CURRICULUM VITA

MRINAL K. SEN

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EDUCATION:

1987	Ph.D. Geophysics, University of Hawaii at Manoa
1979	M.Sc. Applied Geophysics, Indian School of Mines (now IIT), Dhanbad, India
1977	B.Sc. Applied Geophysics, Indian School of Mines (now IIT), Dhanbad, India

PROFESSIONAL EXPERIENCE:

09/07-	***John A. and Katherine G. Jackson Chair*** in Applied Seismology
08/04-	**Professor of Geophysics**, Dept. of Geological Sciences and Institute for Geophysics, The University of Texas at Austin
09/17-	**Associate Director**, University of Texas Institute for Geophysics.
08/18-8/19	***Interim Director***, University of Texas Institute for Geophysics
09/16-	**Head, Energy Research division**, Institute for Geophysics, The University of Texas at Austin
01/12-01/14	**Director**, National Geophysical Research Institute, Hyderabad, India (on leave from University of Texas at Austin, USA)
09/98–08/04	Senior Research Scientist, Institute for Geophysics, The University of Texas at Austin
09/92–08/98	Research Scientist, Institute for Geophysics, The University of Texas at Austin
09/89–08/92	Research Associate, Institute for Geophysics, The University of Texas at Austin
09/87–09/89	Project Seismologist, Woodward-Clyde Consultants, Pasadena, California
09/82–05/87	Graduate Research Assistant, University of Hawaii
07/81–08/82	Geophysicist, OMNI Tape Company, Houston, Texas
09/79–06/81	Geophysicist, INDICOS Computer Services, Bombay, India

VISITING POSITIONS:

02/14-	Adjunct Professor, Academy of Council and Scientific Research, CSIR-National Geophysical Research Institute, Hyderabad, India.
11/01–12/01	Visiting Professor, Section Applied Geophysics, Delft University of Technology, Netherlands.
07/98–08/98	Consultant, Upstream Strategic Research Group, MOBIL Oil Company, Dallas, Texas
06/98–07/98	Consultant, Rock Physics/Seismic Attributes Group, AMOCO Research Center, Tulsa, Oklahoma
08/93	Visiting Scientist, NRL-SSC, Bay St. Louis, Missouri
06/87–08/87	Research Seismologist, Hawaii Institute of Geophysics
02/85–06/85	Geophysical Intern, SOHIO Petroleum Company, Dallas, Texas

TEACHING EXPERIENCE:

Seismic Imaging (GEO384W)
Inverse Theory (GEO384M)
Advanced Theoretical Seismology/SEISMOLOGY III (GEO 391/GEO390D)
Solid Earth Geophysics (GEO354/GEO384D)
Quantitative Seismic Interpretation (GEO 365D)
Linear systems and inverse methods
Seminar courses on seismic migration and inversion
Asymptotic methods in seismic wave propagation
Mathematical Methods in Geophysics

INDUSTRY SHORT COURSES:

"Global optimization methods in geophysical inversion," SBGF 2001, ONGC, Delft, Germany.

"Seismic modeling, migration, and inversion" (one-week short course taught at companies) (ONGC 2003, 2004, 2005; Oil India 2007)

"Seismic modeling and inversion: the state of the art"–SBGF 2005 (Sep. 10), SPG 2006 (Jan. 8)

"Seismic inversion: theory and practice"

"Pre-stack time and depth migration" (one-week short course taught at ONGC, Jan. 2006; Dec 2008)

"Pre- and Post-stack Inversion" (one-week short course taught at ONGC, Dec. 2006; Jan 2008; Dec 2008)

"AVO and Seismic Attributes" (one-week short course taught at ONGC, Dec. 2006; Dec 2007; Dec 2008)

"Elastic wave theory," (two-day short course taught at Conoco-Phillips. Houston, Oct. 2007).

"Innovative techniques for reservoir characterization using seismic data "(one week short course taught at ONGC India Jan 2008)

"Seismic Inversion" – one week short course taught at China University of Petroleum (Sept 2009) and Chinese National Oil Corporation (CNPC).

"Application, Analysis and Interpretation of Converted Waves", JOGMEC, Chiba, Japan (Nov 2009); ONGC (Dec 2010)

"Reservoir Model Building: from seismic to Simulation", SPG conference Hyderabad, India (Dec 2009)

"Advanced Methods for seismic imaging, AVO and inversion", ONGC (Dec 2010)

"Sub-basalt Imaging", ONGC (Dec 2010)

"Seismic inversion" – 2 day short course at BGP, CNPC, Beijing, China (March 2011)

"Seismic inversion for reservoir characterization" – 3 day short course taught at Kuala Lampur, Malayasia organized by MICE Global, Nov 19-21, 2013.

"Seismic inversion for reservoir characterization" – 5 day short course taught at Kuala Lampur, Malayasia organized by MICE Global, Aug 18-22, 2014.

"Sub-basalt Imaging" – 1 day short course, SPG Kochin, November 2013.

"Seismic inversion and Rock Physics (Sen and Spikes)" – 5 day short course taught to EDGER sponsors January 2015.

"Inverse Theory" – 5 day short course taught at the Technical University of Satander, Bucaramanga, Colombia, April 2015.

"Seismic migration and inversion" – 5 day short course at the China University Petroleum, June 2015, 2016, 2017.

"Geostatistical Seismic inversion" – 1 day short course at BGP, China, June 2015.

"Full waveform inversion" – 1 day short course PetroChina, Beijing, China, June 2016, May 2017.

"Global Optimization and Uncertainty Quantification" – 4 day short course, University of Naples Federico II, Naples, Italy, June 2017.

"Full Waveform Inversion" – 1 day short course SEG (SEG San Antonio, Sept 2011; Geo 2012 Baharain, March 2012)

"Sub-basalt Imaging" – 1 day short course, SPG Kolkata, February 2012.

"Full waveform inversion" – 2 day short course at Petroleum Institute, Abu Dhabi, Oct 23-24, 2013.

"Full waveform inversion" – 2 day short course at Kuwait Oil Company, Kuwait, June 26-27, 2013.

2-day short course SEG annual conference Houston Texas, September 19-20, 2013.

2-day short course SEG annual conference New Orleans, October 17-18, 2015.

2-day short course SEG annual conference Dallas, October 17-18, 2016.

2-day short course SEG annual conference Houston, September 23-24, 2017.

2-day short course SEG annual conference Houston, October 13-14, 2018

"Seismic Inversion" – 2 day short course at the Vietnam Petroleum Institute, Hanoi, Vietnam, Dec 26-27, 2017.

"Physics-based and Physics-assisted machine learning for Geophysical applications", Micro-learning short course, first ENERGY IN DATA conference organized by SEG, AAPG and SPE, Austin, TX, June 2019.

RESEARCH INTERESTS:

- Theoretical and Computational Seismology: Wave propagation, Anisotropy, Synthetic seismograms.
- Exploration Geophysics: Seismic Processing, AVO, Imaging, GPR, Post and Pre-stack inversion, Reservoir characterization.
- Inverse Theory and Optimization; uncertainty quantification.
- Computational Methods: Supercomputing and parallel computation applications in Geophysics.

SERVICE:

Member, Editorial Board, *Nature Scientific Reports*, 2019-

Member, Editorial Advisory Board (Geophysics), Cambridge University Press, 2018-

Associate Editor, *Geophysics, Seismic Migration section*, June 06-present.

Associate Editor, *Geophysics, Seismic Modeling and Wave Propagation section*, June 06-present.

Associate Editor, *Journal of Seismic Exploration*, 2005-present.

Member, Editorial Board, International Journal of Geophysics, 2008-2011.

Member, Editorial Board, Geohorizons, 2011-present

Associate Editor, *Computational Seismology and Geodynamics*, American Geophysical Union, 1997-2008.

Guest Editor, *Geohorizons Decmeber 2009*, publication of the Society of petroleum geophysicists, India

Member, SEG book review committee, 2016-

Chairman, opponent committee of PhD Candidate Tuhin Bhakta, NTNU, Trondheim, Norway, May 2015.

Member, National Science and Engineering Research Council (NSERC) Canada , collaborative research grant site review committee, March 2014.

Member, Research Committee, Society of Exploration Geophysicists.

Member, Technical Program Committee (key contact - seismic inversion), Society of Exploration Geophysicists' annual meeting, San Antonio, Texas, 2011.

Member, 2011 NSF Graduate Research Fellowship Program (GRFP), Terrestrial Geosciences Panel.

Co-chair, Technical Program Committee, SEG representative, Society of Petroleum Geophysicists' annual meeting, Hyderabad, India, 2010.

Member, Technical Program Committee (key contact - seismic inversion), Society of Exploration Geophysicists' annual meeting, Houston, Texas, 2009.

Co-convenor, Workshop on 'Seismic Interferometry', SEG annual meeting, Houston, Texas, Oct. 09.

Co-convenor, Workshop on 'Bayesian method for geological model building', EAGE meeting, Amsterdam, The Netherlands, July 09.

Co-chair, Technical Program Committee, SEG representative, Society of Petroleum Geophysicists' annual meeting, Hyderabad, India, 2008.

Member, Technical Program Committee (key contact - seismic inversion), Society of Exploration Geophysicists' annual meeting, San Antonio, Texas, 2007.

Co-chair, Technical Program Committee, SEG representative, Society of Petroleum Geophysicists' annual meeting, Kolkata India, 2006.

Co-chair, Technical Program Committee, SEG representative, Society of Petroleum Geophysicists' annual meeting, Hyderabad, India, 2004.

Member, Technical Program Committee, Society of Exploration Geophysicists' annual meeting, San Antonio, Texas, 2001.

Invited Participant, National Research Council (NRC) planning workshop on 'How uncertainty is related to ocean science models?' Sept. 99, Washington D.C.

Member, **External Review Board** of the Marine Geosciences Division Basic and Applied Research programs, Office of Naval Research, 1999.

Invited Participant (Unclassified), DARPA Geophysics seminar *on Detection of Underground Facilities*, Mar. 99.

Invited panel member, DOE workshop on *Global inversion of Geophysical Data*, San Jose, California, Feb. 99.

Invited Participant, two-week workshop on *Inverse Problems* at the Institute of Mathematics and Its applications at the University of Minnesota (03/06/95–03/17/95).

Member, European Academy of Sciences

Member, American Geophysical Union (AGU)

Member, European Association of Geoscientists and Engineers (EAGE)

Member, Society of Exploration Geophysicists (SEG)

Member, Society of Industrial and Applied Mathematics (SIAM)

Member, *International Committee*, Society of Exploration Geophysicists (past)

Member, *Computer Application Committee*, Society of Exploration Geophysicists (past).

UT Committees:

Member, Executive committee, JSG, 2018

Member, Post-tenure review committee, UT-DGS, 2018

Chair, Eleanor Picard Staff Excellence Committee, UTIG, 2017

Member, Annual Performance Evaluation Committee, UTIG, 2017

Member, Post-tenure review committee, UT-DGS, 2017

Chair, Post-tenure review committee, UT-DGS, 2016

Chair, Exploration Geophysics search committee, 2014

Member, strategic planning committee, UTIG, 2015-16

Member, Shell Chair search committee, 2014-17.

Member, Appointments committee [tenure and promotion committee], Jackson School of Geosciences, 2009-2012.

