

**CURRICULUM VITA**  
**MRINAL K. SEN**  
**INSTITUTE FOR GEOPHYSICS**  
**THE UNIVERSITY OF TEXAS AT AUSTIN**  
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**EDUCATION:**

1987 Ph.D. Geology and Geophysics, University of Hawaii at Manoa  
1979 M.Sc. Applied Geophysics, Indian School of Mines, Dhanbad, India  
1977 B.Sc. Applied Geophysics, Indian School of Mines, 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, The University of Texas at Austin  
08/04- **Research Professor**, 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)  
09/07- **Member**, Graduate Studies Committee, *Computational and Applied mathematics*, UT Austin.  
9/07-12/11 **Chairman**, Geophysics Education and Research Group, Jackson School of Geosciences  
09/06-08/07 Weeks Endowed Fellow, Dept. of Geological Sciences, The University of Texas at Austin  
09/03-08/06 Jackson Endowed Fellow, Institute for Geophysics, The University of Texas at Austin  
99/98-98/04 Senior Research Scientist, Institute for Geophysics, The University of Texas at Austin  
01/02-08/03 Fellow of Edwin Allday Centennial Chair in Subsurface Geology, Department of Geological Sciences, 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 distinguished professor, Academy of Council and Scientific Research, CSIR- National Geophysical Research Institute, Hyderabad, India.  
09/01 - Associated Faculty, Mission Oriented Seismic Research Program, University of Houston.  
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)  
Seismic Imaging in exploration and global scale  
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)  
“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 Kuwait Oil Company, Kuwait, June 26-27, 2013.

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

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

“Seismic inversion for reservoir characterization” – 3 day short course taught at Kuala Lumpur, Malaysia organized by MICE Global, Nov 19-21, 2013.

“Seismic inversion for reservoir characterization” – 5 day short course taught at Kuala Lumpur, Malaysia 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 Santander, Bucaramanga, Colombia, April 2015.

“Seismic migration and inversion” – 5 day short course at the China University Petroleum, June 2015.

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

#### **CURRENT 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.
- Computational Methods: Supercomputing and parallel computation applications in Geophysics, uncertainty in climate models.

#### **SERVICE:**

**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.

**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

**Member, Editorial Board (Advisory Committee)**, *Journal of Indian School of Mines*, 2006-present.

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

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

- 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).

**Committees:**

**Chair**, Exploration Geophysics search committee, 2014

**Member**, strategic planning committee, UTIG

**Member**, Shell chair search committee, 2014

**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**, 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:**

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 School of Mines, 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 - 2007

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

Recipient of Jackson Endowed Senior Fellowship at the Jackson School of Geosciences, UT Austin.

"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, Gov't. of India at the undergraduate level.

**PH.D. ADVISOR:**

L. N. Frazer, University of Hawaii

**SCIENTISTS WITH WHOM I HAVE COLLABORATED (OUTSIDE UTIG):**

M. F. Wheeler, Clint Dawson, H. Klie—UT Computational and Applied Math

J. T. Fokkema, C. P. A. Wapenaar—Delft University of Technology, Netherlands

S. Fomel—UT Bureau of Economic Geology

R. Tatham, Kyle Spikes - UT Geology

S. Srinivasan, UT Petroleum Engineering

U. Dutta, N. N. Biswas, University of Alaska, Fairbanks.

Doug Foster, Dave Lane, Partha Routh, Dan Whitmore – Conoco-Phillips, Houston.

R. Ferguson, University of Calgary

Art Weglein—University of Houston

C. S. Rai, C. Sondergeld–University of Oklahoma

L. Lake–UT Dept. of Petroleum Engg, C. Torres-Verdin–UT Dept. of Petroleum Engr.,

C. Connor –Southwest Research Institute, San Antonio, C. Sondergeld–Amoco, Tulsa (Now at the University of Oklahoma, Tulsa), C. Rai–Amoco, Tulsa (Now at the University of Oklahoma, Tulsa)

S. K. DeSarkar–Mobil, Dallas, B. Secest–BP, Houston, R. Chapman–DREP, Canada.

J. Gettrust–NRL/SSC, D. Lindwall -NRL/SSC, W. T. Wood–NRL/SSC.

D. Helmberger–CalTech, L. Burdick–Woodward-Clyde.

#### **UTIG Collaborators (present and past):**

N. Bangs, C. Frohlich, C. Jackson, K. McIntosh, J. Pulliam, S. Grand, P. L. Stoffa, L. Zhao.

#### **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.**, 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 Hoerber.

