Yujin Liu

Email: yujin.liu@aramcoasia.com

Phone: +86-188-1130-9683

HIGHLIGHTS

- **12+** years of R&D experience in computational seismology focused on seismic imaging, inversion, and monitoring, including real-time, passive, and AI-driven methods
- Technical lead on **10+** R&D projects across HPC, Machine Learning, Acquisition Robotization, and Sustainability in Geophysics at Aramco Beijing Global Research Center
- **50+** first-author or corresponding-author publications (20+ journals, 30+ conferences) and **10+** international patent disclosures
- Recipient of **10+** professional awards, including international, regional, corporate innovation honors

EMPLOYMENT

- Geophysical Specialist   Jan 2026 – Present
  Aramco Beijing Global Research Center
  Leading advanced R&D in AI-driven full waveform inversion, ambient-noise velocity inversion, passive seismic CO_2 monitoring, seismic-while-drilling, and intelligent sensing technology
- Lead Geophysicist   Jan 2022 – Dec 2025
  Aramco Beijing Global Research Center
  Led multiple R&D initiatives in HPC seismic imaging, passive seismic imaging and monitoring, seismic-while-drilling, and intelligent saver sub development
- Senior Geophysicist   Jan 2018 – Dec 2021
  Aramco Beijing Global Research Center
  Led the development of GPU Kirchhoff depth migration for large-scale subsurface imaging and conducted R&D on seismic while drilling and seismic while fracking
- Research Geophysicist   Dec 2015 – Dec 2017
  Aramco Beijing Global Research Center
  Conducted research on least-squares migration and wave-equation tomography and supported early development of seismic-while-drilling data analysis workflows
- Postdoc in Geophysics   Jul 2014 – Nov 2015
  SINOPEC Exploration & Production Research Institute
  Conducted research on wave-equation least-squares migration and automatic wave-equation tomography

EDUCATION

- Ph.D. in Geophysics   Sep 2010 – Jun 2014
  China University of Petroleum (East China)   Advisor: Prof. Zhenchun Li
  Dissertation: Seismic imaging based on inversion in complex geological settings
- Visiting graduate student in Geophysics   Aug 2012 – Sep 2013
  Rice University   Advisor: Prof. William W. Symes
  Research Project: Extended waveform inversion via differential semblance optimization

- M.S. in Geophysics   Sep 2008 – Jun 2010
  China University of Petroleum (East China)   Advisor: Prof. Zhenchun Li
  Note: Transferred to Ph.D. program
- Bachelor in Geophysics   Sep 2004 – Jun 2008
  China University of Petroleum (East China)
  Thesis: Seismic imaging and velocity analysis with common-scattering-point gathers

AWARDS

- 2025 Technology Delivery Award from Beijing Research Center, Aramco Asia
- 2024 Saudi Aramco EXPEC ARC Collaboration Award
- 2023 Saudi Aramco EXPEC ARC Monthly Recognition
- 2022 Best Presentation Award in SEG Workshop on Seismic Imaging
- 2021 Technology Delivery Award from Beijing Research Center, Aramco Asia
- 2021 The First Prize of Excellent Paper at the Chinese Geophysics Society Conference
- 2021 Saudi Aramco EXPEC ARC Weekly Recognition (Twice)
- 2019 SPE Regional Technical Award- Drilling Engineering
- 2018 E&P Special Meritorious Award for Engineering Innovation
- 2018 Saudi Aramco EXPEC ARC Creative Project Award
- 2018 Top 10 Best Paper Nomination from the Petroleum Science Bulleting in China
- 2013 National Scholarship
- 2012 China Scholarship Council Scholarship

JOURNAL PAPERS

[21] **Y. Liu**, Z. Wang, and X. Sun, Connections Between Least-Squares Migration, Capon Beamforming, and Phase Correction for Seismic Resolution Enhancement, *IEEE Geoscience and Remote Sensing Letters*, 2025, 21, 1-5. (SCI)

[20] **Y. Liu**, Y. Luo, Y. Ma, H. Liu, High-resolution Stacking of Seismic Data with Fast Capon Beamforming, *IEEE Geoscience and Remote Sensing Letters*, 2024, 21, 1-5. (SCI)

[19] **Y. Liu,** Y. Yue, Y. Luo, and Y. Li, The seismic broad-band signature of high-speed trains running on viaducts, *Geophysical Journal International*, 2021, 226(2), 884-892. (SCI)