Chairman, Geophysics Curricular Group**,** Dept. of Geological Sciences (until 2009)

Chairman, Internal JSG Hires**, UTIG** (until 2009)

Member, GBDS director search committee**, UTIG** [2010]

Member, Exploration Geophysics Search Committee, Dept. of Geological Sciences [2006]

Member, Endowed chair nomination committee, Dept. of Geological Sciences [2011]

Member, Graduate Studies Committee, *Computational and Applied mathematics*, UT Austin, 09/07-08/12

Chairman, Geophysics Education and Research Group, Jackson School of Geosciences, 9/07-12/11

Member, KAUST (King Abdullah University of Science and Technology) computational geosciences faculty search committee, Institute of computational and engineering sciences, UT Austin.[2007-2009]

Member, KAUST (King Abdullah University of Science and Technology) computational geosciences director search committee, Institute of computational and engineering sciences, UT Austin. .[2007-2009]

Member, JSG Energy initiative search committee

Member, UTIG Fellowship committee

Member, Graduate admissions and support committee (UTIG representative)

Member, Graduate studies committee (GSC), Department of Geological Sciences

Member, Graduate studies committee (GSC), Computational and Applied Math Program, UT Austin

Member, Graduate studies sub-committee (GSSC), three-year term, Computational and Applied Math Program, UT Austin, **Area C: Mathematical modeling of a natural, engineered, or other system.**

Chairman, Graduate curriculum committee**,** Dept. of Geological Sciences [2008-2009]

Member, Steering Committee, Jackson School of Geosciences 2003–2005

Chairman, UTIG Computer committee 2000–2005

Co-chairman, UTIG Seminar committee 2003–2005

AWARDS AND HONORS:

One of the top 25 presentations (out of 1100) at the SEG annual meeting, 2020: R Biswas, AF Arnulf, MK Sen, D Datta, Z Zhao, PK Mishra, P Jaysaval, Two-step velocity inversion using trans-dimensional tomography and elastic FWI.

One of the top 25 presentations (out of 1100) at the SEG annual meeting, 2019: Zhao and Sen, A gradient guided MCMC method for full waveform inversion.

One of the top 25 presentations (out of 1100) at the SEG annual meeting, 2019: Biswas, Kumar and Sen, *Density inversion from seismic data using a trans-dimensional approach*.

Virgil Kauffman Gold medal of the Society of Exploration Geophysicists (SEG) for making significant advances in the sciences of Exploration Geophysics in the past five years, 2018.

Distinguished Researcher Award, University of Texas Institute for Geophysics, 2016.

UTIG director's circle of excellence recognition, 2016.

Distinguished Graduate Alumnus Award, Department of Geology and Geophysics, University of Hawaii at Manoa, 2016.

Distinguished Educator Award, Jackson School of Geosciences, University of Texas at Austin, 2015.

UTIG director's circle of excellence recognition, 2015.

Honorary membership of the Society of Exploration Geophysicists (SEG) for extraordinary contributions as a geophysicist, educator and author, 2015.

UTIG director's circle of excellence recognition, 2014.

Distinguished Alumnus award, Indian Institute of Technology (IIT), Dhanbad, 2014.

Recipient of Dr. Hari Narayan award of the Geological society of India, 2013.

Fellow, Geological society of India, 2013.

Recipient of decennial gold medal of the Indian Geophysical Union (IGU), 2012.

Fellow, A. P. Akademi of sciences, 2012.

Recipient of SPG, India Honorary membership, 2012.

UTIG director's circle of excellence recognition, 05/2010

Recipient of John A. and Katherine G. Jackson Chair in Applied Seismology, 09/2007-

Joseph C. Walter Jr. Award for Research Excellence, University of Texas at Austin, 2007

Weeks Endowed Fellow, Dept. of Geological Sciences, The University of Texas at Austin, 09/06-08/07

Recipient of Weeks Endowed Fellowship, Dept of Geological Sciences at the Jackson School of Geosciences, UT Austin.

Fellow of Edwin Allday Centennial Chair in Subsurface Geology, Department of Geological Sciences, The University of Texas at Austin, 01/02–08/03

Recipient of Jackson Endowed Senior Fellowship at the Jackson School of Geosciences, UT Austin, 09/03–08/06

"Free gas and gas hydrate saturation estimation from multi-component seismic data offshore Oregon," Paper by Kumar, Sen, and Bangs awarded an outstanding student paper award at the AGU fall meeting 2004 in San Francisco, California.

"Joint stochastic inversion of pre-stack seismic data and well logs for high-resolution reservoir delineation and improved production forecast." Paper by Varela, Torres-Verdin, and Sen presented at SEG 2003 in Dallas was selected as best paper presented by a student at SEG2003. Recognition was presented during SEG2004 in Denver, Colorado.

"Multilayer AVO inversion using genetic algorithms." Paper by Sen and Stoffa presented at the SEG/EAEG Summer Research Workshop '92, selected the best paper on AVO inversion.

Recipient of SEG Scholarships, 1984-85, 1985-86, 1986-87.

Recipient of ISM silver medal for ranking first in first class in B.Sc. and M.Sc. at Indian School of Mines.

Recipient of J. Watumul Foundation Award for the most outstanding student in Geology and Geophysics at the University of Hawaii, 1986.

Recipient of National Merit Scholarship, Government. of India at the undergraduate level.

PH.D. ADVISOR:

L. N. Frazer, University of Hawaii

PATENT

Sen, M. K., P. L. Stoffa, and F. Liu, 2003, *Angle dependent surface multiple attenuation for two-component marine bottom sensor data*, United States Patent number 6,654,693 granted on 11/25/03.

PUBLICATIONS

Books:

Sen, M. K., and P. L. Stoffa, 1995, *Global Optimization Methods in Geophysical Inversion*, Elsevier Science Publications, Netherlands.

Sen, M. **K**., 2006, Seismic Inversion, *Society of Petroleum Engineers*, USA.

(this book was nominated for Hamilton author award at the University of Texas at Austin).

Sen, M. K., and P. L. Stoffa, 2013, Global Optimization Methods in Geophysical Inversion, Second Edition, *Cambridge University Press*.

Book Chapters:

Sen, M. K., 2020, Seismic, Reflectivity Method, invited contribution, *Encyclopedia of Solid Earth Geophysics*, vol II, Second Edition, Springer, The Netherlands, In press.

Sen, M. K., and P. L. Stoffa, 2020, Inverse Theory: global optimization, invited contribution, *Encyclopedia of Solid Earth Geophysics*, vol I, Second Edition. Springer, The Netherlands, In Press.

Ghosh, R., and **M. K**. **Sen**, 2020, Effective medium modeling of CO2 sequestered carbonate reservoir, in *Petrophysics and rock physics of carbonate reservoirs*, 155-160, Springer Publications.

Sen, **M. K**. and S. Mallick. 2018, Application of Genetic algorithms in Geophysics, in *Application of soft computing and intelligent methods in Geophysics*, Heijan, A., P. Styles, Springer Publications.

Sen, M. K., and L. N. Frazer, 2014, Multi-fold phase space path integral synthetic seismograms, Society of Exploration Geophysicists (SEG) reprint volume on *Seismic Diffraction: Modeling, Observation, and Imaging*, edited by Michael Pelissier, Tijmen Jan Moser, Kamill Klem-Musatov, and Henning Hoeber.

Liu, Y., and **M. K. Sen,** 2012, A hybrid scheme for absorbing edge reflections in numerical modeling of wave propagation, *Numerical modeling of seismic wave propagation: gridded two-way wave-equation methods,* 80, Society of Exploration Geophysicists, Tulsa, USA.

Pecher, I. A., B. Milkereit. A. Sakai, **M. K. Sen**, N. L. Bangs, and J. Huang, 2012, Vertical seismic profiles through gas-hydrate bearing sediments, chapter 8, in Geophysical Characgterization of gas hydrates, ed. M. Riedel, E. WIlloughbuy, and S. Chopra, 121-142.

DeBasabe, J. and **M. K. Sen,** 2012, Stability of the high order finite element methods for acoustic and elastic wave propagation with high-order time-stepping, *Numerical modeling of seismic wave propagation: gridded two-way wave-equation methods*, 65, Society of Exploration Geophysicists, Tulsa, USA.

DeBasabe, J. and **M. K. Sen,** 2012, Grid dispersion and stability criteria of some common finite element methods for acoustic and elastic wave propagation, *Numerical modeling of seismic wave propagation: gridded two-way wave-equation methods,* 52, Society of Exploration Geophysicists, Tulsa, USA.

Liu, Y., and **M. K. Sen,** 2012, An implicit staggered grid finite-difference method, *Numerical modeling of seismic wave propagation: gridded two-way wave-equation methods*, 39, Society of Exploration Geophysicists, Tulsa, USA.

Sen, M. K., 2011, Seismic, Reflectivity Method, invited contribution, *Encyclopedia of Solid Earth Geophysics*, vol II, 1269-1279, Springer, The Netherlands.

Sen, M. K., and P. L. Stoffa, 2011, Inverse Theory: global optimization, invited contribution, *Encyclopedia of Solid Earth Geophysics*, vol I, 625-632. Springer, The Netherlands.

Stoffa, P. L., **M. K. Sen**, R. Seif, and R. Pestana, 2009, Parallel and adaptive pre-stack plane wave migration in *Advanced Computational Infrastructures for Parallel and Distributed Adaptive Applications*, John Wiley and Sons, ed. M. Parashar, 45-63.

Jackson, C., **M. K. Sen,** P. L. Stoffa, and G. Huerta, 2009, Importance sampling for climate model uncertainty estimation: Parallel and adaptive strategies, *Advanced Computational Infrastructures for Parallel and Distributed Adaptive Applications*, John Wiley and Sons, ed. M. Parashar , 65-78.

Filina, I., D. Blankenship, L. Roy, **M. K. Sen**, T. Richter and J. Holt, 2006, Inversion of airborne gravity data acquired over subglacial lakes in East Antarctica, *"Antarctica -Contributions to Global Earth Sciences"*, edited by Dieter Fütterer, Springer Publishing House Springer Berlin Heidelberg, 129-133.

Liu, F., **M. K. Sen**, and P. L. Stoffa, 2005, Dip selective 2-D multiple attenuation operators in plane wave domain, to be published in a special volume on multiple attenuation, SEG publications.

Sena, A. R., P. L. Stoffa, and **M. K. Sen,** 2004**,** Migration of ground penetrating radar data in heterogeneous and dispersive media, in Oluic, M., ed., *New strategies for remote sensing*, 711-719.

Sen, M.K., P.L. Stoffa, R. Seifoullaev, and J. T. Fokkema, 2003, Airborne GPR for the detection of underground facilities, *Subsurface Sensing Technologies and Applications*, 4(1), 41-60.

Sen, M. K., 2001, Prestack inversion of plane wave seismograms: Isotropy to transverse Isotropy, special volume, *Recent advances in Exploration Geophysics*, *RECODER*, *The Canadian Society of Exploration Geophysicists*, 85-96.

Xia, G., **M. K. Sen**, and P. L. Stoffa, 1997, AVO analysis of Mobil offshore data by linearized inversion in the τ-p domain, *AVO inversion of Mobil data*, Society for Exploration Geophysicists Press, Chapter 9, p. 167-185.

Book Reviews:

Sen, M. K., and J. Vamaraju*, 2018, Review of the book *Numerical Simulation in Applied Geophysics* by Juan Santos , The Leading Edge, In press.

Sen, M. K., 2018, Review of the book *Waves and Rays in Seismology* by M. Slawanski, The Leading EDGE, 37(3), 233.

Sen, M. K., 2000, Review of the book *Seismic Inversion and Deconvolution: Dual Sensor Technology* by E. A. Robinson, *EOS*, 81 (32), 368.

Sen, M. K., and P. L. Stoffa, 1996, Review of the book *Wavelets in Geophysics* by Foufoula-Georgiou and Kumar, *Mathematics and Computation*, 65 (213), 449.

Review Article:

Sen, M. K., 2004, Hyderabad: Leveraging Technologies, *The Leading Edge*, 23 (3), 261-268.

Journal Publications:

* student/post-doc

2021

1. Phan, S*., R. Gogoi, R*. Chatterjee, and **M. K. Sen**, 2021, Predicting Porosity, Water Saturation and Shale Volume with High Resolution Seismic Inversion using Hopfield Network: Upper Assam Basin, India, AAPG Bulletin, Accepted.

