

Department of Earth and Atmospheric Sciences

University of Houston, Science & Research Building 1, Houston, TX, 77204.

Email: hhu5@central.uh.edu

RESEARCH INTERESTS

My research interests are mainly on the seismic exploration and seismology, including:

- Seismic imaging
 - Reverse-time migration using primaries and multiples
 - Gaussian-beam migration
 - Least-squares migration
 - Imaging for global subduction zones
 - CPU&GPU parallel high-performance computation
- Seismic signal processing
 - Data compression and reconstruction
 - Coherent signal detection
 - Nonlinear signal comparison
- Reservoir characterization
 - Reservoir fracture imaging
 - Multi-component field dataset processing
- Near surface seismology
 - Full-wave seismic forward modeling
 - Surface waves prediction and separation
- Seismology
 - Earth inner core heterogeneity

EMPLOYMENT:

April, 2015 - present: University of Houston

Post-Doctoral Research Fellow

Advised by: Dr. Yingcai Zheng

Jun, 2013 - Aug, 2013: Statoil (Beijing) Technology Service Co., Ltd

Summer Internship

Advised by: Dr. Are Osen

EDUCATION:

- Sep, 2009 - Jan, 2015 Institute of Geology and Geophysics, Chinese Academy of Sciences.
Ph.D., Major in geophysics. Advised by Dr. Yike Liu.
Thesis topic: “Seismic Prestack Depth Migration: Reverse Time Migration and Gaussian Beam Migration”.
- Sep, 2005 - Jul, 2009 Yunnan University.
B. S., Major in Geophysics.

AWARDS and HONORS:

- Nov, 2013. “Excellent paper award” in the 29th Chinese Geophysics annual meeting.
Dec, 2014. “Excellent Graduate student award” in the Institute of Geology and Geophysics, Chinese Academy of Sciences.

PROFESSIONAL SOCIETIES:

- SEG: (2010-now)
CGU (China Geophysical Union): (2010-2014)

PUBLICATIONS & PATENTS:

Papers in Peer-reviewed Journals:

1. Wo Y., H.W. Zhou, **H. Hu**, Y. Ding and J. Zong, A layer-cell approach of near-surface first-arrival tomography, in preparing.
2. Zhang Y., A. Li and **H. Hu**, Crustal structure in Alaska from receiver function analysis, **Geophysical Research Letters**, in revising.
3. Pongthep T., **H. Hu**, H.W. Zhou and A. Lau, Seismic migration imaging with an optimal local stacking via segmentation method in angle-domain common-image gathers, **Journal of Applied Geophysics**, in revising.
4. **Hu H.**, Y. Zheng, Data-driven surface wave prediction and removal using multichannel nonlinear signal comparison, **Geophysical Journal International**, in revising.
5. **Hu H.**, M. Senkaya, Y. Zheng, High resolution measurement of surface wave dispersion using multi-channel non-linear signal comparison, **Journal of Applied Geophysics**, revising.
6. Xia K., F. Hilterman, **H. Hu**, 2018, Unsupervised Machine Learning Algorithm for Detecting and Outlining Surface Waves, **Journal of Applied Geophysics**, 157, 73-86.
7. **Hu H.**, Y. Zheng, X. Fang and M. Fehler, 2018, 3D Seismic characterization of fractures with Random spacing Using the Double-Beam Method, **Geophysics**, 83(5): 1-45.

