Curriculum Vitae (last updated March 21, 2016)

Zheng, Yingcai

Yzheng12@uh.edu

Assistant Professor in Geophysics (tenure track)

Department of Earth and Atmospheric Sciences,
University of Houston, TX, 77024-5007.

Personal Data

Sex: Male;
Birthdate: August, 1981, Nei Mongol, China.

Education

2007 Ph.D. in seismology, University of California, Santa Cruz.
Thesis: Imaging Upper Mantle Discontinuities and Earth's Small-scale Heterogeneities
Advisers: Thorne Lay and Ru-Shan Wu

2001, B.S. in Geophysics, Peking University.
Thesis: Study on upper mantle discontinuities in Izu-Bonin region.
Adviser: Shaoxian Zang.

Awards and Honors

- J. Clarence Karcher Award, 2015, from Society of Exploration Geophysicists: "*In recognition of exceptional research contributions to the science and technology of exploration geophysics*" by a researcher under 35 years old. No more than 3 is awarded per year.
- Provost Faculty Travel Award, University of Houston, 2014
- Earth Resources Lab Fellowship, MIT, 2010-2011
- Awarded as SPIRIT Scholar by ConocoPhillips 2006
- Waters Award 2005 UCSC for outstanding PhD thesis proposal
- University of California, Regents Fellowship 2003

Grant Awards

Co-Principal Investigator: ***Kuwait-MIT Center***: "Seismic Wave Propagation and Imaging in Carbonates", 9/1/2012-8/31/2014, award amount $200,000.

Principal Investigator: ***National Science Foundation*** EAR-083835, 1/1/2009 – 7/1/2010: "Probing Depth-dependent Heterogeneities under Japan Using Transmitted Seismic Waves"

Principal Investigator: ***CSIDE Research Grant, IGPP/UCSC***, 2009-2010: "Imaging the upper boundary of the subducting slab"

Membership in Professional Societies

AGU (2002-), SEG (2006-), EAGE (2012-)

Research and Professional Experiences

- 2014- present: Assistant Professor, University of Houston, TX;
  Seismic imaging and monitoring for reservoirs, and planetary seismology (Mars).

- 2011-2014: Research Scientist, MIT;
  Conduct research on seismic imaging of fractures, time-lapse reservoir monitoring, and planetary seismology for Mercury.

- 2010-2011: Postdoctoral Fellow, MIT (concurrent at UCSC)
  Research performed involved working on seismic interferometry and seismic imaging for fracture networks

- 2008 Consultant on seismic imaging at ConocoPhillips, Houston, TX
  Advise ConocoPhillips imaging team on seismic imaging issues (offset plane waves)

- 2007- 2011 Postdoctoral Scholar at UCSC
  Research performed involved investigating seismic wave scattering and imaging

- 2006 Internship at ConocoPhillips
  Created a 3D offset-plane-wave modeling and imaging algorithm, which can distinguish seismic reflection amplitude change due to lithology change or due to overburden structures

- 2002-2007: Research Assistant & Teaching Assistant, UC Santa Cruz;
  Research on global earthquake seismology, 3D seismic images for the Tonga mantle wedge published as a long Article in *Science*; seismic wave propagation in random media; seismic imaging.

- 2001 Research Assistant, Center for Earthquake Research and Information, Memphis, TN
  Seismic imaging of sedimentary basins using receiver functions

Teaching (Undergraduate and Graduate)

Courses TA'd at UC Santa Cruz
- Earth Catastrophes (UCSC; Teaching Assistant);
- Earthquakes and You (UCSC, Teaching Assistant);
- The Dynamic Earth (UCSC, Teaching Assistant);

Courses developed at MIT and UC Santa Cruz
- Seismic Imaging in Phase Space (Instructor, graduate course, MIT; 2011);
- Seismic Imaging (Instructor, graduate course UCSC; 2013);

Courses developed at UH
- Seismic Imaging Fundamentals (Instructor, graduate course, UH).
- Geophysical Signals and Analysis (new course developed at UH; undergraduate)
- Global Seismology (new course developed at UH; undergrad)
- Professional Development Seminar (new seminar developed at UH, with W. Sager)

Synergistic Activities & Invited Talks
- Keynote Speaker, 2016 2nd SEG/DGS near surface workshop Bahrain
- Keynote Speaker 2015 SEG Post-convention workshop on "de-Primary"
- Invited talk, 2015 Schlumberger webinar global
- Invited talk, 2015 LSU department seminar
- Invited Speaker, 2015 GSH (Anadarko)
- Invited Speaker 2015 GSH (Schlumberger)

