

# Stanford

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## Mingliang Liu

Postdoctoral Scholar, Energy Resources Engineering

### Bio

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#### BIO

I am currently a postdoctoral scholar working with Tapan Mukerji on digital rock physics at Stanford University. My research focuses on geophysics inverse problems, seismic reservoir characterization, history matching, digital rock physics, data assimilation and deep learning. I completed my PhD degree in geophysics from the University of Wyoming in 2021 under the supervision of Dario Grana, and earned the bachelor and master degree from China University of Geosciences (Wuhan) in 2013 and 2016, respectively.

#### HONORS AND AWARDS

- Research Scholarship, International Association for Mathematical Geosciences (2021)
- Outstanding Ph.D. Student, University of Wyoming (2021)
- James L. Allen Scholarship, Society of Exploration Geophysicists (2019)
- Technical Program Travel Grant, Society of Exploration Geophysicists (2019)

#### STANFORD ADVISORS

- Tapan Mukerji, Postdoctoral Faculty Sponsor

#### LINKS

- Google Scholar: <https://scholar.google.com/citations?user=gRr5WXUAAAAJ&hl=en>

### Publications

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#### PUBLICATIONS

- **Hierarchical Homogenization With Deep-Learning-Based Surrogate Model for Rapid Estimation of Effective Permeability From Digital Rocks** *JOURNAL OF GEOPHYSICAL RESEARCH-SOLID EARTH*  
Liu, M., Ahmad, R., Cai, W., Mukerji, T.  
2023; 128 (2)
- **Joint Inversion of Geophysical Data for Geologic Carbon Sequestration Monitoring: A Differentiable Physics-Informed Deep Learning Model** *Journal of Geophysical Research: Solid Earth*  
Liu, M., Vashisth, D., Grana, D., Mukerji, T.  
2023; 128 (3)
- **Multiscale Fusion of Digital Rock Images Based on Deep Generative Adversarial Networks** *GEOPHYSICAL RESEARCH LETTERS*  
Liu, M., Mukerji, T.  
2022; 49 (9)
- **Uncertainty quantification in stochastic inversion with dimensionality reduction using variational autoencoder** *GEOPHYSICS*

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Liu, M., Grana, D., de Figueiredo, L. P.

2022; 87 (2): M43-M58

- **Stochastic nonlinear inversion of seismic data for the estimation of petroelastic properties using the ensemble smoother and data reparameterization** *GEOPHYSICS*  
Liu, M., Grana, D.  
2018; 83 (3): M25–M39
- **Computation of effective elastic moduli of rocks using hierarchical homogenization** *JOURNAL OF THE MECHANICS AND PHYSICS OF SOLIDS*  
Ahmad, R., Liu, M., Ortiz, M., Mukerji, T., Cai, W.  
2023; 174
- **Joint Inversion of Geophysical Data for Geologic Carbon Sequestration Monitoring: A Differentiable Physics-Informed Neural Network Model** *Journal of Geophysical Research: Solid Earth*  
Liu, M., Vashisth, D., Grana, D., Mukerji, T.  
2023; 128 (3)
- **Randomized Tensor Decomposition for Large-Scale Data Assimilation Problems for Carbon Dioxide Sequestration** *MATHEMATICAL GEOSCIENCES*  
Liu, M., Grana, D., Mukerji, T.  
2022
- **Prediction of CO2 Saturation Spatial Distribution Using Geostatistical Inversion of Time-Lapse Geophysical Data** *IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING*  
Grana, D., Liu, M., Ayani, M.  
2021; 59 (5): 3846-3856
- **Stochastic inversion method of time-lapse controlled source electromagnetic data for CO2 plume monitoring** *INTERNATIONAL JOURNAL OF GREENHOUSE GAS CONTROL*  
Ayani, M., Grana, D., Liu, M.  
2020; 100
- **Petrophysical characterization of deep saline aquifers for CO2 storage using ensemble smoother and deep convolutional autoencoder** *ADVANCES IN WATER RESOURCES*  
Liu, M., Grana, D.  
2020; 142
- **A comparison of deep machine learning and Monte Carlo methods for facies classification from seismic data** *GEOPHYSICS*  
Grana, D., Azevedo, L., Liu, M.  
2020; 85 (4): WA41–WA52
- **Seismic facies classification using supervised convolutional neural networks and semisupervised generative adversarial networks** *GEOPHYSICS*  
Liu, M., Jervis, M., Li, W., Nivlet, P.  
2020; 85 (4): O47–O58
- **Time-lapse seismic history matching with an iterative ensemble smoother and deep convolutional autoencoder** *GEOPHYSICS*  
Liu, M., Grana, D.  
2020; 85 (1): M15–M31
- **Generation and evolution of overpressure caused by hydrocarbon generation in the Jurassic source rocks of the central Junggar Basin, northwestern China** *AAPG BULLETIN*  
Guo, X., He, S., Liu, K., Yang, Z., Yuan, S., Liu, M.  
2019; 103 (7): 1553–74
- **Accelerating geostatistical seismic inversion using TensorFlow: A heterogeneous distributed deep learning framework** *COMPUTERS & GEOSCIENCES*  
Liu, M., Grana, D.  
2019; 124: 37–45
- **Recycling of oceanic crust from a stagnant slab in the mantle transition zone: Evidence from Cenozoic continental basalts in Zhejiang Province, SE China** *LITHOS*  
Li, Y., Ma, C., Robinson, P. T., Zhou, Q., Liu, M.  
2015; 230: 146–65