[18] **Y. Liu**, Y. Yue, Y. Luo, and Y. Li, Effects of high-speed train traffic characteristics on seismic interferometry, *Geophysical Journal International*, 2021, 227(1), 16-32. (SCI)

[17] **Y. Liu**, Y. Ma, S. Han, and Y. Luo, Locating passive sources on seismic reflection image in the presence of velocity errors, *GEOPHYSICS*, 2020, 85(5), KS161-KS170. (SCI)

[16] **Y. Liu**, Y. Ma, and Y. Luo, Source location with cross-coherence migration, *GEOPHYSICS*, 2020, 85(4), KS127-KS138. (SCI)

[15] **Y. Liu**, Y. Du, and Y. Luo, Sparsity-promoting least-squares interferometric migration for high-resolution passive source location, *GEOPHYSICS*, 2021, 86(1), KS1-KS9. (SCI)

[14] **Y. Liu**, Y. Yue, Y. Li, and Y. Luo, On the retrievability of seismic waves from high-speed-train traffic using seismic interferometry, *IEEE Geoscience and Remote Sensing Letters*, 2022, 19, 1-5. (SCI)

[13] Y. Yue, **Y. Liu***, Y. Ye, Y. Wo, and Z. Qian, Least-Squares Kirchhoff Depth Migration with Fast Point-Spread-Function Computation, *IEEE Transactions on Geoscience and Remote Sensing*, 2023, 61(SCI)

[12] Y. Yue, **Y. Liu***, and S. Gray, Accelerating least-squares Kirchhoff time migration using beam methodology, *GEOPHYSICS*, 2021, 86(3), S221-S234. (SCI)

[11] Y. Yue, **Y. Liu***, Y. Li, and Y. Shi, Least-squares Gaussian beam migration in viscoacoustic media, *GEOPHYSICS*, 2021, 86(1), S17-S28. (SCI)

[10] S. Han, **Y. Liu***, Y. Li, and Y. Luo, First arrival traveltime picking through 3D U-Net, *IEEE Geoscience and Remote Sensing Letters*, 2022, 19, 1-5. (SCI)

[09] Y Ma, **Y. Liu**[*], and Y. Luo, Impacts of model resolution on multiple prediction, ***GEOPHYSICS***, 2022(1), T99-T109. (SCI)
[08] **Y. Liu** and Z. Li, Multi-scale strategies in automatic image-domain waveform tomography, ***Journal of Earth science***, 2015, 26(4): 577-585. (SCI)
[07] **Y. Liu** and Z. Li, Least-squares reverse-time migration with extended imaging condition, ***Chinese Journal of Geophysics (in Chinese)***, 2015, 58(10): 3771-3782. (SCI)
[06] **Y. Liu**, Z. Li, D. Wu, and Q. Wang, Well constrained non-stationary phase correction, ***Chinese Journal of Geophysics (in Chinese)***, 2014, 57(1): 310-319. (SCI)
[05] **Y. Liu**, Z. Li, D. Wu, et al., The research on local slope constrained least-squares migration, ***Chinese Journal of Geophysics (in Chinese)***, 2013, 56(3): 1003-1011. (SCI)
[04] **Y. Liu**, Z. Li, and Q. Zhou, Pre-stack non-stationarity phase correction based on local similarity, ***Oil Geophysical Prospecting***, 2014, 49(3): 468-474. (EI)
[03] **Y. Liu**, Z. Li, and K. Guo, Non-stationarity phase correction based on local similarity, ***Oil Geophysical Prospecting***, 2012, 47(6): 887-893. (EI)
[02] **Y. Liu** and Z. Li, Three-dimensional data regularization by iteratively re-weighted least-squares inversion based on the local plane wave model, ***Oil Geophysical Prospecting***, 2012, 47(3): 418-424. (EI)
[01] **Y. Liu**, Z. Li, J. Huang, and X. Kong, Prestack time migration velocity analysis and imaging of seismic diffractions, ***Progress in Geophysics (in Chinese)***, 2013, 28(6): 3022-3029. (Core)