2020

2. Zhao, Z, and **M. K. Sen**, 2020, A gradient based Markov chain Monte Carlo method for full waveform inversion and uncertainty analysis, Geophysics, Geophysics 86 (1), R15-R30.
3. Tuvi, R., Z.*, Zhao, **M.K. Sen**, 2020, Multi frequency beam-based migration in inhomogeneous medium using windowed Fourier transform frames, Geophysical Journal International, 223 (2), 1086-1099.
4. Vamaraju, J.*, J. Villa, M. Araya-Polo, D. Datta, M. Sidahmed, and **M. K. Sen**, Mini-batch least squares migration in a deep learning framework, Gephysics, 86 (2), 1-61.
5. Silva, R. U*, J. DeBasabe, **M. K. Sen,** M. Gonsalez, E. Gomeza, S. Solorza-Calderon, 2020, Cooperative Full Waveform and Gravimetric Inversion, Journal of Seismic Exploration, 29, 549-573.
6. Vamaraju, J.*, **M. K. Sen**, J. DeBasabe, and M. F. Wheeler, 2020, Hybrid Galerkin finite element approximation for elastic wave propagation in fractured media, Geophysical Journal International, 221, 857-878.
7. Zhang, P*., J. Shiriyev, **M. K. Sen**, and M. M. Sharma, 2020, Fast Inversion of Downhole Electrical Measurements for Proppant Mapping Using Very Fast Simulated Annealing, Geophysics, 85(1), D13-D22.
8. Kumar, D., Z. Zhao, D. J. Foster, D. Dralus and **M. K. Sen**, 2019, Frequency-Dependent AVO Analysis Utilizing Scattering response of a Layered Reservoir, Geophysics, 85 (2), N1-N16.
9. D. J. Foster, D. Kumar, Z. Zhao, D. Dralus and **M. K. Sen**, 2019, Frequency-Dependent AVO Analysis, The Leading Edge, 39(2), 84-91.

2019

10. Datta, D*., **M. K. Sen**, F. Liu, and S. Morton, 2019, Full Waveform inversion of salt models using shape optimization and simulated annealing, Geophysics, 84(5), 1-57.
11. Datta, D*., P. Jaysaval*, **M. K. Sen**, and A. Arnulf, 2019, Fast 2D full waveform modeling and inversion using Schur Complement Approach, Geophysics, 84(5), 1-75.
12. Vamaraju, J.*, and **M. K. Sen**, 2019, Unsupervised neural networks for seismic migration, Interpretation, 7(3), 1-51.

13. Phan, S.*, and **M. K. Sen**, 2019, A Boltzmann machine for high-resolution seismic inversion, Interpretation, 7(3), 1-40.

14. Biswas, R.*, **M. K. Sen**, V. Das, and T. Mukerji, 2019, Pre-stack and post-stack inversion using a physics guided convolutional neural network, Interpretation, 7(3), .

15. Biswas, R.*, A Vassiliou, R Stromberg, **M. K. Sen**, 2019, Estimating NMO velocity using a recurrent neural network, Interpretation, 7(4), 1-76.

16. Zhao, Z. and **M. K. Sen**, 2019, Double plane wave least squares migration in frequency domain, Geophysical Prospecting, 67, 2061–2084.

17. Mishra, P. K.*, G. E. Fasshauer , **M. K. Sen**, and L. Ling, 2019, A stabilized radial basis finite difference method with hybrid kernels. Computers and mathematics with applications, 77(9), 2354-2368.

18. Agrawal, M.,* J. Pulliam, **M. K. Sen**, and S. P. Grand, 2019, Lithospheric removal beneath the eastern flank of the Rio Grande Rift from receiver function velocity analysis, G-cubed, 20, 974-991.

19. Merzilikin, D*., S. Fomel, and **M. K. Sen**, 2019, Least-squares path-summation diffraction imaging using sparsity constraints, Geophysics, 84(3),1-72.

2018

20. Zhang, P*., **M. K. Sen**, M. M. Sharma, J. Gableman, and D. Dlowka, 2018, Modeling of Low-Frequency Downhole Electrical Measurements for Mapping Proppant Distribution in Hydraulic Fractures in Cased hole Wells, SPE Journal. https://doi.org/10.2118/189884-PA

21. Zhao, Z*., and **M. K. Sen**, 2018, Fast image domain target oriented least squares reverse time migration, Geophysics, Geophysics, 83(6), A81-86.

22. Liu, Y., and **M. K. Sen**, 2018, An improved hybrid absorbing boundary condition for wave equation modeling, Journal of Geophysics and Engineering, 15, 2602-2613.

23. Vamaraju, J.*, **M. K. Sen**, J. DeBasabe, and M. F. Wheeler, 2018, Enriched Galerkin finite element approximation for elastic wave propagation in fractured media, Journal of Computational Physics, 372, 726-747.

24. Mishra, P. K.*, S. K. Nath, **M. K. Sen**, and G. E. Fasshauer, 2018. Hybrid Gaussian-cubic radial basis functions for scattered data interpolation, Computational Geosciences, 22(5), 1203-1218.

25. Mandal, B., V. Vijaya Rao, **M. K. Sen**, P. Karuppannan, and D. Sarkar, 2018, Common reflection surface stack imaging of the Proterozoic Chambal Valley Vindhyan basin and its boundary fault in the northwest India: Constraints on crustal evolution and basin formation, Tectonics, 37.

26. Chouhan, M. S*., M. Fedi, and **M. K. Sen**, 2018, Gravity inversion by the MHODE method for investigating salt domes and complex sources, Geophysical Prospecting, doi: 10.1111/1365-2478.12603.

27. Zhang, P*., **M. K. Sen**, M. M. Sharma, J. Gableman, and D. Dlowka, 2018. Mapping proppant distribution in hydraulic fractures in cased boreholes using low frequency downhole electrical measurements, SPE Hydraulic Fracturing Technology.

2017

28. Barone, A.*, and **M. K. Sen**, 2017, A New Fourier AVAz Fracture Characterization Method: Case study in the Haynesville Shale, Geophysics, 83(1),WA101-WA120. *(listed in Geophysics Bright Spots*)

29. Liu, H.*, **M. K. Sen**, K. Spikes, 2017, 3D simulation of seismic wave propagation in fractured media using an integral method accommodating irregular geometries, Geophysics, 83(1),WA121-WA136.

30. Mandal, B., V Vijaya Rao, Dipankar Sarkar, YJ BhaskarRao, S Raju, P Karuppannan, **M. K Sen**, 2017, Deep crustal seismic reflection images from the Dharwar craton, Southern India-Evidence for the Neoarchean subduction, Geophysical Journal International, 212 (2), 777-794.

31. Luo, Chunmei*, **M. K. Sen,** S. Wang, and S. Yuan, 2017, An AVAF inversion method to detect hydrocarbon", Journal of Geophysics and Engineering, 14(5), 1167-1176.

32. Ren, Z.*, Y. Liu, and **M. K. Sen**, 2017, Modeling of the Acoustic Wave Equation by Staggered-Grid Finite-Difference Schemes with High-Order Temporal and Spatial Accuracy, Bulletin of the Seismological Society of America, 107(5), 2160-2182.

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T. Liu, J. D. DeBasabe, and M. K. Sen, 2012, Grid dispersion analysis of triangular grid spectral elements, Copenhagen, Denmark.

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Ghosh, R., and M. K. Sen, 2011, A frequency-dependent fractured poro-elastic effective medium modeling, First international workshop in Rock Physics, Denver, Colorado, USA.

Alhussain, M., Spikes, K., and **M. K. Sen**, 2011, Sensitivity study of fracture parameters in a carbonate oil reservoir, September, SEG San Antonio, USA.

DeBasabe, J., **M. K. Sen**, and M. F. Wheeler, 2011, Seismic wave propagation in fractured media: a discontinuous Galerkin approach, September, SEG San Antonio, USA.

Deng, Z., **M. K. Sen,** U. Wang, X. Bai, and Y. Xue, 2011, Pre-stack PP and PS joint inversion in the same PP time scale, September, SEG San Antonio, USA.

Joy, C, T. Vanorio, and **M. K. Sen,** 2011, A rock physics experiment to differentiate pressure effects and chemical effects on the elastic properties of lower Tuscaloosa sandstone in Cranfield, Mississippi, September, SEG San Antonio, USA.

Phan, S., and **M. K. Sen,** 2011, Reservoir evaluation for CO2 sequestration at Dickman Field, Kansas, SEG annual meeting, September, SEG San Antonio, USA.

Saraswat, P., and **M. K. Sen,** 2011, Artificial immune based self organizing maps for seismic facies analysis, SEG annual meeting, September, SEG San Antonio, USA.

Xue. Y., **M. K. Sen,** and D. Zhiwen, 2011, A mew stochastic inference method for inversion of pre-stack data , September, SEG San Antonio, USA.

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Tao, Y., K. Spikes, and **M. K. Sen,** 2011, Stochastic seismic inversion using both low and high frequency fractal priors , September, SEG San Antonio, USA.

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Sen, M. K., 2011, Some practical aspects of full waveform modeling, invited paper, SEG summer research workshop, Quebec city, Canada.

Y. Xue and **M. K. Sen**, 2011, A new MCMC method for pre-stack seismic inversion, Quebec city, Canada.

S. Phan and **M. K. Sen**, 2011, Stochastic inversion for pre-injection reservoir characterization at Dickman field, Quebec city, Canada.

Liu, Y., and **M. K. Sen,** 2011, Time-space domain finite-difference method with arbitrary even-order accuracy for the 2D acoustic wave equation, June, EAGE Vienna.

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Deng, Z., U. Wang, **M. K. Sen,** Y. He, K. Li, and X. Bai, 2010, A practical approach to mode-converted shear wave velocity analysis from 3C data, SEG annual meeting, October, Denver, USA.

Ye, F., R. H. Tatham, and **M. K. Sen,** , 2010, Anticipated Seismic Responses of the Bakken Formation, East Williston Basin, North Dakota, SEG annual meeting, October, Denver, USA.

Ma, J., **M. K. Sen,** and X. Chen, 2010, OBC Multiple Attenuation Technique Using SRME Theory, North Dakota, SEG annual meeting, October, Denver, USA.

Saraswat, P., and **M. K. Sen,** 2010, Simultaneous stochastic inversion of prestack seismic data using Hybrid Evolutionary Algorithm, SEG annual meeting, October, Denver, USA.

Sil, S., **M. K. Sen,** and B. Gurevich, 2010, On fluid substitution in porous and aligned fractured medium, SEG annual meeting, October, Denver, USA.

Liu, Y., and **M. K. Sen,** 2010, A hybrid absorbing boundary condition for elastic wave modeling with staggered-grid finite difference, SEG annual meeting, October, Denver, USA.

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Tao, Y., **M. K. Sen,** N. Bangs, and T. Hess, 2010, Seismic Inversion for splay fault interpretation in the Nankai Trough accretionary wedge, Japan, SEG annual meeting, October, Denver, USA.

Phan, S., and **M. K. Sen,** 2010, Porosity estimation from seismic data at Dickman Field, Kansas for carbon sequestration, SEG annual meeting, October, Denver, USA.

Srinivasan., and **M. K. Sen,** 2010, Mapping of diagenesis in a carbonate reservoir in the Gulf of Mexico by a stochastic data integration technique, SEG annual meeting, October, Denver, USA.

Sen, M. K., 2010, Inverse problem of reflection seismic data, IEEE conference on Geosciences and remote sensing (IGARSS 2010), Honolulu, HI, July 2010.

Sil, S, **M. K. Sen** and T. M. Smith, 2010, Fluid substitution in an orthorhombic medium, International workshop on seismic anisotropy, Perth, Australia.

Sen, M. K., P. S. Routh, and R. P. Srivastava, 2010, Use of priors and hyper-priors in stochastic inversion for reservoir parameters, SPG bi-annual meeting, Hyderabad, India.