- Invited Speaker 2015 CNPC (Houston)
- Invited Speaker 2014 ExxonMobil (2 times)
- Invited Speaker 2014 ConocoPhillips
- Invited Speaker 2014 IRIS/GSH workshop, Houston
- Invited speaker 2014 SEG post-convention workshop on unconventional resources
- Invited talk 2012 Cornell University
- Invited talk 2011 Chinese Academy of Sciences
- Invited talk 2011 Caltech
- Invited talk 2010 Univ of Science and Technology
- Invited talk 2010 Berkeley seismo lab
- Invited talk 2009 Univ of Science and Technology
- Invited talk 2008 Peking University
- Invited talk 2009 China Earthquake Administration
- Invited talk 2009 MIT
- Convener and Chair 2015 AGU session: Seismic Modeling and Inversion: New Ideas in Waveform Inversion in Exploration and Global Seismology I (oral) &II (poster)
- Convener and Chair 2015 SEG annual meeting session, New Orleans
- Faculty adviser for SEG/Halliburton Evolve Program 2015 UH adviser for 3 teams (Cougar, Texans, Astros)
- Organizing committee of Summer Research workshop: Geophysics of Unconventional Reservoirs (2015) in La Jolla.

Services and Committees

- Merit Review Committee
- Materiel and Planning
- Fundraising/Development/Alumni Relations
- Industry Recruiting
- Rock physics faculty search committee
- Instructional faculty search committee

Book:

Fundamentals of Modern Seismic Imaging, with Ru-Shan Wu; 10 chapters. ~300 pages. Manuscript.

Papers under review

Fang, X.D., **Y.Zheng** and M.C. Fehler (2015) Fracture Clustering Effect on AVO/AVAz Analysis, submitted to **Geophysics**

Liu, Y, X. Liu, A. Osen, Y. Shao, H. Hu**, **Y. Zheng** (2015) Least-squares reverse time migration of controlled order multiples data, submitted to **Geophysics**

Publications in Referred Journals/Books

*Student author * Postdoc author ***

Kang, P. K., **Y. Zheng**, X. Fang, R. Wojcik, D. McLaughlin, S. Brown, M. C. Fehler, D. R. Burns, and R. Juanes (2016), Sequential approach to joint flow-seismic inversion for improved characterization of fractured media, ***Water Resour. Res.***, 52, 903–919, doi:10.1002/2015WR017412.

Hu**,H., Y.K. Liu, **Y. Zheng**, X.J. Liu, H.Y. Lu (2015). Least-squares Gaussian beam migration, ***Geophysics***, in press.

Zheng, Y., A.H. Malallah, M.C. Fehler, and H.Hu (2016). "2D full-waveform modeling of seismic waves in layered karstic media." ***Geophysics***, 81(2), T25-T34. doi: 10.1190/geo2015-0307.1

Hu**, H., Y. Liu, A. Osen, and **Y. Zheng** (2015), Compression of local slant stacks by the estimation of multiple local slopes and the matching pursuit decomposition, ***Geophysics***, 80(6), WD175-WD187.

Liu, Y., H. Hu**, X.-B. Xie, **Y. Zheng**, and P. Li (2015), Reverse time migration of internal multiples for subsalt imaging, ***Geophysics***, ***80***(5), S175-S185.

Zheng, Y., F. Nimmo, and T. Lay (2014). Seismological implications of a lithospheric low seismic velocity zone in Mars, ***Physics of the Earth and Planetary Interiors***, doi:10.1016/j.pepi.2014.10.004.

Wu, R.S. and **Y. Zheng** (2014). Nonlinear partial derivative and its De Wolf approximation for nonlinear seismic inversion, ***Geophysical Journal International*** doi:10.1093/gji/ggt496.

Fang, X.D., M.C.Fehler, Z.Y.Zhu, **Y.Zheng** and D.R. Burns (2013). Reservoir fracture characterization from seismic scattered waves, ***Geophysical Journal International***, ggt381.

Zheng, Y., X.D. Fang, M.C.Fehler and D.R.Burns (2013). Seismic characterization of fractured reservoirs by focusing Gaussian beams, ***Geophysics***, vol. 78 (4), p1-6.

Zheng, Y. (2013). Scale lengths of heterogeneities under Tibet, ***Earthq. Sci.***, 26, 1-6.

Ge, C., Y. Sun, M. N. Toksöz, Y. Zheng, **Y. Zheng**, X. Xiong, and D. Yu (2012), Crustal structure of the central Tibetan plateau and geological interpretation, ***Earthquake Science***, 25(5-6), 363-370.

