

# Yumin Zhao

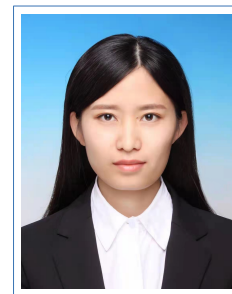
## Curriculum Vitae

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## Education

- 2018–present **PhD, Geophysics**, National University of Singapore, Singapore.
- 2014–2017 : **Master of Science, Geophysics**, China University of Petroleum-Beijing, Beijing, China.
- 2010–2014 : **Bachelor of Engineering, Geophysics**, China University of Petroleum-Beijing, Beijing, China.

## Publications

### Journal Articles

- 2023 **Zhao, Yumin**, Enhedelilai Nilot, Bei Li, Gang Fang, Wei Luo, and Yunyue Elita Li. Seismic attenuation extraction from traffic signals recorded by a single seismic station. *Geophysical Research Letters*, accepted, 2023.
- 2023 **Zhao, Yumin**, Yunyue Elita Li, and Bei Li. On beamforming of DAS ambient noise recorded in an urban environment and Rayleigh-to-Love waves ratio estimation. *Journal of Geophysical Research*, submitted, 2023.
- 2023 **Zhao, Yumin** and Yunyue Elita Li. Near-surface imaging with Rayleigh and Love waves extracted from DAS ambient noise data. *Journal of Geophysical Research*, submitted, 2023.
- 2023 Yunyue Elita Li, Enhedelilai Nilot, **Zhao, Yumin**, and Gang Fang (all authors are equally contributed). Quantifying urban activities using nodal seismometers in a heterogeneous urban space. *under review*, 2023.
- 2022 **Zhao, Yumin**, Yunyue Elita Li, Enhedelilai Nilot, and Gang Fang. Urban Running Activity Detected Using a seismic sensor during COVID-19 Pandemic. *Seismological Research Letters*, volume 93, pages 181–192, 2022.
- 2020 Gang Fang, Yunyue Elita Li, **Zhao, Yumin**, and Eileen R Martin. Urban near-surface seismic monitoring using distributed acoustic sensing. *Geophysical Research Letters*, volume 47, page e2019GL086115. Wiley Online Library, 2020.
- 2017 **Zhao, Yumin**, Guo-Fa Li, Wei Wang, Zhen-Xiao Zhou, Bo-Wen Tang, and Wen-Bo Zhang. Inversion-based data-driven time-space domain random noise attenuation method. *Applied Geophysics*, volume 14, pages 543–550. Springer, 2017.

### Peer-reviewed conference papers

- 2022 **Zhao, Yumin**, Yunyue Elita Li, Bei Li, Wei Luo, Zhaoyin Liu, and Yuxuan Zhou. Seismic attenuation extracted from isolated traffic signals. In *Second International Meeting for Applied Geoscience & Energy*, pages 2071–2075. Society of Exploration Geophysicists, 2022.
- 2021 **Zhao, Yumin**, Yunyue Elita Li, and Bei Li. Estimation of Rayleigh to Love waves ratio from ambient noise recorded by DAS. In *First International Meeting for Applied Geoscience & Energy*, pages 447–451. Society of Exploration Geophysicists, 2021.

- 2021 Enhedelilai Nilot, Gang Fang, Yunyue Elita Li, and **Zhao, Yumin**. Characterizing ambient seismic sources in an urban environment. In **First International Meeting for Applied Geoscience & Energy**, pages 1906–1910. Society of Exploration Geophysicists, 2021.
- 2021 Gang Fang, Yunyue Elita Li, Enhedeliha Nilot, **Zhao, Yumin**, and Arthur Cheng. Anonymous vehicle identification on seismic spectrograms. In **First International Meeting for Applied Geoscience & Energy**, pages 1886–1890. Society of Exploration Geophysicists, 2021.
- 2021 Yunyue Elita Li, Enhedelilai Nilot, **Zhao, Yumin**, and Gang Fang. Urban activity monitoring using wireless geophones in Singapore. In **First International Meeting for Applied Geoscience & Energy**, pages 3209–3214. Society of Exploration Geophysicists, 2021.
- 2020 **Zhao, Yumin** and Yunyue Elita Li. On beamforming of ambient noise recorded by DAS. In **SEG Technical Program Expanded Abstracts 2020**, pages 515–519. Society of Exploration Geophysicists, 2020.
- 2019 **Zhao, Yumin**, Yunyue Elita Li, and Gang Fang. Extracting subsurface information based on extremely short period of DAS recordings. In **SEG Technical Program Expanded Abstracts 2019**, pages 958–962. Society of Exploration Geophysicists, 2019.
- 2017 Wei Wang, Guofa Li, **Zhao, Yumin**, Wuyang Yang, and Wanli Wang. Laterally-constrained sparse deconvolution in the mixed domain. In **SEG Technical Program Expanded Abstracts 2017**, pages 808–812. Society of Exploration Geophysicists, 2017.
- 2016 **Zhao, Yumin**, Guofa Li, Jizhen Wei, Bei Li, Jingjing Wang, and Mingchao Wang. Inversion-based t-x Domain Signal-preserving Random Noise Reduction method. In **78th EAGE Conference and Exhibition 2016**, volume 2016, pages 1–5. European Association of Geoscientists & Engineers, 2016.
- 2016 **Zhao, Yumin**, Guofa Li, and Bei Li. A robust deconvolution algorithm with sparsity and lateral continuity constraints for nonstationary seismic data. In **SEG Technical Program Expanded Abstracts 2016**, pages 5203–5207. Society of Exploration Geophysicists, 2016.
- 2016 **Zhao, Yumin**, Guofa Li, and Bei Li. A Robust Deconvolution Algorithm with Sparsity and Lateral Continuity Constraints. In **78th EAGE Conference and Exhibition 2016**, volume 2016, pages 1–5. European Association of Geoscientists & Engineers, 2016.

