

Zhicheng Geng

Education

- 2017–present **PhD in Geophysics**, *The University of Texas at Austin*, Austin, TX, 3.93/4.0.
Advisor: Dr. Sergey Fomel
- 2013–2017 **B.S. in Geophysics**, *Tongji University*, Shanghai, China, 4.5/5.0.
Advisor: Dr. Yuzhu Liu
Thesis: Frequency-dependent First-Arrival Traveltime Tomography and Waveform Inversion

Professional Experience

- Sept. 2017–
Present **Graduate Research Assistant**, *University of Texas at Austin*, Austin, TX.
Supervisor: Dr. Sergey Fomel
- Reduced computational cost of seislet at coarser scales by utilizing the relative geologic time attribute to construct prediction and update operators.
 - Applied deep learning to estimating Relative Geologic Time volumes using synthetic data and achieved excellent results on real seismic images.
- May 2019–
Aug. 2019 **Intern, Geology & Geophysics**, *ConocoPhillips*, Houston, TX.
- Implemented parallel fault detection tools using deep learning and tested them on several real datasets.
 - Utilized least-squares Kirchhoff migration to improve spatial resolution of seismic reflectively models.
- May 2018–
Aug. 2018 **Research Geophysicist Intern**, *PGS*, Houston, TX.
- Developed and implemented PML absorbing boundaries for two-way acoustic wave equation with variable density to save memory usage and computation cost.
 - Implemented the visco-acoustic modeling for different types of medium.
- Jul. 2016–
Jun. 2017 **Undergraduate Research Assistant**, *Tongji University*, Shanghai, China.
Supervisor: Dr. Yuzhu Liu
- Combined first-arrival traveltime tomography with the first-arrival waveform inversion to reduce the dependence on the initial model and obtain a detailed near surface velocity structure.
 - Integrated an improved scattering-integral algorithm into Fresnel Volume tomography and evaluate the performance on the Overthrust model.

Computer Skills

- Languages C/C++, Python, Java, Fortran, Matlab, \LaTeX , Shell scripting
Libraries Tensorflow, Keras, Pytorch, MPI, OpenMP, Madagascar, Seismic Unix

Research Interests

- Deep learning
- Seismic data processing
- Computational geophysics
- Seismic inversion

Relative Courseworks

- Computational and Variational Inverse Problems
- Python For Geoscience Research
- Multidimensional Data Analysis in Geoscience
- Tools and Techniques for Computational Science
- Numerical analysis: Linear Algebra
- Seismic Data Processing

Publications

Peer-reviewed publications

Zhicheng Geng, Xinming Wu, Sergey Fomel, and Yangkang Chen. Rt-seislet transform. *Geophysics*, submitted.

Zhicheng Geng, Xinming Wu, Yunzhi Shi, and Sergey Fomel. Relative geologic time estimation using a deep convolutional neural network. *Geophysics*, submitted.

Yuhan Sui, Jianwei Ma, Zhicheng Geng, and Sergey Fomel. Time-varying wavelet estimation with phase using local attributes. *Geophysics*, submitted.

Xinming Wu, Zhicheng Geng, Yunzhi Shi, Nam Pham, and Sergey Fomel. Building realistic structure models to train convolutional neural networks for seismic structural interpretation. *Geophysics*, submitted.

Xinming Wu, Luming Liang, Yunzhi Shi, Zhicheng Geng, and Sergey Fomel. Deep learning for local seismic image processing: fault detection, structure-oriented smoothing with edge-preserving, and slope estimation by using a single convolutional neural network. *Geophysical Journal of International*, submitted.

Conference publications

Zhicheng Geng, Xinming Wu, Yunzhi Shi, and Sergey Fomel. Relative geologic time estimation using a deep convolutional neural network. In *SEG Technical Program Expanded Abstracts 2019*, pages 2238–2242. Society of Exploration Geophysicists, 2019.

Yuzhu Liu, Zheng Wu, and Zhicheng Geng. First-arrival phase-traveltime tomography. In *SEG 2017 Workshop: Full-waveform Inversion and Beyond, Beijing, China, 20-22 November 2017*, pages 83–86. 2017.

Xinming Wu, Zhicheng Geng, Yunzhi Shi, Nam Pham, and Sergey Fomel. Building realistic structure models to train convolutional neural networks for seismic structural interpretation. In *SEG Technical Program Expanded Abstracts 2019*, pages 4745–4750. Society of Exploration Geophysicists, 2019.

Xinming Wu, Luming Liang, Yunzhi Shi, Zhicheng Geng, and Sergey Fomel. Deep learning for local seismic image processing: fault detection, structure-oriented smoothing with edge-preserving, and slope estimation by using a single convolutional neural network. In *SEG Technical Program Expanded Abstracts 2019*, pages 2222–2226. Society of Exploration Geophysicists, 2019.