Lü, J., Y. Sun, M. Nafi Toksöz, **Y. Zheng**, and M. T. Zuber (2011), Seismic effects of the Caloris basin impact, Mercury, ***Planetary and Space Science***, 59(15), 1981-1991. *Authors are in a-z order*.

Liu, Y., X. Chang, D. Jin, R. He, H. Sun, and **Y. Zheng** (2011), Reverse time migration of multiples for subsalt imaging, ***Geophysics***, 76(5), WB209-WB216.

Zheng, Y., Y. He, and M. C. Fehler (2011), Crosscorrelation kernels in acoustic Green's function retrieval by wavefield correlation for point sources on a plane and a sphere, ***Geophys. J. Int.***, Volume 184 (2), 853–859,

Zheng, **Y.**, R.-S. Wu, Y. Liu, and M. C. Fehler (2011), Seismic interferometry using non-far-field sources and removing the spurious arrival, ***Bull. Seismo. Soc. Am.***, 101(2). doi: 10.1785/0120100218.

Zheng, Y. (2010). Retrieving the exact Green's function by wavefield crosscorrelation, ***J. Acoust. Soc. Am. Express Letters***, 127 (3), EL93-EL98, doi: 10.1121/1.3298452.

Zheng, Y. and R.S. Wu (2008). Theory of transmission fluctuations in random media with a depth-dependent background velocity structure, chapter 2 in: *Earth Heterogeneity and Scattering Effects on Seismic Waves*, eds. H. Sato and M. Fehler, pp. 21-41.

Zheng, Y., T. Lay, M.P. Flanagan, and Q. Williams (2007). Pervasive Seismic Wave Reflectivity and Metasomatism of the Tonga Mantle Wedge, ***Science***, Vol. 316. no. 5826, pp. 855–859, DOI: 10.1126/science.1138074.

Zheng, Y. (2007), *Imaging Upper Mantle Discontinuities and Earth's Small-scale Heterogeneities*, Ph.D. thesis. University of California, Santa Cruz, pp. 240.

Zheng, Y., and T. Lay (2006). Low Vp/Vs ratios in the crust and upper mantle beneath the Sea of Okhotsk inferred from teleseismic p_MP, s_MP, and s_MS underside reflections from the Moho, ***J. Geophys. Res.***, 111, B01305, doi:10.1029/2005JB003724.

Zheng, Y., R.S.Wu and T.Lay (2006), Inverting the power spectrum for a heterogeneous medium, ***Geophysical Journal International*** 168 (3), 1005–1010. doi:10.1111/j.1365-246X.2006.03241.x

Zheng, Y., and R. Wu (2005), Measurement of phase fluctuations for transmitted waves in random media, ***Geophys. Res. Lett.***, 32 , L14314, doi:10.1029/2005GL023179.

SEG/EAGE Expanded Abstracts

Liu*, Z., and **Y. Zheng** (2015), Direct waveform inversion, in *SEG Technical Program Expanded Abstracts 2015*, edited, pp. 1268-1273, Society of Exploration Geophysicists.

Hu**, H., Y. Liu, **Y. Zheng**, X. Liu, and H. Lu (2015), Least-squares Gaussian beam migration, paper presented at 2015 SEG Annual Meeting, Society of Exploration Geophysicists.

Zheng, Y., F. Nimmo, and T. Lay (2015), Probing the Thermal State of Mars Using InSight Seismic Data, paper presented at Lunar and Planetary Science Conference.

Liu, Y., H. Hu**, X.-B. Xie, and **Y. Zheng** (2015), Reverse Time Migration of Internal Multiples, paper presented at 2015 SEG Annual Meeting, Society of Exploration Geophysicists.

Zheng, Y., X. Fang, M. C. Fehler, and D. Burns (2014), Seismic characterization of naturally fractured reservoirs by double focusing Gaussian beams with limited seismic acquisition, in *SEG Technical Program Expanded Abstracts 2014*, edited, pp. 2517-2522, Society of Exploration Geophysicists.

Y. Zheng, X.D. Fang, M.C. Fehler, D.R. Burns (2014). Seismic characterization of naturally fractured reservoirs by double focusing Gaussian beams with limited seismic acquisition, SEG expanded abstract (**oral presentation**).

