain** Jan 2024 - Aug 2024
  - Laid fiber optic cables and applied frequency-Bessel method to detect fractured karst zones.
- **Numerical Simulation for Subsurface Cavity Detection** Jan 2023 - Oct 2023
  - Simulated shallow cavities using specfem3d/2d to analyze DAS imaging responses.
- **DAS and Urban Ground Collapse Research** Jan 2021 - Dec 2024
  - Major focus during master's studies, involving experiments and research with DAS seismology.
- **Engineering Geological Conditions Evaluation for River-Crossing Tunnels** June 2023 - Aug 2024
  - Served as the student leader, designed experimental plans, coordinated field tests, and co-authored the final report.

Publications

* indicates the corresponding author

Journal Articles

- **Haiyang Liao**, Dan Zhang*, Kai Lin, and Haoyu Wang. "Urban shallow subsurface void detection using fiber-optic distributed acoustic sensing" in preparation.
- **Haiyang Liao**, Dan Zhang*, Zhengyu Qian, Hasanjan Yimit, and Qi Luo. "Characterization of shallow karst zones using distributed acoustic sensing and ambient noise tomography: a case study in Mufu Mountain, China" *Engineering Geology*, submitted.
- Zhengyu Qian, Dan Zhang*, **Haiyang Liao**, and Haoyu Wang. "Can the seismic wave attenuation characteristics of various soils be identified using distributed acoustic sensing?" *Journal of Applied Geophysics* 221 (2024): 105281.

Conferences

- 11/2024 ”Utilizing distributed acoustic sensing to reveal shallow karst development areas” presented at the 1st Distributed Fiber Optic Sensing Technology and Application Conference in Nanjing, China.
- 09/2024 Attend at the 12th China Optical Fiber Sensing Conference, Chongqing, China.
- 08/2024 Training and Learning at the 10th Summer School on Algorithms and Programs in Seismology, Online Learning.
- 08/2023 Training and Learning at the 9th Summer School on Algorithms and Programs in Seismology, Hohhot, China.
- 04/2023 Attend at the National Annual Conference on Engineering Geology, Nanjing, China.

Patents

- **Haiyang Liao**, Dan Zhang, Bin Shi, and Haoyu Wang. ”A multi-parameter monitoring device for karst development drilling holes” *CN Utility Model*, 2024, current status: pending submission.
- **Haiyang Liao**, Dan Zhang, Zhengyu Qian, Hasanjan Yimit, and Qi Luo. ”Distributed fiber optic sensing surface wave imaging system” *CN Computer Software Copyright*, 2024, 2024SR1195965. *pdf*

Honors and Awards

- Outstanding Graduate Student Cadre, Nanjing University 2024
- Outstanding Member of the Communist Youth League, Nanjing University 2024
- Star of the Advanced Computational Engineering Institute for Earth Environment (ACEI), NJU 2023
- Outstanding Volunteer at the National Annual Conference on Engineering Geology 2023
- Outstanding Member of the Communist Youth League, Anhui University 2021

Skills

- Languages: Chinese (Native), English (TOEFL: 92).
- Programming Languages: Python, Matlab, Shell.
- Technical Softwares: MAPS, CC-FJpy, evodcinv, MASW, specfem3d/2d, GMT.
- Document / Presentation: LaTeX, Markdown, HTML, Office, Adobe.