Srinivasan, S., and M. K. Sen, 2010, Modeling diagenetic pathways constrained to seismic impedance data in a carbonate reservoir, SPG bi-annual meeting, Hyderabad, India.

Liu, Y., and M. K. Sen, 2010, 3D acoustic wave modeling with a time-space domain dispersion-relation based finite-difference Scheme, SPG bi-annual meeting, Hyderabad, India.

Saraswat, P**.,** Srivastava , R. P. and **M. K. Sen,** 2010, Particle Swarm and Differential Evolution: Optimization for stochastic inversion of post-stack seismic data, SPG bi-annual meeting, Hyderabad, India.

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Sen, M K., 2009, Use of marine multi-component seismic data in the estimation of elastic properties of shallow sediments, Invited paper to be presented at the workshop on 'multi-component seismic data' at the SEG annual meeting, Houston, TX..

DeBasabe, J., and **M. K. Sen,** 2009, Continuous and discontinuous finite element methods for elastic wave propagation, SEG annual meeting, Houston, TX.

Miah, K. H, and **M. K. Sen,** 2009, Grid dispersion minimization in Green's tensor used in Scattering Integral inversion method, SEG annual meeting, Houston, TX.

Ma, J, **M. K. Sen,** and X. Chen, 2009, Free surface multiple attenuation using inverse data processing in the coupled plane-wave domain: field data example, SEG annual meeting, Houston, TX.

Sil, S., R. P. Srivastava, and **M. K. Sen,** 2009, Observation of azimuthal anisotropy on multi-component Atlantis node seismic data, SEG annual meeting, Houston, TX.

Srivastava , R. P. and **M. K. Sen,** 2009, Stochastic pre-stack seismic inversion using fractal prior, SEG annual meeting, Houston, TX.

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Sena, A, **M. K. Sen,** P. L. Stoffa, R. Seif and L. Jin, 2009, Joint inversion of time-lapse seismic and production data using VFSA with Local Thermal Regulation and pilot point parameterizatios, SEG annual meeting, Houston, TX.

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Smith, D. R., **M.K. Sen** and R.J. Ferguson, 2009, Optimized Regularization and Redatuming by Conjugate Gradients, EAGE meeting, Amsterdam, The Netherlands.

Yang Liu and **M. K. Sen,** 2009, 2D acoustic wave equation modeling with a new high-accuracy time-space domain finite-difference stencil, EAGE meeting, Amsterdam, The Netherlands.

Yang Liu and **M. K. Sen**, 2009, A new time-space domain high-order finite-difference method for acoustic wave equation, SEG Beijing meeting, Beijing, China.

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M. K. Sen and S. Srinivasan 2008, Reservoir modeling accounting for scale and precision of seismic data: application to a carbonate reservoir, *Invited paper:* Workshop on data integration, SEG Annual meeting, Las Vegas, NV.

DeBasabe, J., **M. K. Sen**, and M. F. Wheeler, 2008, Grid dispersion of discontinuous Galerkin method for elastic wave propagation, SEG Annual meeting, Las Vegas, NV.

Hong, T., and **M. K. Sen**, 2008, Joint Bayesian Inversion for Reservoir Characterization and Uncertainty Quantification, SEG Annual meeting, Las Vegas, NV.

J. Ma, **M. K. Sen**, and X. Chen, 2008, Multiple Attenuation Using Inverse data processing in the plane-wave domain, SEG Annual meeting, Las Vegas, NV.

L. Jin, **M. K. Sen**, and P. L. Stoffa, 2008, One-dimensional full waveform inversion using ensemble Kalman filter, SEG Annual meeting, Las Vegas, NV.

P. Routh, **M. K. Sen**, D. Whitmore and P. Anno, 2008, Inversion Using Bayesian Hyper-Prior Formulation for Sharp Boundaries, SEG Annual meeting, Las Vegas, NV.

S. Sil, S. Sriivasan, **M. K. Sen**, Jaime J. Ríos López and Madain Moreno Vidal , 2008, Markov Bayes Simulation for structural uncertainty estimation, SEG Annual meeting, Las Vegas, NV.

M. K. Sen and N. Vedanti**,** 2008, Seismic Inversion tracks in-situ combustion: 4D seismic at the Balol field, India, paper no. SPE-116600-PP, Society of Petroleum Engineers' annual technical convention, Denver, Colorado.

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S. Sil and **M. K. Sen,** 2007, A new NMO equation for HTI medium, Proceedings of the national seminar on modern trends in geophysical sciences and techniques, Indian School of Mines, Dhanbad, 24-28.

A. Gangopadhyay, J. Pulliam and **M. K. Sen,** 2007, A Modeling of S, Sp, SsPmP and shear-coupled PL waveformsfor the crust and upper mantle velocity structure, Proceedings of the national seminar on modern trends in geophysical sciences and techniques, Indian School of Mines, Dhanbad, 60-65.

U. Dutta, **M. K. Sen,** N. Biswas and Z. Yang**,** 2007, Waveform inversion of local earthquake data from Delaney Park Downhole Seismic Array, Anchorage, Alaska, Proceedings of the national seminar on modern trends in geophysical sciences and techniques, Indian School of Mines, Dhanbad, 71-75.

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van der Neut, J, R. K. Shaw, and **M. K. Sen**, 2007, Estimation of the fluid indicator from AVO gradient variations with azimuth at arbitrary fracture sets s, SEG Annual meeting, San Antonio.

Sil, S., and **M. K. Sen** 2007, Azimuthal tau-p analysis in HTI media, SEG Annual meeting, San Antonio.

Young, R., and **M. K. Sen** 2007, A comparison of porosity estimates obtained using post, partial, and prestack seismic inversion methods: Marco Polo Field, Gulf of Mexico, SEG Annual meeting, San Antonio.

Routh, P., L. Qiu, **M. K. Sen**, and P. Anno, 2007, Inversion for non-smooth models with physical bounds, SEG Annual meeting, San Antonio.

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Jin, L., **M. K. Sen**, P. L. Stoffa, and R. Seif, 2007, Optimal Model Parameterization in Stochastic inversion for reservoir properties using time-lapse seismic and production data, SEG Annual meeting, San Antonio.

Jin, L., **M. K. Sen**, T. Hong, and P. L. Stoffa, 2007, Joint estimation of porosity and saturation by combining a rock physics model and constrained pre-stack seismic waveform inversion, SEG Annual meeting, San Antonio.

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Chaoshun, H., **M. K. Sen**, P. L. Stoffa, and K. McIntosh, 2007, Plane wave pre-stack Gaussian beam depth migration, Expanded abstract, SEG Annual meeting, San Antonio.

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Kumar, C., **M. K. Sen**, and R. J. Ferguson, 2006, Travel time sensitivity analysis for parameter estimation in TI media, EAGE conference, Vienna, Austria.

M. K. Sen, and P. L. Stoffa, 2006, True Amplitude Migration-Inversion in Phase Space, SPG meeting, Kolkata, India.

Roy, A., and **M. K. Sen**, 2006, Modeling of Deep Structures of Andaman Subduction Zone from Satellite Gravity Data, SPG meeting, Kolkata, India.

Shaw, R. K., and **M. K. Sen**, and A. Chatterjee, 2006, Estimation of dip of oblique fractures using AVOA analysis, SPG meeting, Kolkata, India.

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Stoffa, P. L., **M. K. Sen**, R. Seifoullaev, R. Pestana, and J. Fokemma, 2005, Double Plane Wave Kirchhoff Depth Migration, SBGF annual meeting, Salvador, Bahia, Brazil.

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Stoffa, P. L., **M. K. Sen**, R. Seifoullaev, H. Klie, X. Gai, W. Bangerth, J. Rungamornrat and M. F. Wheeler, 2005, An analysis of flow-simulation scales and seismic response, SEG annual meeting, Houston, Texas.

X. Gai, J. Rungamornrat, H. Klie, W. Bangerth, M. F. Wheeler, P. L. Stoffa, **M. K. Sen**, R. Seifoullaev, 2005, Fully integrated reservoir flow, geomechanics, and seismic modeling: A tool for better

reservoir characterization and geomechanical prediction from 4D seismic, SEG annual meeting, Houston, Texas

Mallick, S., D. Gillespie, and **M. K. Sen**, 2005, Azimuthal reflectivity and quantitative evaluation of anisotropy parameters from seismic data: a feasibility study, SEG annual meeting, Houston, Texas.

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J. vanGestel**,** P. L. Stoffa**,** and **M. K. Sen**, 2000, Migration of GPR data, presented at the *70th Annual International Society of Exploration Geophysicists Meeting and Exposition*, Houston, Texas.

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Sen, V., **M. K. Sen** and P. L. Stoffa, 1996, Parallel algorithms for automatic estimation of seismic velocities, Final Report UTIG Technical Report TR-147 to Cray Research Inc.

Sen, M. K., P. L. Stoffa, and C. Calderón-Macías, 1995, Velocity analysis and seismic processing using neural network, Final report UTIG Technical Report TR-135 to Cray Research Inc.

Tanis, M. C., A. W. Mulder, P. L. Stoffa, **M. K. Sen**, and J. T. Fokkema, 1995, Pre-stack split-step Fourier depth migration in the p_O-p_S domain, UTIG Technical Report TR-133.

Sen, M. K., 1991, Deep structural complexity and site response in Los Angeles basin, USGS open-file report.

SUMMARY OF STUDENT ACTIVITIES:

CURRENT STUDENTS

MRINAL K. SEN
Supervisor (Current)

227. Anthony Barone, PhD student, DGS
228. Son Phan, PhD student, DGS
229. Xin Liu, PhD student, DGS
230. Ricardo DeBreganza, PhD student, DGS
231. Arnab Dhara, PhD student, DGS
232. Dimitri Voytan, PhD student, DGS
233. Cameron DeFabry, PhD student, DGS

PAST STUDENTS

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1. **Jackson Tomski, MS Fall 2020,** DGS, UT Austin
2. **Raul Silva (co-supervision with Jonas DeBasabe), PhD, Fall 2020,** CICESS, Mexico
3. **Reetam Biswas, PhD Fall 2019**, DGS, UT Austin
4. **Janaki Vamaraju**, **PhD Fall 2019**, DGS, UT Austin
5. **Badr A. Alulaiw, PhD Fall 2018**, DGS, UT Austin
6. **Hala Alqatari, MS Fall 2018**, DGS, UT Austin
7. **Pedro Alejandro**, **MS, Spring 2018**, DGS, UT Austin
8. **Debanjan Datta, PhD, fall 2017**, DGS, UT Austin
9. **Han Liu (co-supervision with Kyle Spikes),** Spring 2016, PhD, DGS, UT Austin
10. **M. Chauhan (co-supervision with Prof. Maurizio Fedi) , Fall 2017, PhD, University of Naples Federico, Italy**.
11. **P. K. Mishra (co-supervision with Prof. S. K. Nath), Fall 2017, PhD, Indian Institute of Technology, Kharagpur, India.**
12. **Pan Bei, PhD Spring 2016**, **China University of Geosciences, Wuhan**, *Estimation of fluid factor in fractured media from multi-component seismic data (Exchange PhD Student)*
13. **Qi Ren, PhD Spring 2016, UT-DGS,** *Seismogram synthesis, imaging, and rock physics for reservoir characterization*
14. **Zeyu Zhao, PhD Spring 2016, UT-DGS,** *Double plane wave reverse time migration*
15. **Biswajit Mandal, PhD Spring 2014, NGRI, India,** *Velocity-independent imaging of DSS data*
16. **Yang Xue, PhD Fall 2013, UT-DGS,** *Seismic inversion for reservoir characterization and monitoring*