8. Eftekhari R., **H. Hu*** and Y. Zheng, Convergence acceleration in scattering series and seismic waveform inversion using nonlinear Shanks transformation, **Geophysical Journal International**, 214(3): 1732–1743, <https://doi.org/10.1093/gji/ggy228>.
9. Zhou. H. W., **H. Hu**, Z. Zou, Y. Wo and O. Youn, 2018, Reverse time migration: A prospect of seismic imaging, **Earth-Science Reviews**, 179: 207-227.
10. **Hu H.**, Y. Zheng, 2018, 3D Seismic Characterization of Fractures in a Dipping Layer Using the Double-beam Method, **Geophysics**, .83(2): V123-V134.
11. Ding, Y., Zheng, Y., Zhou, H. W., Howell, M., **Hu, H.** and Zhang, Y., 2017. Propagation of Gaussian Wave Packets in complex media and application to fracture characterization. **Geophysical Journal International**, 210(2): 1244-1251.
12. Zheng Y., **H. Hu**, 2017, Nonlinear signal comparison and high-resolution measurement of surface wave dispersion, **BSSA**, 107(3):1551-1556..
13. Liu X., Y. Liu, H. Lu, and **H. Hu**, 2017, Prestack correlative least-squares reverse time migration, **Geophysics**, 82(2): S159-S172.
14. Liu X., Y. Liu, **H. Hu**, Peng Li, Majid Khan; 2016, Imaging of first-order surface-related multiples by reverse-time migration. **Geophysical Journal International**, 208(2): 1077-1087.
15. Liu Y., X. Liu, A. Osen, Y. Shao, **H. Hu** and Y. Zheng, 2016, Least-squares reverse time migration using controlled order multiples data. **Geophysics**, 81(5): S347-S357.
16. **Hu H.**, Y. Liu, Y. Zheng, X. Liu, H. Lu, 2016, Least-squares Gaussian beam migration. **Geophysics**, 81(3), S87-S100.
17. Zheng Y., A. H. Malallah, M. C. Fehler, **H. Hu**, 2016, 2D full-waveform modeling of seismic waves in layered karstic media. **Geophysics**, 81, T19-T28.
18. **Hu H.**, Y. Liu, A. Osen, Y. Zheng, 2015, Compression of local slant stacks by the estimation of multiple local slopes and the matching pursuit decomposition. **Geophysics**, 80, WD175-187.
19. Y. Liu., **H. Hu**, X. Xie, Y. Zheng, 2015, Reverse time migration of internal multiples for subsalt imaging. **Geophysics**, 80, S175-S185.
20. **Hu H.**, Y. Wang, and X. Chang, 2015, Migration of free-surface-related multiples: removing artefacts using a water-layer model, **Journal of Applied Geophysics**, 112, 147-156.
21. Liu Y., W. Zhu, Mi L., J. Zhou, **H. Hu**, 2015, Migration of multiples from the South China sea. **Science China**, 45(2), 482-490.
22. Liu X., Y. Liu, **H. Hu**, S. Xie, 2015, Focal transformation imaging of first-order multiples. **Chinese Journal Geophysics**, 58(6), 1985-1997. (In Chinese)
23. Wang Y., X. Chang, and **H. Hu**, 2014, Simultaneous reverse time migration of primaries and free-surface related multiples without multiple prediction. **Geophysics**, 79, S1-S9.
24. **Hu H.**, Y. Liu, X. Chang, Y. Wang, X. Du, R. Yang, 2013, Analysis and application on boundary treatment for the computation of reverse-time migration: **Chinese J. Geophys**, 2033-2042. (In Chinese)

Expanded Abstracts in Professional Meetings:

1. **Hao Hu**, Yingcai Zheng, 2018, Date-driven Prediction and Separation of Surface Waves into Fundamental Mode and Overtones Based on the Nonlinear Dispersion Measurement, AGU,

Expanded abstracts.

