

SHENYAO JIN

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EDUCATION

Colorado School of Mines, Reservoir Characterization Project

Golden, Colorado

Ph.D. Geophysics

Aug 2023 – May 2027

- Advisor: Dr. Ge Jin, Committee Chair: Dr. Hossein Kazemi
- **Focus:** *Seismic inverse problems, distributed fiber-optic sensing (DFOS), inversion algorithms, numerical modeling, and optimization for subsurface characterization*
- **Minor:** *Computer Science*

Zhejiang University

Hangzhou, China

B.S. Geoscience

Sept 2019 – Aug 2023

- **Thesis:** “Clustering-Based Joint Inversion for Imaging Shallow Subsurface Geological Targets”
- Thesis Advisor: Dr. Zhanjie Shi

TECHNICAL SKILLS

- **Programming:** Python, MATLAB, C/C++, L^AT_EX, Bash; proficient in Linux/Unix environments
- **Software and Packages:** Seismic Un*x, MOOSE (Multiphysics Object-Oriented Simulation Environment), DASCore (Distributed Acoustic Sensing data processing), Devito (seismic wave propagation modeling), Scikit-learn, TensorFlow
- **Inverse Problems & Optimization:** Gauss-Newton iteration, gradient-based optimization, regularization techniques, Tikhonov inversion, history matching, parameter estimation
- **Geophysical Methods:** Seismic imaging and inversion, DFOS/DAS data processing and modeling, strain-pressure analysis, hydraulic fracture interpretation, forward modeling, signal denoising, numerical wave propagation
- **Machine Learning & AI:** Supervised learning for geophysical inversion, neural network surrogate models, machine learning-enhanced data interpretation
- **Related Coursework:** Inversion Theory, Advanced Machine Learning, Reservoir Simulation, Advanced Geophysical Computing, Advanced Data Science, Numerical Methods
- **Software Development:** Author of **fiBeRIS**, an open-source Python package for history matching and interpretation of DAS data (github.com/shenyaojin/fibeRIS).

EXPERIENCE

Graduate Research Assistant

Golden, Colorado

Reservoir Characterization Project, Colorado School of Mines

Aug 2023 – Present

- **Cement Quality Monitoring using Low-Frequency DAS (ExxonMobil Project Mariner)**
 - Developed a low-frequency DAS (LF-DAS) data processing workflow and field deployment strategy to monitor cement quality in horizontal wells.
 - Implemented a coupled pressure-strain numerical model using MOOSE to simulate LF-DAS forward responses under various cementing conditions.
 - Conducted iterative history matching of field LF-DAS data to validate methodology effectiveness in identifying cement channeling.
- **Permeability Inversion from DAS Data (ExxonMobil Collaboration)**
 - Formulated and solved an inverse problem for low-frequency DAS data to quantify in-situ permeability; developed physics-based forward modeling and optimization algorithms for inversion.
 - Advanced inverse problem solving through iterative history matching of field datasets, demonstrating methodology effectiveness for subsurface characterization.
 - Integrated analytical and physics-based approaches with optimization techniques to validate inversion results against well logs and operational data.
- **Geothermal Energy Systems Data Interpretation (Fervo Energy Collaboration)**
 - Collaborating with Rice University and Fervo Energy to develop inversion-driven interpretation tools for multiple geophysical data types (e.g., DAS, sonic, seismic).
 - Designing novel machine learning-enhanced inversion workflows for LF-DAS data to analyze pressure-strain coupling and fracture characterization.

Graduate Research Intern

Idaho Springs, Colorado

Reservoir Characterization Project, Colorado School of Mines

May 2025 – Aug 2025

- Conducted DOE-funded research on monitoring induced fracture propagation using low-frequency DAS; developed novel data acquisition and processing strategies.

- Designed and deployed a novel U-shaped fiber-optic cable in monitoring wells with co-located DTS and DSS sensing fibers, advancing field deployment methodologies.
- Analyzed multi-channel DAS datasets to extract fracture signatures and validate subsurface imaging workflows.

Undergraduate Research Intern

Golden, Colorado

Reservoir Characterization Project, Colorado School of Mines

July 2022 – September 2022

- Developed data processing and inversion workflows for low-frequency DAS data collected in Lake Hattie, Wyoming; implemented velocity scanning and optimization algorithms for enhanced data interpretation.
- Contributed to research workflow development for DAS-based subsurface imaging and applied signal processing techniques to improve data quality.

Undergraduate Research Assistant

Hangzhou, China

School of Geosciences, Zhejiang University

Sept 2021 – June 2023

- Developed advanced joint inversion algorithms in *C++* to solve coupled seismic and electromagnetic inverse problems for subsurface characterization.
- Implemented optimization techniques including Gauss-Newton iteration and regularization methods to improve inversion stability and convergence.
- Validated inversion algorithms on field datasets and well log data, demonstrating practical effectiveness in resolving subsurface geological structures.

ABSTRACTS AND PRESENTATIONS

Shenyao J., Ge J. *Low-Frequency DAS for Cement Quality Monitoring in Horizontal Wells*

- URTeC 2026, Houston, Texas. Oral Presentation (Abstract Accepted).
- SEG-AAPG IMAGE 2025, Houston, Texas. Oral Presentation.
- American Geophysical Union Fall Meeting 2025, New Orleans, Louisiana. Oral Presentation.
- RCP Sponsor Meeting 2025, Golden, Colorado. Oral Presentation.

Shenyao J., Ge J. *Conductive Fracture Monitoring Using Distributed Strain Sensing: From Stimulation to Production*

- SEG-AAPG IMAGE 2024, Houston, Texas. Poster Presentation.
- RCP Sponsor Meeting 2024, Golden, Colorado. Oral Presentation.

PUBLICATIONS

Jin, S., and Jin, G. (2026). Low-Frequency DAS for Cement Quality Monitoring in Horizontal Wells: Seismic Inversion and Optimization Perspectives. *SPE Journal* (in review); abstract submitted to URTeC 2026.

Mao, F., Yang, B., & **Jin, S.** (2025). Recovering missing regions of earth magnetic anomaly grid data (EMAG2) using RePaint based on diffusion model. *Big Data and Earth System*, 1(1), 100004.

HONORS AND AWARDS

George R. Pickett Memorial Scholarship

Oct 2024

- Awarded for excellence in borehole geophysics with applied focus on oil and gas workflows.

First-Year Fellowship for Graduate Students

Mar 2024

- Awarded by the Colorado School of Mines to recognize incoming students for integrating computational geophysics to advance sustainable energy systems.

Meritorious Winner, Mathematical Contest in Modeling (MCM)

Feb 2022

- Top 8% of international undergraduate teams. Contributed as lead programmer and data analyst.