17. **Kumar Das, MS Spring 2013, UT-DGS,** *Seismic inversion and estimation of hydrate saturation*
18. **Mohammed Alhussain, PhD Spring 2013, UT-DGS,** *Overbuden removal and new AVOA method for fracture characterization*
19. **Yi Tao, PhD Fall 2012, UT-DGS,** *Seismic interferometry and full waveform inversion in plane wave domain.*
20. **Corey Joy, MS Summer 2011, UT-DGS,** *Effective medium modeling of carbon sequestered reservoirs.*
21. **Son Phan, MS Spring 2011, UT-DGS,** *Uncertainty in reservoir parameter estimation,*
22. **Ma Jitao, PhD Spring 2009, China University of Petroleum,** *Multiple attenuation in plane wave domain.*
23. **Jonas De Basabe, PhD Spring 2009, Computational and Applied Math,** *Numerical Simulation of Elastic Wave Propagation*
24. **Samik Sil, PhD Spring 2009, UT-DGS,** *Two-way travel time analysis for seismic reservoir characterization*
25. **Tao Liu, Exchange PhD Student 2009, Beijing University, Dept of Geophysics,** *Hybrid finite difference-finite element of seismic wave propagation.*
26. **Daniel Smith, MS Fall 2008, UT-DGS,** *Seismic Trace Regularization and Datuming*
27. **Abdul Aziz Al-Aslani, MS Summer 2008, UT-DGS,** *Post-stack and pre-stack inversion for porosity estimation of carbonate reservoirs*
28. **Tiancong Hong, PhD Summer 2008, UT-DGS,** *MCMC Algorithm, Integrated 4D Seismic Reservoir Characterization and Uncertainty Analysis in a Bayesian Framework*
29. **Sanjay Sood, MS Fall 2007, UT-DGS,** *Estimation of Q from seismic refractions data*
30. **Reeshidev Bansal, PhD Spring 2007, UT-DGS,** *Seismic Characterization of Naturally Fractured Rerservoirs*
31. **Gregory Russell Young, MS Spring 2007, UT-DGS,** *Effective Porosity Estimation from 3D Seismic: Marco Polo Field*
32. **Dhananjay Kumar, PhD Spring 2005, UT-DGS,** *Analysis of multicomponent seismic data from the Hydrate Ridge, offshore Oregon*
33. **Jiao Xue, PhD (Visiting Student), China University of Geosciences,** *Anisotropy parameter estimation and inversion for reservoir characterization*
34. **Adam Allan, BS Fall 2009 (Dec) Honors Program, DGS-UT (Undergraduate),** *Regularization methods*
35. **Chandan Kumar, PhD Fall 2006, UT-DGS,** *Stress estimation from fault plane reflection coefficient,*
36. **Joost Van der Noot, Exchange MS Student 2005, Applied Geophysics, Delft University of Technology, Netherlands,** *Stress induced anisotropy*
37. **Armando Sena, PhD Fall 2004 (Dec), UT-DGS,** *Imaging and analysis of GPR data*
38. **Heidi Poot, Exchange PhD Student 2003, Applied Geophysics, Delft University of Technology, Netherlands,** *Imaging methods for acoustical data.*
39. **Chengshu Wang, PhD Summer 2003 (Aug), UT-DGS,** *Velocity estimation of gas hydrate.*
40. **Gijs Meek, Exchange MS Student 2003, Mining Engr and Applied Geophysics, Delft University of Technology, Netherlands,** *Integrated subsurface modelling,*
41. **Anubrati Mukherjee, PhD Spring 2002 (May), UT-DGS,** *Seismic Processing in transversely isotropic media: A tau-p approach.*
42. **Abdul-Aziz Saleh Alaslani, PhD Fall 2001 (Dec), UT-DGS,** *Developing, testing, and evaluating wave equation based multiple removal methods for marine seismic data.*
43. **Saleh Mohammad Al-saleh, MS Summer 2001 (Aug), UT-DGS,** *Processing of ocean bottom cable data.*
44. **Faqi Liu, PhD Summer 1999 (Aug), UT-DGS,** *Free surface multiple elimination operators and their applications.*
45. **Mehmet Tanis, PhD Fall 1989 (Dec), UT-DGS,** *A Comparison of Migration Methods in Laterally*

Varying Media.

46. **Ganyuan Xia, PhD Summer 1997 (Aug), UT-DGS,** *Prestack Migration and Inversion.*
47. **Carlos Calderon-Macias, PhD Summer 1997 (Aug), UT-DGS,** *Feedforward NN, Hopfield network and mean field annealing in seismic waveform inversion.*
48. **Faruq Akbar, PhD Summer 1997 (Aug), UT-DGS,** *Three-dimensional prestack plane-wave Kirchhoff depth migration in laterally varying media.*
49. **Eddy Luhurbudi, MA Spring 1997 (May), UT-DGS,** *Traveltime calculation in 3-D.*
50. **Raghu Chunduru, PhD Spring 1996 (May), UT-DGS,** *Hybrid linear/nonlinear inversion of geophysical data.*
51. **Setiyono Kriyanti, MS Fall 1996 (May), UT-DGS,** *Comparison of Multiple Elimination Methods*

POST-DOCTORAL AND VISITING SCIENTISTS SPONSORED

1. **Ram Tuvi,** January 19-
2. **Pankaj Mishra,** July 18 -
3. **Xiaohui Cai,** October 17-
4. **Piyoosh Jaisval,** July 16-
5. **Zeyu Zhao,** Jan 16-Nov 18
6. **Debanjan Datta,** Jan 18-October 2018.
7. **Chunmei Luo**, Oct 15-Oct 16
8. **Maheswar Ojha,** Jan 15-April 15
9. **Dr. Rui Zhang,** Jan 11 - Sep-13
10. **Dr. Ranjana Ghosh,** Apr-11 – Mar-13
11. **Dr. Deng Zhiwen,** Mar-10 - Sep-11
12. **Dr. Jonas DeBasabe,** Apr-09 - Sep-11
13. **Dr. Ma Jitao,** Sep-09 - Mar-10
14. **Puneet Saraswat,** Jul-10 - Aug-10(Undergrad from ISM Dhanbad) ISM Dhanbad
15. **Prof. Utpal Dutta**, Jun-07 - Aug-10, (Summers 2007-2010) University of Alaska
16. **Prof. Yang Liu**, Sep-08 - Aug-09, China University of Petroleum
17. **Dr. Adrian Ciuciavara**, Jan-08 - May-09
18. **T. Vikranth Babu**, Jun-09 - Jul-09, (Undergrad from IIT Madras) IIT Madras
19. **Dr. Ravi Srivastava**, Mar-08 - May-09
20. **Dr. Armando Sena**, Oct-07 - Jun-09
21. **Dr. Jin Long**, May-06 - Sep-08
22. **Dr. A. Pal**, May-06 - Apr-08
23. **Dr. Abhijit Gangopadhyay,** Jan-06 - Oct-07
24. **Dr. Nimiisha Vedanti**, May-07 - Apr-08
25. **S. Rajput**, Dec-06 - Feb-07
26. **Joost van der Noot**, Jan-06 - Apr-06
27. **S. Rajput**,Oct-06 – Nov-06 , Visiting Graduate Student NGRI India
28. **Dr. Utpal Dutta**, Jul-05 - Jul-05
29. **Dr. Murthi Guddati,** Jun-04 - Jul-04, Asst. Prof., University of North Carolina
30. **Dr. Y. Xia**, Jan-02 - Dec-03
31. **Dr. Qiaozhen Mu**, Jan-02 - Dec-03, Post-doctoral Fellow
32. **Dr. Wulfgang Bangerth**, Sep-03 - May-05, Post-doctoral Research Fellow (joint position Institute for Computational Engineering and Sciences (ICES) and UTIG
33. **Dr. Indrajit G. Roy,** Nov-00 - Aug-03
34. **Dr. Zhan Wu**, Sep-03 - May-04
35. **Dr. Ranjit K. Shaw**, Jun-02 - May-03
36. **Dr. Lopamudra Roy**, Jun-02 - May-03
37. **Prof. Robert Nowack**, Feb-01 - March-01, Visiting Scientist Purdue University

38. **Prof. Milton Porsani**, Jan-01 - Feb-01, Visiting Scientist
39. **Dr. J. Pestana**, Sep-98 - Aug-99
40. **Dr. Farup Akbar**, Jul-97 - Sep-98
41. **Dr. Roustam Seif**, Sep-98 - Aug-04 , Research Fellow Programmer
42. **Dr. Jay Pulliam**, Jan-95 - Aug-97, Post-doctoral Fellow
43. **Dr. R. Phillip Bording**, Aug-95 - Jul-97

INVITED LECTURES:

2020

"Machine Learning based Methods for Seismic Imaging", Seismic Imaging Workshop, China University of Petroleum, China, December 2020.

"Physics-based and Physics-assisted machine learning for Geophysical applications", REPID, CNPC, Beijing, China, October 2020.

"Seismic characterization of Shale Reservoirs", key-note speech (online) in the conference on 'unconventional resources' organized by UTPB and UPES, June 2020.

"Machine Learning and Data Analytics: A new technology for Geosciences, Foundations day lecture (online), Wadia Institute of Himalayan Geology, India, June 2020.

2019

"Neural network based optimizers for seismic imaging", Shell workshop on machine learning for seismic imaging and reservoir characterization, Shell research center, Amsterdam, The Netherlands, October 2019.

"A Boltzmann machine for seismic inversion", Key-note talk, SEG workshop on seismic reservoir characterization, SEG Annual meeting, San Antonio, September 2019

"Physics-based and Physics-assisted machine learning for Geophysical applications", One hour micro learning short course lecture, Exxon-Mobil Research Center, Spring, TX, August 2019.

"Trans-dimensional seismic inversion", Exxon-Mobil Research Center, Spring, TX, August 2019.

"Physics-based and Physics-assisted machine learning for Geophysical applications", One hour micro learning short course lecture, first ENERGY IN DATA conference organized by SEG, AAPG and SPE, Austin, TX, June 2019.

2018

"Physics-based and Physics-assisted machine learning for Geophysical applications", Keynote speech, Indian Geophysical Union (IGU) annual meeting, Bhopal, India, December 2018.

"Trans-dimensional Full waveform inversion", INFORMS annual meeting, Phoenix, Arizona, November 2018.

"Trans-dimensional Full waveform inversion", 2018 Chevron FWI workshop, Houston, TX, November 2018.

"Trans-dimensional Full waveform inversion", SEG workshop on *recent advances in full waveform inversion*, SEG annual conference, Anaheim, California, October 2018.

"Trans-dimensional Full waveform inversion", University of Houston Departmental seminar, Houston, TX, October 2018.

"Trans-dimensional Geophysical Inversion and Uncertainty Quantification", Indian Institute of Technology, Dhanbad, India, June 2018.

"Seismic waves and hazard", Geological Society of Mizoram meeting, Aizawl, Mizoram, India, June 2018.

"Trans-dimensional Geophysical Inversion and Uncertainty Quantification", Exxon-Mobil, Houston, May 2018.

2017

"Trans-dimensional Geophysical Inversion and Uncertainty Quantification", Electrotek and Geomatics Endowed Lecture (Gold medal of the Indian Geophysical Union), Indian Institute of Technology, Bombay, India, December 2017.

"DAS: A new tool for subsurface monitoring", Academy of Scientific and Industrial research, National Geophysical Research Institute, Hyderabad, India, December 2017.

"Trans-dimensional Geophysical Inversion", Keynote lecture at the Indian Geophysical Union, Hyderabad, India, December 2017.

"Time-lapse seismic monitoring of reservoirs", Department of Geological Sciences, Baylor University, Texas, October 2017.

"Machine leaning applications in Geophysics", Anadarko Corporation, Houston, TX, October 2017.

"Seismic modeling of a fractured reservoir", Apache Corporation, Houston, TX, May 2017.

"FWI & Seismic modeling of a fractured reservoir", Chevron R&D, Houston, TX, May 2017.

"Global Optimization for geophysical inversion", NSF workshop on 'mathematics for oil and gas exploration and production', Institute of Pure and Applied Mathematics, UCLA, March 2017.

