

Zhicheng Geng

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Education

The University of Texas at Austin

Ph.D. in Geophysics, 3.95/4.0

- Advisor: Dr. Sergey Fomel
- Thesis: Deep learning for pattern recognition in seismic reflection data

Austin, TX

Sept. 2017 - May 2022

Tongji University

B.S. in Geophysics, 4.5/5.0

- Advisor: Dr. Yuzhu Liu
- Thesis: Frequency-dependent First-Arrival Traveltime Tomography and Waveform Inversion

Shanghai, China

Sept. 2013 - Jun. 2017

Professional Experience

Amazon

Applied Scientist

Austin, TX

June 2022 - Present

University of Texas at Austin

Graduate Research Assistant

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 images using synthetic data and achieved excellent results on real seismic images.

Austin, TX

Sept. 2017 - May 2022

Microsoft

Research Intern

Redmond, WA

May 2021 - Aug. 2021

- Spatial temporal interpolation for smooth video conference experience via limited-computation transformer.
- Achieved SOTA performance with smaller number of parameters, smaller memory consumption and higher FPS.
- Submissions to top conference and patent applications in preparation.

Microsoft

Research Intern

Redmond, WA

May 2020 - Aug. 2020

- Extremely lightweight model based on deformable convolutions for real-time RAW image denoising as an online camera sensor driver alternative.
- Knowledge transferred to the production team for the next generation surface and Windows.

ConocoPhillips

Intern, Geology & Geophysics

Houston, TX

May 2019 - Aug. 2019

- 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.

PGS

Research Geophysicist Intern

Houston, TX

May 2018 - Aug. 2018

- 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.

Tongji University

Undergraduate Research Assistant

Shanghai, China

Jul. 2016 - Jun. 2017

Supervisor: Dr. Yuzhu Liu

- Combined first-arrival traveltimes 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, OpenGL

Libraries: Tensorflow, Keras, Pytorch, MPI, OpenMP, Madagascar, Seismic Unix

Research Interests

- Computer vision
- Deep learning
- Computational geophysics
- Inversion problems

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.....

Zhengfa Bi, Xinming Wu, Zhicheng Geng, and Haishan Li. Deep relative geologic time: a deep learning method for simultaneously interpreting 3-D seismic horizons and faults. *Journal of Geophysical Research: Solid Earth*, 126(9):e2021JB021882, 2021.

Zhicheng Geng, Zhanxuan Hu, Xinming Wu, Luming Liang, and Sergey Fomel. Semisupervised salt segmentation using mean teacher. *Interpretation*, 10(3):SE21–SE29, 2022.

Zhicheng Geng, Luming Liang, Tianyu Ding, and Ilya Zharkov. Rstt: Real-time spatial temporal transformer for space-time video super-resolution. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, pages 17441–17451, 2022.

Zhicheng Geng, Xinming Wu, Sergey Fomel, and Yangkang Chen. Relative time seislet transform. *Geophysics*, 85(2):V223–V232, 2020.

Zhicheng Geng, Xinming Wu, Yunzhi Shi, and Sergey Fomel. Deep learning for relative geologic time and seismic horizons. *Geophysics*, 85(4), 2020.

Zhicheng Geng, Zeyu Zhao, Yunzhi Shi, Xinming Wu, Sergey Fomel, and Mrinal Sen. Deep learning for velocity model building with common-image gather volumes. *Geophysical Journal International*, 228(2):1054–1070, 2022.

Xinming Wu, Zhicheng Geng, Yunzhi Shi, Nam Pham, Sergey Fomel, and Guillaume Caumon. Building realistic structure models to train convolutional neural networks for seismic structural interpretation. *Geophysics*, 85(4):WA27–WA39, 2020.

Xinming Wu, Luming Liang, Yunzhi Shi, Zhicheng Geng, and Sergey Fomel. Multitask learning for local seismic image processing: fault detection, structure-oriented smoothing with edge-preserving, and seismic normal estimation by using a single convolutional neural network. *Geophysical Journal International*, 219(3):2097–2109, 2019.