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[13] **Y. Liu**, Stretch-free normal moveout and stacking with time-shift common midpoint gathers, International Patent, WO2025233656A1.
[12] **Y. Liu**, Method of determining a diffraction seismic image to identify complex geological features, International Patent, WO2025152094A1.
[11] **Y. Liu**, Y. He, H. Liu, and F. Qin, A method of determining a smooth seismic velocity model using shaping regularization and kinematic equivalence, International Patent, WO2025043395A1.
[10] **Y. Liu**, H. Liu, Y. He, F. Qin, and Y. Du, Method and system for determining migration data using cross-spread gathers and parallel processing, US Patent, US20250060495A1.
[09] **Y. Liu**, H. Liu, Y. He, F. Qin, and Y. Du, Application of twin-block gathers to enhance the computational efficiency of 3D prestack Kirchhoff depth migration on a GPU/CPU hybrid platform, US Patent, US12535607.
[08] **Y. Liu**, H. Liu, F. Qin, and Y. He, Method and system of imaging hydrocarbon reservoirs using adaptive aperture tapering in Kirchhoff depth migration, US Patent, US20240302555A1.
[07] **Y. Liu**, Y. Du, T. Fei and Y. Luo, Three-component seismic data acquisition while fracking, US Patent, US11474270.
[06] **Y. Liu**, Y. Du, T. Fei and Y. Luo, Three-component seismic data processing and interpretation methods for seismic while fracking, US Patent, US11143773B1.
[05] W. He, **Y. Liu**, and S. Han, System and method for forming a seismic velocity model and imaging a subterranean region, US Patent, US20240125955.
[04] Y. He, **Y. Liu**, H. Liu, F. Qin, and Y. Du, Method and system for determining migration data using cross-spread gathers and parallel processing, US Patent, US20250060495A1.
[03] Y. Ma, **Y. Liu**, and H. Liu, System and method for reducing coherent and random noise in seismic data, International Patent, WO2024148457A1.
[02] H. Liu, Y. Luo, **Y. Liu**, S. Han, and Y. Du, Method and systems for computational efficiency 3D prestack Kirchhoff depth migration, US Patent, US11774615.
[01] Y. Luo, **Y. Liu**, P. Golikov, E. Hemyari and A. Muhaidib, Analyzing secondary energy sources in seismic while drilling, US Patent, US20200233113A1.

CONFERENCE PAPERS

[30] **Y. Liu**, E. Aljshi, and A. Ali, PyRGT: A Python-based Framework for Robust Relative Geological Time Estimation from Complex Seismic Data, *EAGE*, 2025.

[29] **Y. Liu**, G. Wang, O. Dajani, K. Machocki, E. Fataierge, Integrated Vibration Analysis System for Enhanced Understanding of Drilling Dynamics and Optimization of Drilling Efficiency, *MEOS GEO*, 2025.

[28] **Y. Liu**, P. Golikov, A. Dawood, E. Alfataierge, Enhancing Well Placement Precision with Seismic-Based Drillbit Tracking Method, *MEOS GEO*, 2025.

[27] **Y. Liu**, T. Tonellot, Y. He, Y. Kim, H. Salim, Efficient Sampling and Reconstruction of Traveltime Volumes for Kirchhoff Depth Migration, *MEOS GEO*, 2025.

[26] **Y. Liu**, T. Tonellot, Y. He, Y. Kim, H. Salim, Efficient Estimation of Traveltime Upper Bounds Using Fermat's Principle for Enhanced Seismic Imaging, *MEOS GEO*, 2025.

[25] **Y. Liu**, P. Golikov, A. Dawood, E. Alfataierge, Enhanced Drillbit Localization Using Surface Seismic-While-Drilling Data. *The 7th Annual Meeting of Petroleum Geophysics*, 2025.

[24] **Y. Liu**, Real-time Fracture Monitoring Using Resonant Frequencies of Guided Waves: a Field Experiment, *IPTC*, 2024.

[23] **Y. Liu**, Connection Between Least-squares Migration, Capon Beamforming, and Phase Correction, *The 6th Annual Petroleum Geophysics Conference*, 2024.

[22] **Y. Liu**, Separation and imaging of deep diffractions, *3rd International Meeting for Applied Geoscience & Energy*, 2023.

[21] **Y. Liu**, H. Liu, Y. He, F. Qin, and Y. Du, Accelerated Kirchhoff depth migration on CPU-GPU heterogeneous computing systems, *2nd International Meeting for Applied Geoscience & Energy*, 2022.