"Uncertainty quantification in Geophysics", NSF workshop on 'mathematics for oil and gas exploration and production', Institute of Pure and Applied Mathematics, UCLA, March 2017.

2016

"Modeling of seismic wave propagation in fractured media", IA meeting, CSM, ICES, UT Austin, October 2016.

"Seismic modeling of a fractured reservoir", keynote lecture, International workshop on seismic anisotropy 17, Horseshoe Bay, September 2016

"Geophysical characterization of a shale gas reservoir", Indian Institute of Technology (ISM), Dhanbad, India, July 2016

"Full waveform inversion", CNPC, Beijing, China, July 2016.

"Full waveform inversion", China university of Petroleum, Beijing, China, July 2016.

"Seismic Inversion for reservoir characterization", China university of Petroleum, Qingdao, China, July 2016.

"Strategies for full waveform inversion", Computational Energy Day workshop, Institute of computational engineering and sciences, UT Austin, February 2016.

2015

"Mitigation of cycle skipping in full waveform inversion", Chevron FWI workshop, Houston, TX, December 2015.

"Starting models in full waveform inversion: global optimization approach", SEG post-conference workshop, New Orleans, LA, October 2015.

"Full waveform modeling and inversion", Statoil, Bergen, Norway, May 2015.

"Stochastic inversion of Cana field data", Cimarex Tulsa, Oklahoma, April 2015.

"Trans-dimensional seismic inversion", Geophysical Society of Houston symposium honoring Leon Thomsen, March 2015

"Pushing the limits of seismic resolution", Department of Geological Sciences, The University of Texas at El Paso, March 2015.

"Inversion of time-lapse seismic data", Indian School of Mines, Dhanbad, February 2015.

2014

"Recent results from seismic waveform inversion", Exxon Research, Houston, TX, December 2014.

"Hybrid optimization methods for full waveform inversion", Chevron Research, Houston, TX, September 2014.

"Hybrid optimization methods for full waveform inversion", Hess corporation, Houston, TX, July 2014.

"Full wavefield modeling and inversion", AGU-SEG summer research workshop, Vancouver, Canada, July 2014.

"Critical aspects of numerical simulation of seismic wave propagation", Lawrence Livermore National Laboratory, California, May 2014.

"Critical aspects of numerical simulation of seismic wave propagation", International Conference on theoretical and computational acoustics, Texas A&M University, College Station, March 2014.

"Seismic fracture characterization", PEMEX oil company, Viallehermosa, Mexico, February, 2014.

"Subsurface Imaging: Challenges and Opportunities", INSPIRE Lecture, University of Tirupati, January, 2014.

2013

"Bayesian Geophysical Inversion: imposing constraints and uncertainty quantification", keynote lecture, international conference statistics 2013, C. R. Rao institute of advanced mathematics, computer science and statistics, University of Hyderabad, December 2013.

"Fundamantals of forward and inverse problems in Geophysics", short course on mathematical geosciences at Wadia Institute of Himalayan Geology, December 2013.

"Uncertainty quantification in Geophysics", short course on mathematical geosciences at Wadia Institute of Himalayan Geology, December 2013.

"Pushing the limits of seismic resolution", Cairn Energy Technology Forum 2013, Delhi, India, December 2013.

"Critical aspects of full waveform modeling and inversion", Petronas, Kuala Lampur, Malayasia, November 2013.

"Seismic inversion for reservoir characterization", Technical University of Petronas, Kuala Lampur, Malayasia, November 2013.

"Fundamentals of seismic interferometry", Department of Applied Geophysics, ISM, Dhanbad, India, November 2013.

"Large scale data integration: challenges in seismic imaging", Keynote lecture, Geological society of India annual meeting, ISM Dhanbad, India, November 2013.

"Shale gas: how can geophysics help?", Keynote lecture, Coal mine planning and development institute, Ranchi, India, November 2013.

"Geophysics for subsurface mapping", Dr. S. Balakrishna Endowment Lecture, A.P. Akademi of sciences, Nalgonda, India, October 2013.

"Seismic fracture characterization", Dr. Hari Narayan Memorial Lecture, Association of Exploration Geophysicists, Delhi, India, October 2013.

"Subsurface Imaging: Challenges and Opportunities", S. N. Singh memorial lecture, Indian society of paleontologists, Lucknow, India, September 2013.

"Subsurface Imaging: Challenges and Opportunities", Birbal Sahani Institute of paleobotany, Lucknow, India, September 2013.

"Uncertainty Quantification in Geophysics", BRGM, Orleans, France, August, 2013.

"Details in Sparsity?", Gujrat State Petroleum Corporation, Gandhinagar, Gujrat, India, July 17, 2013.

"Details in Sparsity?", Institute of Seismological Research, Gandhinagar, Gujrat, India, July 17, 2013.

"Full waveform inversion: a large scale inverse problem", Workshop on modeling and inversion of electromagnetic waves, NGRI, Hyderabad, India, July 8, 2013.

"Joint inversion of disparate geophysical datasets: A game theoretical approach", IGU workshop at Wadia Institute of Himalayan Geology, Dehradun, India, June 11, 2013.

"Uncertain Uncertainty?", University of Hyderabad, Hyderabad, India, April 17, 2013.

"Uncertain Uncertainty?", Physical Research Laboratory Colloquium, Ahmedabad, India, April 2, 2013.

"Subsurface imaging: challenges and opportunities", Physical Research Laboratory, Ahmedabad, India, April 2, 2013.

"Estimation of fracture parameters from seismic data", Society of Petroleum Geophysicists – Baroda chapter, Baroda, India, April 1, 2013.

"Seismic Reservoir Characterization", CEWELL Oil and Natural Gas Corporation, Baroda, India, April 1, 2013.

"Geophysical Investigation of Impact craters", J. B. Auden Lecture, Wadia Institute of Himalayan Geology, March 18, 2013.

"Geophysical Investigation of Impact craters", Key note speech at the DST conference on exploration geophysics, Osmania University, Hyderabad, March 14, 2013.

"Geophysical Investigation of Impact craters", PLANEX conference, Hyderabad, India, Jan 11, 2013.

“Subsurface Imaging”, Indian Science Congress, Kolkata, India, Jan 6, 2013.

2012

"Computational methods for subsurface investigation" Indian National Science Academy annual meet, Pune, India, Dec 27, 2012.

"Challenges and opportunities in subsurface imaging", K. D. Malaviya Memorial Lecture, KDM Institute of petroleum exploration, ONGC, Dehradun, Dec 18, 2012.

"Seismic inversion for thin bed resolution", Indo-Norwegian conference on CO2 sequestration, Hyderabad, India, Nov. 26, 2012.

"Uncertainty quantification in Geophysics", A.P akademi of Sciences annual meeting, Hyderabad, Oct 24, 2012.

"Uncertainty quantification in Geophysics", Indian Geophysical Union (IGU) decennial gold medal award lecture, Oct 29, 2012.

"Challenges and opportunities in subsurface imaging", First Prof. R. S. Mithal Memorial Lecture, Indian Institute of Technology, Roorkee, Oct 5, 2012.

"The fourth paradigm of seismic imaging", Wadia Institute of Himalayan Geology, India, Aug 27, 2012.

"Dharawar Craton: where is the Moho?" CSIR-NGRI, Hyderabad, India July 24, 2012.

"The fourth paradigm of subsurface imaging", Dr. M. G. Krishna Endowed lecture, Andhra University, Vishakhapattanam, India, July 16, 2012

"Accuracy of finite difference and finite element methods for numerical simulation of seismic wave propagation", Invited Lecture, SINTEF and NTNU, Trondheim, Norway, June 1, 2012.

"Subsurface Imaging: challenges and opportunities", Invited Lecture, Nartional Institute of Oceanography, Goa, India, May 4, 2012.

"Subsurface Imaging: challenges and opportunities", Institute Lecture, Indian Institute of Technology, Kanpur, India, April 9, 2012.

"Subsurface Imaging: challenges and opportunities", Indian Institute of Geomagnetism, Mumbai, India, April 2, 2012.

"Metaheuristics for uncertainty quantification in Gephysics", Dept of Civil Engg, Indian Institute of Sceiences, Bangalore, India, March 25, 2013.

"Some critical issues related to numerical simulation of seismic wave propagation", Key-note talk, SPG Hyderabad, India, February 2012.

"Subsurface imaging: a cross-displiniary science", key-note speech, SPG, Hyderabad, India, February 2012.

"Subsurface imaging: a cross-displiniary science", key-note speech, Indian society of applied geochemists annual conference at Banaras Hindu University, Varanasi, India, February 2012.

"Sub-basalt Imaging", One-day short course taught at Kolkata for SPG,India, February 2012.

"Full waveform Inversion", one day short course taught at GEO 2012 Bahrain for SEG, February 2012.

"Seismic Inversion for reservoir characterization", Osmania University, Hyderabad, India, February 2012.

"High performance computing in geosciences" Center for mathematical modeling and computer simulations, Bangalore, India, February 2012.

"Numerical methods for ground motion simulation: critical aspects", Indo-US joint workshop on intra-plate earthquakes, Seismological Research Institute, Gandhinagar, India, January 16, 2012.

"Possible M9 earthquake at Kashmir valley – critical comments", Ministry of Earth Sciences, New Delhi, India, January 2012.

"Global energy demand", Key-note speech, Indian Mineral Congress, Indian School of Mines, Dhanbad, India, January 2012.

2011

"Seismic inversion and Uncertainty Quantification for reservoir characterization", Cairn Energy, Gurgaon, India, December 9, 2011.

"Challenges in computational seismology: 4^{th} paradigm of subsurface imaging", National Geophysical Research Institute Golden Jubilee, Hyderabad, India, October 12, 2011.

"Some practical aspects of numerical simulation of seismic wave propagation", Exxon-Mobil Research Center, Houston, TX, August 2011.

"Some practical aspects of numerical simulation of seismic wave propagation", BP Research Center, Houston, TX, August 2011.

"Meta-heuristics for uncertainty characterization in geophysical inversion", key-note speech in the session on soft-computing applications in geophysics, AOGS 2011 conference Taipei, Taiwan, August 2011.

"Computational methods for forward and inverse problems of seismology", Indian School of Mines, Dhanbad, India, August 2011.

"Seismic methods for subsurface characterization", Central institute of mining and fuel research, Dhanbad, India, August 2011.

"Computational methods for forward and inverse problems of seismology", Indian Institute of Science Education and Research, Kolkata, India, August 2011.

"Seismic Inversion: computational challenges", National Geophysical Research Institute, India, July 2011.

"Critical issues related to numerical simulation of wave propagation", SEG summer research workshop, Quebec City, Canada, June 2011.

"On some practical aspects of numerical simulation of seismic wave propagation", KAUST-IAMCS workshop on Multi-scale modeling, Advanced discretization techniques, and simulation of wave propagation, King Abdullah University of Science and Technology, May 2011.

"Full waveform inversion for reservoir characterization", BGP Chinese National Oil Comapany, Beijing, China, March 2011.

"Wave propagation in fractured porous media", China University of Petroleun, Beijing, China, March 2011.

"Use of priors and hyper-priors in seismic inversion", workshop on seismic exploration: current status and future directions, King Abdullah University of Science and Technology, Jan 2011

.

2010

"Inverse methods, geostatistics and neural networks for seismic reservoir characterizartion", SPG Dehradun India, Dec 2010.

"Seismic inversion for reservoir characterization: some critical issues", Department of Geophysics, Stanford University, May 2010.

"Use of prior and hyper-prior in seismic inversion for reservoir characterization", Key-note speech, SPG Conference Hyderabad, India, February 2010.

"Role of scientific societies in promoting science and technology", Key-note speech, SPG Conference Hyderabad, India, February 2010.

2009

"Use of marine multi-component seismic data in the estimation of elastic properties of shallow sediments", Invited paper presented at the workshop on 'multi-component seismic data' at the SEG annual meeting, Houston, TX, November, 2009.

