Hongrui Peng

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Education

- **M.S. in Solid Earth Geophysics**, Wuhan University, GPA: 3.81/4.0 2021 - 2024 (expected)

  Thesis: A Rayleigh wave attenuation tomography method based on noise interferometry (In preparation)
  Advisor: Prof. Jiangtao Li

- **B.S. in Geophysics**, Wuhan University, GPA: 3.8/4.0 2017 - 2021

  Thesis: The spatial-temporal analysis of hydrology and climate elements in the Mekong River Basin
  Advisor: A/Prof. Hok Sum Fok

- **Minor in Computer Science and Technology**, Wuhan University, GPA: 3.68/4.0 2018 - 2020

  Related Courses: Digital Logic, Discrete Mathematics, Data Structure, Object-Oriented Programming

Research Interests

I am broadly interest in everything associated with seismology and tectonics, especially:

- **Seismic Ambient Noise**
  (1) The origin and spatial-temporal variation of the seismic noise field;
  (2) Extracting more information from interferometry (e.g., Attenuation, Body wave, Higher-modes).
- **Earth Structure Imaging**
  (1) Attenuation tomography (esp., partial-melting body, such as magma chamber, potential crust flow);
  (2) Fault zone imaging;
  (3) Novel parametrization and inversion methods for complex structures.

I am also enthusiastic about learning other cutting-edge techniques, such as full-waveform inversion, and DAS seismology.

Research Experience

- **Research Assistant**, Wuhan University 2021 - present

  With Prof. Jiangtao Li, and Prof. Yudi Pan, I mainly focus on the following fields:

  Ambient Noise Attenuation Tomography:
  (1) Summarize and develop a noise interferometry based attenuation tomography workflow;
  (2) Test and improve this workflow, and image attenuation structures in several regions (e.g., the Yellowstone National Park, NE China, Yunnan China) (ongoing).

  Imaging with Short-term Nodal Arrays:
  (1) Use (inverse) continuous wavelet transform to separate the waveforms of higher-modes surface waves;
  (2) Image shallow structures near Kunlun station (Antarctica) from multimodal surface waves (ongoing).

  Nature of Ambient Noise Field:
  (1) Analyze the spatial-temporal variation of the seismic noise field with beam-forming and wavelet analysis;
  (2) Develop effective methods to separate constructive and destructive noise in EGFs (ongoing).

- **Undergraduate Research Assistant**, Wuhan University 2018 - 2021

  Hydrology and Climate: (Advisor: A/Prof. Hok Sum Fok)
  (1) Improve the stage-discharge relationship in estuary regions by taking the tidal effect into account;
  (2) Use sensitivity analysis to reveal monsoons' influence on precipitation and water storage in SE Asia;
  (3) Use K-means clustering to characterize the spatial-temporal patterns of water storage.

  Magnetic Field Modeling: (Advisor: Prof. Zhengtao Wang)
  (1) Engineer MATLAB codes for the inversion of spherical harmonic geomagnetic field models;
  (2) Construct monthly geomagnetic field models, by utilizing measurements from ESA's Swarm mission.

Publications

[1]. **Hongrui Peng**, Jiangtao Li. Rayleigh wave attenuation tomography based on ambient noise interferometry: methods and an application to Northeast China. (submitted to *Geophysical Journal International*, in moderate revision).

[2]. **Hongrui Peng**, Hok Sum Fok, Junyi Gong, and Lei Wang (2020). Improving Stage-Discharge Relation in The Mekong River Estuary by Remotely Sensed Long-Period Ocean Tides. *Remote Sensing*.

Presentations

[1]. **Hongrui Peng** and Jiangtao Li (2023/12, Oral). Rayleigh wave attenuation tomography based on ambient noise interferometry: methods and applications. 2023 AGU Fall meeting, San Francisco, US.

[2]. **Hongrui Peng**, Yudi Pan, Jiangtao Li, Yu Zhang, Mengkui Li, and Yuande Yang (2023/11, Poster). Estimation of shallow structure near Antarctic Kunlun station using multimodal surface wave from seismic interferometry. Geophysics Youth Forum of the Middle and Lower Yangtze River. USTC, Hefei, China.

[3]. **Hongrui Peng** and Jiangtao Li (2023/10, Oral). Rayleigh wave attenuation tomography based on ambient noise interferometry: methods and applications. 2023 CGU Annual Meeting, Zhuhai, China.

[4]. **Hongrui Peng** and Jiangtao Li (2023/4, Online Oral). An improved attenuation tomography method based on ambient noise cross-correlation. EGU General Assembly 2023, Vienna, Austria.

[5]. **Hongrui Peng** and Jiangtao Li (2023/4, Oral). Ambient noise attenuation tomography method and its application to NE China. Congress of China Geodesy and Geophysics, Wuhan, China.

[6]. **Hongrui Peng** and Jiangtao Li (2022/11, Online Oral). An improved attenuation tomography method based on ambient noise cross-correlation: Tests on the Yellowstone National Park. Annual Meeting of CGU, Online.

Honors and Awards

- **Outstanding Student Paper Award at CGU Annual Meeting** 2023
  Awarded by Chinese Geoscience Union (CGU)
- **Outstanding Student Poster Award** 2023
  Awarded by School of Earth and Space Sciences, USTC
- **Hongtuchuangzhan Scholarship (∼Top 3%)** 2019
  Sponsored by Wuhan University
- **Suyiguang Scholarship (∼Top 6%)** 2018
  Sponsored by Wuhan University
- **Outstanding Student Scholarship (∼Top 15%)** 2018/2019/2020/2022
  Sponsored by Wuhan University

Additional Activities

- **Winter school exchange student:** Academic writing course, University of Oxford Jan. 2020
- **The student president of Geophysical Union of Wuhan University** 2018 - 2019
- **Student member of AGU and CGU** both since 2021

Technical Skills

- **Languages:** Chinese (Native), English (TOEFL:107)
- **Programming Languages:** MATLAB, Python, Shell, C, R
- **Technical Softwares:** SAC, GMT, SPECFEM2D
- **Document/Presentation:** Office platform, Adobe, Overleaf