## Research Experience

### National University of Singapore, Civil and Environmental Engineering

- August, 2021 – April 2022 **Seismic attenuation extracted from traffic signals recorded by a seismic sensor.**
- Detected isolated traffic signals from seismic ambient noise data.
  - Extracted daily seismic attenuation statistically from hundreds of traffic signals.
  - Analyzed the potential factors which cause variations in seismic attenuation.
- July, 2020 – Jan, 2021 **Urban Running Activity Detected Using a Seismic Sensor during COVID-19 Pandemic.**
- Developed an algorithm and a python package for automatic footstep signal detection and runner count from urban seismic ambient noise.
- Jan, 2020 – June, 2021 **Near-surface imaging with DAS ambient noise data.**
- Developed a method to invert the near-surface shear-wave velocity model from both Rayleigh and Love waves with the dispersion spectrum inversion method.
- Jan, 2019 – June, 2020 **On beamforming of ambient noise recorded by DAS and wave type identification.**
- Simulated urban seismic ambient noise (geophone/DAS).
  - Tested the reliability of beamforming on DAS ambient noise under different source conditions.
  - Identified surface wave types in the DAS ambient noise data.
  - Developed an algorithm to invert the Rayleigh-to-Love waves (R/L) ratio from DAS ambient noise data.
- Jan, 2019 – Jan, 2020 **Urban near-surface seismic monitoring using distributed acoustic sensing (DAS) (co-contributor).**
- Processed the DAS quarry blast data: remove the near-field noise (traffic, construction, etc.), extract the seismic interferometry, and estimate the surface waves phase velocities.

- Aug,2018 – ***Extracting subsurface information based on extremely short period of DAS recordings.***  
 April,2019
  - Removed the near-field noise in the DAS ambient noise data.
  - Extracted the seismic interferometry and dispersion spectrum from 2-min DAS ambient noise data.  
 China University of Petroleum-Beijing, Department of Geophysics and Information Engineering
- April,2016 – ***Multi-trace seismic data deconvolution.***  
 April,2017
  - Developed a multi-trace seismic data deconvolution method that is robust to noise and performs well in preserving the lateral continuity of the inversion result.
- Sep,2014 – ***Inversion-based time-space domain random noise reduction.***  
 April,2016
  - Developed an inversion-based random noise reduction method in the time-space domain using the prediction error filter (PEF) calculated from the noisy data as the regularization term.

## Professional service

- 2018–present **Reviewer (journals).**  
  - *Geophysics*
  - *Computers and Geosciences*
  - *Exploration Geophysics*

## Awards & Honors

- 2018 –2021 ***NUS research scholarship***  
 2017 ***Outstanding presentation*** for Thesis of M.S., CUPB  
 2015 ***Third prize,*** the 3rd “Oriental Cup” National Exploration Geophysics Competition for College Students (NEGCCS)

## Skills

- Seismic data processing Seismic noise reduction, frequency/time-frequency analysis, automatic events detection, etc.
- Seismic data simulation Seismic ambient noise (Geophone/DAS), seismic exploration data
- Inversion Gradient-based and heuristic global inversion for geophysical problems, Machine Learning, Deep Learning
- Programming Languages Python, Matlab, R, C, C++

## Teaching Assistantship

- Fall, 2020 : **CE3201: Civil Engineering Analytics and Data Visualization.**