"Use of prior and hyper-prior in seismic inversion for reservoir characterization", EGS seminar, UT Austin, October 2009.

"Seismic Inversion" One week short course taught at China University of Petroelum, Beijing, China.

"Seismic Inversion: critical issues", Beijing University, Department of Geophysics, September, 2009

"Shale-gas productivity", SPG North American Chapter Luncheon talk at the University of Houston, July 2009.

"Seismic inversion of Bossier sand data", Anadarko Petroleum Company, Houston, June 2009

"AVO, simulataneous inversion, and full waveform inversion", Whiting Oil Company, Denver, Colorado, June 2009.

"Seismic Inversion for reservoir characterization," TOTAL Research Center, Pau, France, May 2009

"Seismic Interferometry" Indian Institute of Technology, Mumbai, India, May 2009.

"Barnett Shale: Geology, Geophysics, and production engineering issues", EDGER Forum, Austin, TX, February 2009.

"Seismic inversion of time-lapse data from a heavy oil field", EDGER Forum, Austin, TX, February 2009.

2008

"Seismic Interferometry," Geodata Processing and Interpretation Center, Dehradun, ONGC, India, Dec. 2008.

"Density Estimation from seismic reflection data" Reliance India Limited, Mumbai, India, Aug. 08.

"Recent advances in seismic inversion technology," Society of Petroleum Geophysicists, Mumbai, India, Aug. 2008.

"Joint inversion of seismic and fluid flow data for dynamic reservoir characterization," Aramco EXPEC advanced research center, Daharan, Saudi Arabia, July 08.

"Inverse Methods, Geostatistics and Neural Networks for Geophysical Analysis" Aramco EXPEC advanced research center, Daharan, Saudi Arabia, July 08.

"Recent Developments in Inversion Technology," Aramco EXPEC advanced research center, Daharan, Saudi Arabia, July 08.

"Seismic Modeling and amplitude versus azimuth in fractured media" Aramco EXPEC advanced research center, Daharan, Saudi Arabia, July 2008.

"Recent advances in seismic inversion technology," Exxon Production and Research, Houston, TX, June 2008

"Joint inversion of seismic and fluid flow data for dynamic reservoir characterization," Chevron Research Center, San Ramon, California, May 2008

Inverse Methods, Geostatistics and Neural Networks for Geophysical Analysis, Exploration Geophysics Seminar, Jackson School of Geosciences, UT Austin.

Recent Developments in Inversion Technology, Keynote speech—joint session of SPG, APG, EAGE, SEG at the Society of Petroleum Geophysicists conference at Hydearabad, India, Januray 2008.

Seismic Modeling and amplitude versus azimuth in fractured media, Keynote speech—session on "AVO, modeling and inversion," Society of Petroleum Geophysicists conference at Hydearabad, India, Januray 2008.

2007

Pre-stack Full Waveform Inversion for Estimating Elastic Properties of Marine Sediments, Acoustical Society of America meeting, New Orleans, Nov. 28, 2007.

Estimation of uncertainty in some geophysical models, Sandia Workshop on uncertainty estimation in large scale inverse problems, Santa Fe, New Mexico, Sept. 2007.

Bayesian Geophysical Inversion, Department of Physics, UT Austin, Aug. 2007.

New trends in seismic inversion for reservoir characterization, 4th ENAEP Ecuador (4to Encuentro Anual de la Energia y el Petroleo), Aug. 2007.

New trends in seismic Modeling of fractured reservoirs, 4th ENAEP Ecuador (4to Encuentro Anual de la Energia y el Petroleo), Aug. 2007.

Seismic Inversion for Reservoir Characterization, Keynote speech, First International forum on oil and gas for doctoral students, China University of Petroleum, Beijing, China, Aug. 2007.

Seismic Inversion and fracture characterization, BGP, Beijing, China, Aug. 2007.

Need for seismic analysis in reservoir characterization, Oil India Limited, Duliajan, India, June 2007.

Seismic Inversion for Reservoir Characterization: Current Status and Future Direction, Dept. of Geology and Geophysics, University of Wyoming, Laramie, Wyoming, May 2007.

Seismic Modeling of Fractured Reservoirs: Failure of AVOA? Dept. of Geology and Geophysics, University of Wyoming, Laramie, Wyoming, May 2007.

New Results from Seismic Inversion in the Plane Wave Domain, Sheriff Symposium, University of Houston, Apr. 2007.

Stiffness, Compliance and Tensor to Matrix mapping for Fracture Modeling, EGS Lecture, University of Texas at Austin, Apr. 2007.

Seismic Inversion for Reservoir Characterization: Current Status and Future Direction, School of Geology and Geophysics, University of Oklahoma, Norman, Oklahoma, Apr. 2007.

Anomalous AVOA in fractured media, Conoco-Phillips, Houston, Mar. 23, 2007.

Elastic Modeling: Current Status and Future Directions, Conoco-Phillips, Houston, Mar. 23, 2007.

Some analytic results from AVOA over fractured reservoirs, EDGER forum, UT Austin, Feb 07.

2006

Bayesian Geophysical Inversion, EGS Seminar, UT Austin, Oct. 20, 2006.

Uncertainty Estimation in Geophysics, Invited lecture, Joint Statistical Society meeting (JSM), Seattle, Washington, Aug. 7, 2006.

Seismic modeling and inversion: the state of the art, Chevron Texaco Research Center, San Ramon, CA, May 15, 2006.

Seismic Modeling in 3D, SEG forum on new generation seismic models, Apr. 06.

AVOA for fluid detection in fractured resrvoirs, Edger forum, UT Austin, Feb. 06.

True amplitude migration-inversion, keynote speech at the SPG conference, Kolkata India, Jan. 10, 2006.

2005

Seismic Inversion for hydrocarbon exploration, crustal structure, and whole earth modeling AGU-SEG joint session spring meeting, New Orleans, Louisiana, invited.

Seismic modeling of fractured reservoirs, School of Geology and Geophysics, University of Oklahoma, Norman, Oklahoma, Sep. 29, 2005.

Seismic waveform inversion and characterization of gas hydrates offshore Oregon, School of Geology and Geophysics, University of Oklahoma, Norman, Oklahoma, Sep. 29, 2005.

AVO and Seismic Waveform Inversion: present and future, Schlumberger workshop on AVO, Houston, Texas, Sep. 15, 2005.

Fracture Estimation from seismic data: new ideas, Conoco-Phillips, Houston, Texas, July 05.

Seismic Inversion for hydrocarbon exploration, crustal structure and whole earth modeling, AGU-SEG joint session spring meeting, New Orleans, Louisiana.

Constrained pre-stack waveform inversion, Western-Geco/Schlumberger Reservoir Services, Houston, Texas, Apr. 8, 2005.

Free Gas and Gas Hydrate Saturation from multi-component seismic data from offshore Oregon, Rice University, Houston, Texas, Mar. 25, 2005.

Free Gas and Gas Hydrate Saturation from multi-component seismic data from offshore Oregon, Edger Forum meeting, Austin, Texas, Feb. 14, 2005.

Seismic Inversion: State of the art, SPG Kolkata chapter, Kolkata, India, Jan. 5, 2005.

2004

Seismic modeling of fractured reservoirs, SIAM annual meeting, Portland Oregon, July 2004.

Seismic waveform inversion and characterization of gas hydrates offshore Oregon, Dept. of Geological Sciences, Indiana University, Bloomington, Indiana, Apr. 2004.

Seismic imaging in heterogeneous, anisotropic media, Dept. of Geological Sciences, Indiana University, Bloomington, Indiana, Apr. 04.

Seismic Inversion for reservoir characterization, Dept. of Earth Sciences, Memorial University of Newfoundland, Mar. 04.

Analysis and interpretation of OBS and streamer data from Hydrate Ridge, offshore Oregon EDGER forum meeting, University of Texas at Austin, Feb. 17, 2004.

Seismic waveform inversion: Current status and future directions Keynote address, Society of Petroleum Geophysicists (SPG) conference, Hyderabad, India, Jan. 16, 2004.

2003

Seismic Modeling of fractured reservoirs, Industrial Associates meeting, Institute of computational and engineering sciences, The University of Texas at Austin, Oct. 12, 2003.

Gas Hydrates: their resource potential and geophysical characterization, Institute for Geophysics, UNAM, Mexico City, Mexico, Aug. 13, 2003.

Pre-stack Seismic waveform inversion: current status and future directions, Mexican Institute of Petroleum (IMP), Mexico City, Mexico, Aug. 12, 2003.

Gas Hydrates: their resource potential and geophysical characterization, Mexican Institute of Petroleum (IMP), Mexico City, Mexico, Aug. 11, 2003

Synthetic Seismograms in layered fractured media, FRACCITY annual meeting, Jackson Hole, Wyoming, July 21, 2003.

Pre-stack inversion and anisotropic velocity analysis, Jason Geosystems, Rotterdam, Netherlands, Mar. 24, 2003.

Migration velocity estimation by non-linear optimization, Society of Industrial; and Applied Math conference on mathematical and computational issues in geosciences, Mar. 24, 2003.

Estimation of Vp and Vs of shallow sediments offshore Oregon: Implication towards the distribution of gas hydrates, Petrotech Conference, New Delhi, Jan. 9 2003.

Gas Hydrates: their resource potential and geophysical characterization, Prof. Jagdeo Singh Memorial Lecture at Indian School of Mines, Dhanbad, Jan. 6, 2003.

Gas Hydrates: their resource potential and geophysical characterization, Society of Petroleum Geophysicists, Kolkata chapter, Jan. 2, 2003.

2002

Geophysical Inversion–An overview, Schlumberger Oilfield Services, Houston, Oct. 02.

Rock property estimation from reflection seismic data, Shell Oil Company, Houston, Sept. 02.

Techniques for pre-stack waveform inversion, R&D Division, Western Geco, Houston, Apr. 02.

Waveform inversion for reservoir characterization, BP Houston, Mar. 02.

Pre-stack inversion with adaptive regularization, Society of Petroleum Geophysicists meeting, Mumbai, India, Jan. 02.

2001

Seismic Processing in transversely isotropic media: the tau-p approach, Section Mining Engg and Applied Geophysics, Delft Unviersity of Technology, Netherlands, Dec. 01.

Pre-stack inversion: Current status and future directions, SBGF meeting, Bahia, Salvador, Oct. 01.

Pre-stack inversion: Isotropy and Transverse Isotropy, EDGER Forum, University of Texas at Austin, Apr. 01.

Air-borne GPR for the detection of underground facilities, International workshop on GPR, TNO, Netherlands, May 01.

2000

Integrated reservoir characterization, Western Geophysical , Houston, Texas, Aug. 00.

Integrated reservoir characterization, BP , Houston, Texas, July 00.

Inverse Problems and uncertainty estimation in Geophysics, TICAM, UT Austin, Mar. 00.

Seismic waveform inversion: from isotropy to anisotropy, Shell Oil Company, Houston, Texas, March, 00.

Normal moveout and Seismic waveform inversion in transversely isotropic media, Conoco, Ponca City, Oklahoma, Feb. 15, 2000.

Parameter Estimation in Anisotropic Media, Phillips Oil Company, Barttlesville, Oklahoma, Jan. 12, 2000.

1999

Free surface multiple attenuation in reflection seismic data, ONR Broadband Signal Processing Working Group Meeting, Applied Research Laboratory, University of Texas at Austin, Dec. 2, 1999.

Seismic Waveform Inversion and Tomography: Examples of ill-posed geophysical inverse problems, PGS Series, Houston, Texas, Oct. 11, 1999.

Processing of multi-component OBC data, PGS Houston, Sep. 16, 1999.

Geophysical Inversion and Uncertainty Estimation, National Research Council Workshop on 'How uncertainty is treated in ocean science models?' National Academy of Sciences, Washington, D.C, 12-13 Sept. 1999.