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 Characterization of gas hydrates*, ed. M. Riedel, E. Willoughby, 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  $\tau$ -p domain, *AVO inversion of Mobil data*, Society for Exploration Geophysicists Press, Chapter 9, p. 167-185.

### Book Reviews:

- 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:****2015**

1. Datta, D., and **M. K. Sen**, 2015, Estimating a starting model in full waveform inversion using a global optimization method, *Geophysics*, Submitted.
2. Ojha, M., **M. K. Sen**, and K. Sain, 2015, Imaging of gas-hydrate bearing sediments in Krishna Godavari basin by full waveform inversion, *Applied Geophysics*, Submitted.
3. Ma, J., Chen, X. and M. K. Sen, 2015, Free surface multiple attenuation of blended data, *Geophysics*, Submitted.
4. Agarwal, M., J. Pulliam, **M. K. Sen**, H. Garrola, 2015, Lithospheric structure of Texas Gulf of Mexico passive margin from surface wave dispersion and migrated Ps receiver function, *Geochemistry, Geophysics, Geosystems*, 16(7), 2221-2239.
5. Patro, P. K., K. Aziz, Veeraswamy, S. Sarma, and **M. K. Sen**, 2015, Sub-basalt seismic imaging – the efficacy of magentotelluric method, *Applied Geophysics*, 121, 106-115.
6. Vedanti, N, **M. K. Sen**, R. P. Srivastava, 2015, Integrated reservoir characterization for understanding in-situ combustion process in Balol oil field, India, *Interpretation*, 3(2), T69-T80.
7. Agarwal, M., J. Pulliam, **M. K. Sen**, U. Dutta, M. Pesyanos, and R. Mellors, 2015, Crustal and upper mantle structure in the Middle East: Assessing constraints provided by jointly modeling Ps and Sp receiver functions and Rayleigh wave group velocity dispersion curves, *Geophysical Journal International*, 201(2), 783-810.
8. DeBasabe, J. D., and **M. K. Sen**, 2015, A comparison of finite difference and spectral element methods for elastic wave propagation in media with a solid-fluid interface, *Geophysical Journal International*, 200(1), 278-298.
9. **Sen, M. K.**, and R. Biswas, 2015, Choice of regularization weight in basis pursuit deconvolution, *Journal of Geophysics and Engineering*, 12, 70-79.
10. Ghosh, R., **M. K. Sen**, and N. Vedanti, 2015, Quantitative interpretation of a growing CO2 plume in Sleipner, north sea from time-lapse seismic data using rock physics modeling, *Journal of Greenhouse Gas Control*, 32,147-158.
11. Vijayarao, D., N. Damodara, K. Sain, and **M. K. Sen**, 2015, Upper crust of the archean Dharwar craton in southern India as revealed by refraction tomography and its implications, *Geophysical Journal International*, 200(1), 652-663.

**2014**

12. Perumal, S. K., J. Kopiseti, K. Nagula, R. Menon, ..... **M. K. Sen**, 2014, Impact fragmentation of Lonar Crater, India: Implications for impact cratering processes in Basalt, *Journal of Geophysical Research: Planets*, 111(9), 2029-2059.

