Zemin Wu

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EDUCATION

Southern University of Science and Technology　　　　　　　　　　　China, Shenzhen
*M.Sc. in Geophysics; **GPA: 3.53/4.00***　　　　　　　　　　　　　　　　　Sep 2023 – Present

　　Relevant coursework: Quantitative Seismology, Advanced Marine Seismic Observation, Geodynamics, Modern
　　Signal Analysis and Data Processing, Marine Geophysical Signal Analysis, Scientific Writing in English

　　Advisors: Prof. Bin Luo, Prof. Zhen Guo

Southern University of Science and Technology　　　　　　　　　　　China, Shenzhen
*B.Sc. in Computer Science; **GPA: 3.3/4.00***　　　　　　　　　　　　　　Sep 2019 – Jun 2023

　　Relevant coursework: Computer Organization, Algorithm Design and Analysis, Database Systems, Computer
　　Networks, Object-Oriented Analysis and Design, C/C++ Programming, Compiler Principles, Operating Systems,
　　Artificial Intelligence

　　Advisors: Prof. Jiang Liu

SKILLS

　　Languages: Mandarin (Native), English (IELTS: 7)

　　Programming Languages: C/C++, C#, Java, Python, JavaScript, SQL, MATLAB, R

　　Technologies:MATLAB, PyTorch, TensorFlow, Flask, Django, Node.js, MySQL, Git, Docker, Kafka, OpenCV

RESEARCH EXPERIENCE

Seismic Phase Picking and Association with Distributed Acoustic Sensing　　　China, Shenzhen
Project Leader　　　　　　　　　　　　　　　　　　　　　　　　*Feb 2025 – Present, Full-time*

- Manually labeled a dataset of DAS seismic events using high-precision earthquake catalogs to support supervised model training.
- Evaluated multiple deep learning models and demonstrated the superior performance of large pre-trained DiTing model in phase picking tasks.
- Fine-tuned DiTing to achieve over 90% recall in seismic phase picking in DAS data.
- Trained a YOLOv12-based detection model to swiftly identify and extract earthquake signals from DAS data, effectively doubling the number of detectable seismic events.
- Conducted feasibility analysis for earthquake localization, compare three association algorithm (REAL, GaMMa, PyOcto), validating the potential for DAS in distributed seismic monitoring.
- Integrated an end-to-end workflow covering DAS-data seismic detection, phase picking, event association, and location.
- Application in two scenarios: the Xinfengjiang Reservoir area induced micro seismic and Anyuan mining-induced seismicity, and contributing to the generation of high-resolution earthquake catalogs.

Deep Learning-Based Vehicle Tracking Using DAS Data　　　　　　　　　　China, Shenzhen
Project Leader　　　　　　　　　　　　　　　　　　　　　　　　　　*Jul 2024 – Nov 2025*

- Manually labeled a mixed dataset of 40,000 samples containing highway vehicle-induced DAS traces to support model training and validation.
- Trained a YOLOv5-based detection model to accurately identify and extract vehicle signals from DAS spatio-temporal diagrams, achieving 92% detection accuracy.
- Developed multi-vehicle tracking and correlation algorithms to transform detection outputs into continuous vehicle trajectories, enabling precise traffic flow analysis and extraction of quasi-static strain waveform.
- Utilized waveform simulation techniques to model and interpret the relationship between DAS signal characteristics and underlying vehicle physical attributes, such as weight and axle configuration.

Long-Term Bridge Health Monitoring and Urban Noise Analysis Using DAS Data　　China, Shenzhen
Project Leader　　　　　　　　　　　　　　　　　　　　　　　　　*Dec 2023 – June 2024*

- Extracted fundamental frequencies and vibration modes from ambient background noise through Power Spectral Density (PSD) analysis of long-term DAS recordings.

- Applied continuous spatio-temporal signal analysis to assess structural health and dynamic behavior of bridges based on vibration characteristics.
- Evaluated the energy distribution of urban background noise in DAS data, revealing its correlations with construction activities and human behavior patterns.

Diffusion Model-Based Surgical Image Generation
Project Leader

China, Shenzhen
Dec 2022 – May 2023

- Developed an image generation model combining mesh transfer and Stable Diffusion to create realistic cataract surgery images
- Trained the model to generate images in specified styles based on text prompts.
- Addressed data imbalance issues in surgical datasets by synthesizing high-quality training samples.

Cross-Domain Data-Based Surgical Video Analysis
Core Project Member

China, Shenzhen
Oct 2021 – Jun 2022

- Applied domain adaptation methods to improve the generalization of semantic segmentation models for cataract surgical tool segmentation.
- Conducted spectral analysis on datasets to identify domain-invariant features.
- Built and trained a multi-view adversarial network (GAN) to learn domain-invariant features.

ACADEMIC HONORS & SCHOLARSHIPS

Graduate Research Assistant Stipend – Special Prize: Awarded by SUSTech Geophysics Department for exceptional performance in DAS-based seismic research, recognizing contributions to high-resolution earthquake catalog development. (Sep 2023, Sep 2024)

Graduate Academic Scholarship – Special Prize: Granted by SUSTech for outstanding academic achievement (GPA: 3.5/4.0) and research progress in deep learning-driven geophysical signal analysis. (Octo 2023, Octo 2025)

Graduate Academic Scholarship – First Prize: Awarded for excellence in undergraduate-to-graduate transition coursework and early contributions to DAS vehicle tracking research. (Octo 2024)

PUBLICATION & PRESENTATIONS

[1] **Zemin Wu** [*], Lipeng He, Bin Luo, and Zhen Guo. "Intelligent Traffic Flow Recognition from DAS Data Based on Deep Learning". In: *CGU Meeting* (Sept. 2024).

[2] **Zemin Wu** [*], Zhuowei Xiao, Luo Bin, Guo Zhen, and Chen Shi. "Fine-Tuning the DiTing Seismogram Foundation Model to DAS Data for Natural Earthquake Phase Picking and Association". In: *AGU Meeting* (Dec. 2025).

EXTRACURRICULAR ACTIVITIES

Team Leader
Earthquake Prevention and Disaster Mitigation Digital & Intelligent Technology Competition

China, Shenzhen
Jul 2025 – Present

- Led a 4-member graduate student team to achieve top-4 rankings in two consecutive monthly rounds of the competition.
- Mentored new members in model fine-tuning and API integration.
- Among 85 participating teams across China, we developed the top-performing Phase Picking Model and Event Classification Model.

Workshop Participant & Practical Trainer
Advanced Seminar on Seismic Large Models

China, Beijing
Jul 2025

- Topic: DAS Technology Fundamentals and Practical Application of DiTing Large Model in Seismic Phase Picking
- Delivered hands-on tutorials on DAS data preprocessing workflows and step-by-step guidance for fine-tuning the DiTing model to solve low-SNR seismic signal picking challenges.

Workshop Speaker
Sheshan School 2025: Dense Array Technology & AI Applications

China, Shanghai
Nov 2025

- Session: Hands-On Practice: Distributed Fiber-Optic Seismic Signal Picking with AI Models
- Led group exercises on implementing pre-trained AI models for DAS seismic signal extraction, provided real-world case examples (e.g., mining-induced microseisms) and troubleshooting support for participants.