[20] **Y. Liu**, High-speed train traffic as powerful noise source for near-surface scattering imaging, *Shallow Geophysics, Prospecting & Geohazards Site Characterization and Monitoring workshop, SEG*, 2022.

[19] **Y. Liu**, Y. Du, and Y. Luo, High-resolution source location with sparsity-promoting interferometric cross-correlation migration, *90th Annual International Meeting, SEG, Expanded Abstracts,* 2020, 2135-2139.

[18] **Y. Liu**, L. Liu, Y. Ma, X. Ji, and Y. Luo, Retrievability of seismic waves from train traffic with seismic interferometry, *90th Annual International Meeting, SEG, Expanded Abstracts,* 2020, 3432-3436.

[17] **Y. Liu** and Y. Luo, Towards a unified approach for stretch correction in prestack migration, *1st EAGE conference on seismic inversion*, 2020.

[16] **Y. Liu,** Y. Luo, J. Ning, and Y. Li, Broadband Seismic Signals Generated by High-Speed Trains, *9th international conference on environmental and engineering geophysics*, 2020.

[15] **Y. Liu**, Y. Du, Y. Luo, and A. V. Bakulin, Multicomponent seismic-while-drilling data analysis without pilot records, *International Petroleum Technology Conference*, 2020.

[14] **Y. Liu**, Y. Wu, X. Wang, et al., Wave-equation tomography with surface offset gathers by plane-wave encoding, *87th Annual International Meeting, SEG, Expanded Abstracts*, 2017.

[13] **Y. Liu**, Y. Wu, X. Wang et al., Efficient wave-equation tomography with surface offset gathers. *International Geophysical Conference, Qingdao, China*, 2017.

[12] **Y. Liu**, W. Symes et al., Application of plane-wave extended waveform inversion to an onshore seismic dataset, *WS05-Wave equation based migration velocity analysis, in 77th EAGE Conference & Exhibition*, 2015.

[11] **Y. Liu**, C. Zhu et al., Wave-equation migration velocity analysis with dip contraction in the subsurface offset common image gather, *77th EAGE Conferences & Exhibition*, 2015.

[10] **Y. Liu**, W. Symes, and Z. Li, Extended reflection waveform inversion via differential semblance optimization, *84th Annual International Meeting, SEG, Expanded Abstracts*, 2014, 1232-1237.

[09] **Y. Liu**, W. Symes, and Z. Li, Inversion velocity analysis via differential semblance optimization, *76th EAGE Conferences & Exhibition*, 2014.

[08] **Y. Liu**, Z. Li et al., Inversion to common scatterpoint gathers and its application in time-domain velocity analysis and imaging, *76th EAGE Conferences & Exhibition*, 2014.

[07] **Y. Liu**, Z. Li et al, Least-squares seismic data mapping and its application in seismic data regularization, *76th EAGE Conferences & Exhibition*, 2014.

[06] **Y. Liu**, W. Symes et. al, Linearized extended waveform inversion via differential semblance optimization in the depth-oriented Extension, 83rd Annual International Meeting, *SEG, Expanded Abstracts*, 2013, 4869-4874.

[05] **Y. Liu**, W. Symes, et.al, Multisource least-squares extended reverse-time migration with preconditioning guided gradient method, *83rd Annual International Meeting, SEG Expanded Abstracts*, 2013, 3709-3715.

[04] **Y. Liu**, Z. Peng, W. Symes, and W. Yin, Sparse Radon transform with dual gradient ascent method, *83rd Annual International Meeting, SEG, Expanded Abstracts*, 2013, 4650-4655.

[03] **Y. Liu** and W. Symes, Linearized extended waveform inversion via differential semblance optimization, *WEMVA workshop in 75th EAGE Conference & Exhibition incorporating SPE EUROPEC 2013 London, UK*, 2013. Invited talk.

[02] **Y. Liu**, Z. Li and Y. Yue, De-noising method based on wave-equation seismic data mapping, *81st Annual International Meeting, SEG, Expanded Abstracts*, 2011, 3653-3657.

[01] **Y. Liu,** Z. Li and Z. Xue, 3-D seismic data regularization based on iteratively re-weighted least-squares inversion, *SPG/SEG International Geophysical Meeting: Shenzhen*, 2013.

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