2. Yingcai Zheng, **Hao Hu**, X. Fang and R. Stewart, 2018, Novel 3-D Field-scale Characterization of Reservoir Fractures Using Surface Seismic Data by the Double-Beam Method and Field Applications, Unconventional Resources Technology Conference (URTeC) in Houston, Expanded abstracts.
3. **Hao Hu**, Yingcai Zheng, Xinding Fang, Michael C. Fehler, 2018, 3D Seismic Characterization of Irregularly Distributed Fractures in Unconventional Reservoirs, SEG, Expanded abstracts.
4. David Li, Xiao Tian, **Hao Hu**, Xiao-Ming Tang, Yingcai Zheng, 2018, Removal of dispersive borehole waves and beam imaging of fractures around the wellbore using sonic logging data, SEG Expanded abstracts.
5. Yukai Wo, Hua-wei Zhou, **Hao Hu**, 2018, Tomographic velocity model building for complex near surface and its impact on depth imaging, SEG, Expanded abstracts.
6. Pongthep Thongsang, **Hao Hu**, August Lau, Hua-wei Zhou, 2018, Imaging improvement in angle-domain common-image-gathers by a local stack utilizing segmentation method, SEG, Expanded abstracts.
7. **Hao Hu**, Yingcai Zheng, 2018, Prediction and Separation of Surface Waves into Fundamental Mode and Overtones Based on the Nonlinear Dispersion Measurement, SSA, Expanded abstracts.
8. Yingcai Zheng, **Hao Hu**, Xinding Fang, Michael C. Fehler, 2018, Seismic characterization of reservoir fractures by double beams and inference of reservoir transport properties, CPS/SEG Beijing 2018, Expanded abstracts.
9. **Hao Hu**, Yingcai Zheng, 2017, High-resolution measurement of surface wave dispersion by nonlinear signal comparison. AGU, Expanded abstracts.
10. Jessica Chew, **Hao Hu**, Yingcai Zheng, 2017, Earth inner core anisotropy using PKiKP and PKIIKP reflection paris. AGU, Expanded abstracts.
11. **Hao Hu** and Yingcai Zheng, 2017, 3D Seismic Characterization of Fractures in a Dipping Reservoir Layer by Double Beams, SEG, Expanded abstracts.
12. Pongthep Thongsang, **Hao Hu**, Hua-wei Zhou and August Lau., 2017, Relaxed flatness-constraint of angle-domain-common-image-gathers generating by Poynting vectors via concurrent vector-median-filter, SEG, Expanded abstracts.
13. Liu, X., Y. Liu., **H. Hu**, P. Li., 2017, Reverse time migration of isolated first-order multiples, SEG, Expanded abstracts.
14. Wei,Z.L., **H. Hu**, A. Lau, Y. Zheng, H.W. Zhou, 2016. Joint inversion for microseismic event positions and velocity structures by combining multi-scale deformable-layer tomography and master station earthquake location method, SEG, Expanded Abstracts.
15. Li, L., **H. Hu**, X. Li and Y. Zheng, 2016. Understanding slab-mantle interaction by 3D seismic imaging of reflectivity in the mantle wedge, Fall AGU.
16. Ding,Y., Y. Zheng, H.W. Zhou, M. Howell, and **H. Hu**, 2016. Propagation of Gaussian Wave Packets in heterogeneous media and the application to fracture characterization, Fall AGU.
17. Ding, Y., Y. Zheng, H.W. Zhou, Y. Zhang, **H. Hu**, 2016. Seismic characterization of fractures using exact localized waves: Gaussian wave packet, SEG expanded abstract.
18. Thongsang P., H.W. Zhou, **H. Hu**, 2016, .Analysis of oscillational behaviors of waves in

- gas-pocket reservoirs via decoupling wavefields, SEG expanded abstract.
19. Liu Y., X. Liu, Y. Shao, A. Osen, Y. Zheng, **H. Hu**, 2016, Least-squares reverse time migration of controlled order multiples, SEG expanded abstract.
 20. Liu, Y., X. Liu, A. Osen, **H. Hu**, Y. Zheng, 2016 Least-squares Reverse Time Migration Using Controlled Order Multiples, EAGE Conference and Exhibition, expanded abstract.
 21. Liu X., Y. Liu, H. Lu, **H. Hu**, 2016, Prestack-image based correlative least-squares reverse time migration, SEG expanded abstract.
 22. **Hu H.**, Y. Liu, Y. Zheng, X. Liu, H. Liu, 2015, Least-squares Gaussian beam migration. 85th Annual International Meeting, SEG, Expanded Abstracts.
 23. Liu Y., **H. Hu**, X. Xie, and Y. Zheng, 2015, Reverse time migration of internal multiples. 85th Annual International Meeting, SEG, Expanded Abstracts.
 24. **Hu H.**, Y. Liu, A. Osen, 2014, The application of compression of local slant stacks by local slopes estimation and matching pursuit decomposition, 1st Chinese Geoscience Union Annual Meeting, Expanded Abstract, 1202. (In Chinese)
 25. **Hu H.**, Y. Liu, X. Chang, Y. Wang, 2013, The application of seismic prestack Gaussian beam migration, 29th Chinese Geophysics Annual Meeting, Expanded Abstract, 914. (In Chinese)
 26. **Hu H.**, Y. Liu, X. Chang, Y. Wang, 2013, A study of pre-stack Gaussian beam migration. International Conference on 3-D Wave Propagation and Imaging Through the Earth's Interior, Expanded Abstract, 86-89.
 27. **Hu H.**, Y. Liu, Y. Wang, 2011, Study of different boundary treatments in pre-stack reverse-time migration, 27th Chinese Geophysics Annual Meeting, Expanded Abstract, 750. (In Chinese)

Patents

- One disclosed invention (with Prof. Zheng) “Nonlinear signal comparison and high-resolution measurement of seismic or acoustic wave dispersion” to Office of Intellectual Property Management, University of Houston.
- One disclosed invention (With Prof. Zheng) “Data-driven surface wave prediction and removal using multichannel nonlinear signal comparison”, to Office of Intellectual Property Management, University of Houston.
- Seismic prestack migration imaging method, CN 102944894 B