Y. Zheng, X.D. Fang, M.C. Fehler, D.R. Burns (2014). Characterizing fracture networks for unconventional reservoirs using focusing seismic waves: spatial resolution and interpretation, post-conventiona in Workshop: W-7 — *Seismic Acquisition and Imaging for Unconventional Reservoirs—Too Conventional?* Organizers: Sam Gray, Jim Gaiser, and Jim Schuelke. (**Invited speaker)**.

Wu, R., L. Ye, and **Y. Zheng** (2013), Nonlinear partial functional derivative and nonlinear LS seismic inversion, paper presented at 75th EAGE Conference & Exhibition incorporating SPE EUROPEC 2013.

Kang, P. K., **Y. Zheng**, X. Fang, R. Wojcik, D. McLaughlin, S. Brown, M. C. Fehler, D. R. Burns, and R. Juanes (2013), Joint Flow–Seismic Inversion for Characterizing Fractured Reservoirs: Theoretical Approach and Numerical Modeling, paper presented at 2013 SEG Annual Meeting, Society of Exploration Geophysicists.

Zheng, Y., X. Fang, and M. C. Fehler (2013), Seismic characterization of reservoirs with variable fracture spacing by double focusing Gaussian beams, paper presented at 2013 SEG Annual Meeting, Society of Exploration Geophysicists.

Wu, R.S., L. Ye, and **Y. Zheng** (2013). Nonlinear partial functional derivative and nonlinear LS seismic inversion, 75th Annual International Meeting, EAGE, Expanded Abstracts.

Zheng, Y., X.D. Fang, M.C. Fehler (2013). Seismic characterization of fracture reservoirs with irregular fracture spacing, SEG expanded abstract.

Wu, R.S., and **Y. Zheng** (2012). Nonlinear Fréchet derivative and its De Wolf approximation, 82th Annual International Meeting, SEG, Expanded Abstracts, 2012-1468.

Zheng, Y., X.D. Fang, M.C. Fehler and D.Burns (2012). Efficient double-beam characterization for fractured reservoir, European Assoc. Geophysicists and Engineers, Copenhagen, 2012, June (**Invited speaker**), pp 5.

Zheng, Y., X.D. Fang, M.C. Fehler and D.Burns (2012). Seismic characterization of fractured reservoirs using 3Ddouble beams, SEG Technical Program Expanded Abstracts: pp. 1-5.

Zheng,Y., L.Vetri, X.D. Fang, M.C.Fehler and D.R.Burns (2012). Application of the double focusing Gaussian beams method for fracture characterization using multiply scattered waves: a new seismic approach to rock physics and fluid flow, SEG post convention workshop. (**invited speaker)**.

Yang, D., **Zheng, Y.**, Fehler, M., and Malcolm, A. (2012) Target-oriented time-lapse waveform inversion using virtual survey. SEG Technical Program Expanded Abstracts: pp. 1-5.

Fang, X., Fehler, M., Zhu, Z., **Zheng, Y.**, and Burns, D. (2012) Reservoir fracture characterizations from seismic scattered waves. SEG Technical Program Expanded Abstracts 2012: pp. 1-6.

Zheng, Y., X.D. Fang, M.C. Fehler and D. Burns (2011). Double-beam stacking to infer seismic properties of fractured reservoirs, SEG Annual Metg. Expanded Abstracts (pp 5). **(oral presentation)**.

Zheng, Y. *and Y.F. He (2010).* The far-field approximation in seismic interferometry*, SEG Expanded abstract, Denver,* **(oral presentation).**

Meeting Abstracts

Zheng, Y., (2015) Direct Waveform Inversion: a New Recursive Scheme, AGU Fall Meeting Abstracts.

Zheng, Y., F. Nimmo, and T. Lay (2014), InSight detection of a Lithospheric Low Seismic Velocity Zone in Mars, *AGU Fall Meeting Abstracts*, *1*, 4507.

Brown, S., P. Kang, **Y. Zheng**, X. Fang, M. Fehler, D. Burns, and R. Juanes (2013), Joint flow-seismic inversion for characterizing fractured reservoirs: theoretical approach and numerical modeling, *AGU Fall Meeting Abstracts*, *1*, 1285.

de Silva*, S., V. Cormier, **Y. Zheng**, and J. Hernlund (2013), Seismological Modeling of Inner Core Boundary Topography, *AGU Fall Meeting Abstracts*, *1*, 2284.

Zheng, Y., X. Fang, and M. Fehler (2013), Seismic Imaging And Characterization Of Fractured Oil Reservoirs By Focusing Gaussian Beams, *AGU Fall Meeting Abstracts*, *1*, 2455.