Inverse Problems, Statistics and a touch of philosophy, UTIG seminar, Sept. 9, 1999

Free surface multiple attenuation in the plane wave domain, Upstream Strategic Research Division, Mobil Oil Company, Dallas, Texas, June 28, 1999.

Application of active source Seismology in imaging of subsurface structures, DARPA Geophysics Seminar, Mar. 99.

Geophysical Inversion: Application to hydrocarbon exploration, DOE Workshop on Global inversion of Geophysical Data, Feb. 99.

1998

Geophysical Inversion: Theory and Practice, Southwest Research Institute, San Antonio, Texas, Nov. 98.

AVO and Seismic Inversion in he Plane Wave Domain, Mobil Strategic Research Center, Dallas, Texas, Mar. 98.

AVO and Seismic Lithology, Oil and Natural Gas Commission, Calcutta, India, Jan. 98.

AVO and Seismic Waveform Inversion in the Plane Wave Domain: Application to Gas Hydrate Data, Society of Petroleum Geophysicists, Chennai, India, Jan. 98.

1997

Mapping of Elastic properties of gas hydrates, Amoco EPTG, Tulsa, OK, Nov. 97.

Seismic Wave Propagation Modeling: Current Status and Future Trends, Department of Mechanical Engineering, The University of Texas at Austin, Oct. 97.

Practical Approaches to Uncertainty Estimation in Geophysical Inversion, *Sociedade Brasileira de Geofisica*, Sao Paulo, Brazil, Sept. 97.

To Bayes or not to Baye," PPPG, Federal University of Bahia, Salvador, Brazil, Sept. 97.

1996

Global Optimization Methods and Migration Velocity Analysis, Oil and Natural Gas Commission, Calcutta, India, Nov. 96.

"To Bayes or not to Bayes," Society of Petroleum Geophysicists, Oil and Natural Gas Commission Dehradun, India, Dec. 96.

Inverse methods and uncertainty estimation in geophysics, Western Atlas Wireline Service, Houston, Texas, July 96.

1995

Gibbs' sampler and its application to geophysical inversion, SIAM meeting on Geophysical Inverse Problems in Geophysics, Fish Camp, CA, Dec. 95.

Optimization methods for automatic velocity estimation, SIAM meeting on Geophysical Inverse Problems in Geophysics, Fish Camp, CA, Dec. 95.

Nonlinear geophysical inversion, Department of Petroleum and Geosystems Engineering, University of Texas at Austin, Austin, Texas, Feb. 95.

1994

Nonlinear geophysical inversion, Indian Institute of Technology, Kharagpur, India, July 94.

Global optimization methods in geophysical inversion and Seismic migration and modeling in 3-D, National Geophysical Research Institute, Hyderbad, India, July 94.

Nonlinear geophysical inversion, Indian School of Mines, Dhanbad India, July 94.

Nonlinear optimization methods in geophysics, Delft University of Technology, Netherlands, June 94.

Nonlinear optimization methods in geophysics, University of Potsdam, GeoForschungs Zentrum, Potsdam, Germany, June 1994.

Global optimization methods in geophysical inversion, University of Utrecht, Netherlands, June 94.

1993

Bayesian inference, Gibbs' sampler and uncertainty estimation in nonlinear geophysical inversions, Department of Computational and Applied Mathematics, Rice University, Houston, Texas.

Geophysical inversion using global optimization, Society of Industrial and Applied Mathematics Conference on Mathematical and Computational Issues in the Geosciences, Houston, Texas, 1993.

High resolution shallow water 3-D survey and inversion for geophysical parameters, Acoustical Society of America, Ottawa, Canada, 1993.

1992

Nonlinear inversion of geophysical data, Department of Geophysics, Center for Tectonophysics, Texas A&M University, Nov. 1992.

Genetic Algorithms, Naval Research Laboratory, Stennis Space Center, MS, 1992.

1990 and earlier

Modeling of wave propagation in Los Angeles Basin, CICESE, Mexico, 1990.

Multifold path integral synthetic seismograms, Seismological Laboratory, California Institute of Technology, Pasadena, California, 1987.

Kirchhoff-Helmholtz reflection seismograms, SOHIO Petroleum Company, Dallas, Texas, 1985.

CURRENT RESEARCH GRANTS

Funding Agency	Project	Amount	Duration
Exxon-Mobil Research Center	Transdimensional facies inversion	$376,000	11/19-10/21
NSF	Uncertainty Quantification in Seismic Inversion by Nonlinear Sampling **Sen and Arnulf**	$407,916	06/01/17 - 05/31/21
TOTAL	Global Full Waveform Inversion in 3D and Estimation of Uncertainty for Application in Hydrocarbon Exploration **Sen and Arnulf**	$765,693	09/01/17 - 08/31/21
NSF	NSF Big Data Challenges: fracture characterization **Wheeler, Sen, Srinivasan, Parashar**	$1.2M (my part $280K)	1/1/16-1/15/19
Hess	VFSA inversion for salt bodies **M. K. Sen**	$85,000	1/1/16-5/15/17
Total	Joint inversion of seismic and electromagnetic data **A. Arnulf and M. K. Sen**	$450,000	6/1/16-5/15/21

BP	Spectral AVO and density inversion **M. K. Sen and D. Foster**	$750,000	11/1/15-12/31/18
Various oil & service companies	EDGER **M. K. Sen, K. Spikes, N. Tisota**	$40,000 per year per sponsor	Multi-year

COMPLETED PROJECTS

Conoco-Philips	Joint Inversion of Seismic and Fluid Flow data **M. K. Sen**	$301,000	09/01/14-08/31/16
US Dept of Energy	Seismic inversion for the estimation of crustal velocity structure–**Sen and Pulliam**	$600,000	06/01/09-08/31/14
Shell-UT Unconventional research	Seismic inversion consrtained by novel rock physics modeling and geostatistical simulation in liquid rich shales **Sen**, **Spikes, Srinivasan and Torres-Verdin**	$867,783	09/01/12-12/31/2016
US Dept of Energy	**Center for Frontiers of Subsurface Energy Security** Gary A. Pope (Director), T. Arbogast, M. Balhoff, P. Bennett, S. Bryant, M. Cardenas, M. Delshad, D. DiCarlo, I. Duncan, P. Eichhubl, S. Hovorka, C. Huh, K. Johnston, L. Lake, **M. K. Sen**, S. Srinivasan, M. Wheeler	$3M/yr	5 years starting Aug 1, 2009
KAUST AEA	Seismic Modeling of fractured reservoirs	$160,000	09/08-08/09
Shell USA/UT Jackson School of Geosciences (Shell Game Changer Project)	WEMI–wave equation migration inversion **Sen**–UTIG, Fornel-BEG	$500,000	01/06–04/08
Conoco-Phillips UT Jackson School of Geosciences Initiative	Joint Inversion of Seismic and Fluid Flow data P. L. Stoffa, **M. K. Sen**	$500,000	06/01/06–05/31/09
NSF Information Technology Research	**Collaborative Research: ITR-:Data Driven Simulation of the Subsurface: Optimization and Uncertainty Estimation–National Science Foundation Information Technology Research**	$1.1 million	10/04–09/08

NSF–Math and Geosciences	**Collaborative Research: CMG: Stochastic Representation of Parameter Uncertainty within Model Predictions of Future Climate National Science Foundation** **Jackson and Sen UTIG**	$600,000	09/04–08/08
NSF Information Technology Research	A Data Intense Challenge–Instrumented oil-field of the future Wheeler, Dawson,–Computational and applied math **Sen**–Institute for Geophysics	$2.3 milllion	09/01–09/05
US Dept of Energy	Determination of crustal structure by inversion of shear-coupled PL waves using global optimization–**Pulliam and Sen**	$600,000	09/04–02/08
Joint industry/JSG initiative Current sponsor–Chevron Texaco More companies are likely to participate	FRST–Fluid Rock Seismic Technology BEG–Fomel, Janette, & Jennings UTIG–**Sen**	$300,000	09/04–08/05 (Multi-year)
Department of Energy	Integrated approach to petrophysical interpretation of post- and pre-stack 3D seismic data, well-log data, core data, geological information and reservoir production data via Bayesian stochastic inversion **Sen**–UTIG, C. Torres-Verdin–UT Petroleum Engr. Dept.	$1.1 million	09/00–08/04
Defense Threat Reduction Agency (DTRA)	Determination of crustal structure by inversion of shear-coupled PL waves using global optimization Pulliam, **Sen**, Frohlich, and Grand	$438,492	08/00–07/06
DTRA (Subcontract from IAT)	Airrbore GPR for the detection of underground facilities Stoffa and **Sen**	$140,000	08/00–12/01
NSF Ocean Sciences	"Collaborative Research: 3-D Seismic Imaging of an Active Margin Hydrate System –Oregon Continental Margin." Nathan L. Bangs, Mrinal K. **Sen** and Yosio Nakamura	$524,993	01/00–12/02
Joint Industry	"SLOSEIS: Slowness Analysis, Waveform Inversion and Uncertainty Estimation in VTI Media." Mrinal K**. Sen** and Paul L. Stoffa	$210,000	01/98–12/01

NSF Earth Sciences EAR-9725427	"Parameter Estimation in Anisotropic Media." Mrinal K. **Sen** and Jay Pulliam	$170,000	01/98–12/01
NSF Ocean Sciences OCE-9724555	"Acquisition of an Origin 2000 for Seismic Research." Stoffa, Shipley, **Sen,** and Bangs	$399,112	09/97–08/00
Mobil Oil Company	3D Multiple Attenuation Methods–Feasibility Studies–Mrinal K. **Sen**	$12,000	01/99–12/99
NSF Ocean Sciences OCE-9503412	"Rock property estimation by AVO inversion of marine seismic data." Mrinal K. **Sen** and Paul L. Stoffa	$292,980	11/95–10/99
Texas Higher Education Coordinating Board	"Anisotropic Earth Model Calculations." Mrinal K. **Sen** and Paul L. Stoffa	$107,157	01/96–08/98
NSF Earth Science EAR-9304417	"Neural Computing in Geophysics." Mrinal K. **Sen** and Paul L. Stoffa	$313,469	07/93–07/96
Texas Higher Education Coordinating Board	"Hybrid Linear/nonlinear of seismic waveform inversion." Mrinal K. **Sen** and Paul L. Stoffa	$128,000	01/94–08/95
Cray Research, Inc.	"Pre-stack plane wave Kirchhoff migration on Cray T3D" Paul L. Stoffa and Mrinal K. **Sen**	$60,000	01/95–12/95
ONR	"Imaging of Ocean Subbottom Structure." Mrinal K. **Sen**	$32,929	09/93–12/95
Cray time award	"Seismic Velocity Analysis using Neural Networks" Mrinal K. **Sen**		
Cray Research, Inc.	"Prestack Migration-Inversion of Seismic Gathers." Paul L. Stoffa and Mrinal K. **Se**n	$49,000	01/93–12/93
ONR N00014-92-J-6001	"Imaging of Ocean Subbottom Structure Using Swath Mapping Data." Mrinal K. **Sen** and Paul L. Stoffa	$69,445	03/92–08/93
Cray Research, Inc.	"Prestack migration velocity analysis in two- and three-dimension." Paul L. Stoffa and Mrinal K. **Sen**	$60,000	01/92–12/92
NSF Earth Science EAR-9105922	"Non-linear inversion of plane wave seismograms uding global optimizaion methods" Mrinal K. **Sen** and Paul L. Stoffa	$157,156	07/91–June 93
NSF Earth Science EAR-90xxxx	"Source and path effects and remnant seismic risk of Loma Prieta earthquake" Mrinal K. **Sen** and Fumiko Tajima	$45,000	09/90–08/91

U.S. Geological Survey	"Deep structural complexity and site response in Los Angeles basin." Mrinal K. **Sen**	$130,000	88–90