Zheng, Y., Y. Geng and R.S. Wu (2011). Numerical investigation of propagation of localized waves in complex media, international workshop on ***Geophysical Imaging with Localized Waves***, July 24 – 28, 2011, Sanya, China. (**Oral presentation**).

Zheng, Y. and R.S. Wu (2010). Imaging Earth heterogeneities using seismic body waves, western Pacific Geophysical Meeting, Taipei, Taiwan. **(oral presentation)**.

Zheng, Y. and M.C. Fehler (2010). Scales and scattering strengths of lower mantle heterogeneities using PKP-ab, PKP-bc and PKIKP waves, Fall AGU, 2010, San Francisco. (**Invited oral presentation**).

Zheng, Y. and M.C. Fehler (2010). Retrieval of acoustic Green's function for random media and the farfield approximation, Fall AGU, 2010, San Francisco.

Wu, R.-S., X.-B. Xie, and **Y. Zheng** (2009), Amplitude and phase fluctuations of seismic waves and characterization of small-scale heterogeneities in the earth, J. Acoust. Soc. Am., 126(4), 2171-2171. (**invited speaker**).

Zheng, Y. and R.S. Wu (2009). Statistical characterization of Earth's heterogeneities from seismic scattering. *EOS transaction, AGU*. (**oral presentation**).

He. Y.F, and **Y. Zheng** (2009). Imaging crustal and mantle discontinuities by crosscorrelating weak energetic waves recorded by the HiNet seismic network. *EOS transaction, AGU.*

Zheng,Y., and M.P. Flanagan and T.Lay (2008). Imaging Upper Mantle Discontinuities by 3D Kirchhoff migrtion of p_XP, s_XP, s_XSH data with seismic illumination compensation. *EOS transaction, AGU,* 89. (**Oral presentation**).

Zheng, Y. and R.S. Wu (2007). Inversion of depth-dependent small-scale heterogeneity spectra in the Earth using transmission fluctuations of logarithmic amplitude and phase data, *EOS transaction, AGU*, 88. (**Oral presentation**).

Zheng,Y., and M.P. Flanagan and T.Lay (2006). Imaging upper mantle discontinuities in the Tonga wedge by 3D true-amplitude Kirchhoff migration of p_XP, s_XP, s_XSH data. *EOS transaction, AGU,* 87.

Zheng, Y., and M. Flanagan and T. Lay (2005). Upper mantle discontinuities around circum-Pacific subduction zones, *EOS transaction, AGU,* 86.

Zheng, Y., and R.S. Wu (2005). Probe the Earth's small-scale heterogeneity spectrum using transmission fluctuation functions. *IASPEI* 2005 Santiago, Chile.

Zheng, Y. and R-S, Wu (2004). Is Markov approximation valid for transmission fluctuation problems? *EOS transaction*, *AGU,* 85, No.47.

Wu, R-S, and **Y. Zheng** (2004). Revisit the theory of transmission fluctuation in random media, workshop on "Probing earth media having small-scale heterogeneities", November, 22 (Mon), 2004, Tohoku University, Sendai, Japan.

Zheng, Y., and T. Lay (2002). Imaging properties of the Moho and upper mantle discontinuities under the Sea of Okhotsk, EOS, 83 (Fall AGU Meeting).

Technical Reports

Zheng, Y., and R-S. Wu (2004). Applicatioin of boundary element method in SEG-EAGE salt modeling, (Wavelet Transform On Propagation and Imaging Consortium) *WTOPI* report **11**:159-167.

Zheng, Y. and R-S. Wu (2005). Measurement of phase fluctuations for transmitted waves in random media, *WTOPI* report, **12**, 181-187.

Zheng,Y. and R-S. Wu (2006). Prestack Gaussian beam migration and amplitude compensation in local angle domain for acquisition aperture correction. *WTOPI* report **13**, 177-185.

Zheng, Y., C.C. Mosher and R. S. Day (2007). Three-dimensional offset plane wave modeling and migration, *WTOPI* report, **14**, 178-190.

Zheng, Y., X.F. Jia and R-S. Wu (2008). Impact of survey sinking using Gaussian beam propagator on imaging, *WTOPI* report, **15**, 63-70.

Zheng, Y., and Y. Geng (2009). Numerical investigation of propagation of localized waves in complex media, WTOPI report, 16, 207-222.

Zheng,Y., and Y.F. He (2010). The far-field approximation in seismic interferometry, WTOPI report, 19, 227-236.

Zheng, Y., and R.S. Wu (2011). Fast Multiscale waveform inversion, WTOPI report, 21.

END