13. **Sen, M. K.**, R. Biswas, P. Mandal, and P. Kumar, 2014, Basis pursuit receiver function, Bulletin of the seismological society of America, doi 10.1785/0120140004.
14. Saraswat, P., V. Raj, **M. K. Sen**, and A. Naryanan, 2014, Multiattribute Seismic Analysis With Fractal Dimension and 2D and 3D Continuous Wavelet Transform,, paper no. SPE-164417-MS, <http://dx.doi.org/10.2118/164417-PA>.
15. Singha, D. K., R. Chatterjee, **M. K. Sen** and K. Sain, 2014, Pore-pressure prediction in gas-hydrate bearing sediments of Krishna-Godavari basin, India, Marine Geology, 357, 1-11.
16. Murthy, A. S. N., D. Sarkar, **M. K. Sen**, V. Sridher, and A. Prasad, 2014, Mapping the sub-trappean Mesozoic sediments in the western part of Deccan volcanic province of India, Journal of Asian earth sciences, 93, 15-24.
17. Dixit, M. K., S. Kumar, R. Catchings, K. Suman, D. Sarkar, and **M. K. Sen**, 2014, Seismicity, faulting and structure of the Koyna-Warna Seismic regions, Journal of Geophysical Research: Solid Earth, 119(8), 6372-6398, DOI: 10.1002/2014JB010950.
18. Behera, L., and **M. K. Sen**, 2014, Tomographic imaging of sub-basalt sediments and shallow basement for hydrocarbon potential in Deccan volcanic province of India, Geophysical Journal International, 199 (1), 296-314
19. Kumar, P., **M. K. Sen**, and C. Halder, 2014, Estimation of shear velocity contrast from transmitted PS amplitude variation with ray-parameter, Geophysical Journal International, 198 (3), 1431-1437.
20. Kumar, P., K. Talukdar and **M.K. Sen**, 2014, Lithospheric Structure below Transantarctic Mountain using Receiver Function Analysis of TAMSEIS Data, JOURNAL GEOLOGICAL SOCIETY OF INDIA, 83(5), 483-492.
21. Sain, K, M. Rai and **M. K. Sen**, 2014, A review on shale gas prospect in Indian sedimentary basins, J. Ind. Geophys. Union, 18(2), 183-194.
22. Zhang, R, X. Song, S. Fomel, **M. K. Sen**, S. Srinivasan, 2014, Time-lapse pre-stack seismic data registration and inversion for CO<sub>2</sub> sequestration study at Cranfield, Geophysical Prospecting, doi: 10.1111/1365-2478.12114
23. Zhang, R., **M. K. Sen** and S. Srinivasan, 2014, Time-lapse pre-stack seismic inversion with thin bed resolution for monitoring CO<sub>2</sub> sequestration from Carnfield, Mississippi, International Journal of Greenhouse Gas Control, 20, 223-229.
24. Mandal, B., **M. K. Sen**, and V. VijayaRao, 2014, Deep seismic image enhancement by the common reflection stack (CRS) method: Delhi-Aravalli fold belt, Geophysical Journal International, doi: 10.1093/gji/ggt402, 196(2),902-917.

## 2013

25. Tao, Y., and **M. K. Sen**, 2013, Frequency domain full waveform inversion using scattering integral approach and its sensitivity analysis, *Journal of Geophysics and Engineering*, 10(6),065008.

26. Prasad, A. S. S. R. S, K. Sain, and **M. K. Sen**, 2014, Imaging sub-basalt mesozoics along Jakhau-Mandvi and Mandvi-Mundra profiles in Kutch sedimentary basin from seismic and gravity modeling, *Geohorizons*, 51-56.
27. Prasanna Lakshmi, K. J., P. Senthil Kumar, K. Vijaya Kumar, A. Ravinder. T. Seshunarayana, and **M. K. Sen**, 2013, Petrophysical stratigraphy of the Deccan basalts across the western ghats escarpment around Mahabaleswar and Koyna regions, *Journal of Asian Earth Sciences*, September.
28. Satyavani, N., **M. K. Sen**, M. Ojha, and K. Sain, 2013, Azimuthal anisotropy in OBS observations in Mahanadi offshore, India, *Interpretation*, 1(2), T187-T198.
29. Kumar, P., M. Ravi Kumar, G. SriJayanthi, K. Arora, D. SriNagesh, R. K. Chadha, and **M. K. Sen**, 2013, Seismological evidence of flexure in the Indian continental tectonic plate, *Journal of Geophysical Research*, VOL. 118, 1-13, doi:10.1002/jgrb.50366.
30. Zhang, R., S. Song, S. Fomel, **M. K. Sen** and S. Srinivasan, 2013, Time-lapse seismic data registration and inversion for CO2 sequestration study at Cranfield, *Geophysics*, 78(6), B329-B338.
31. Mandal, B., **M. K. Sen**, and V. VijayaRao, 2013, New seismic images of the central Indian suture zone and their tectonic interpretation, *Tectonics*, 32, doi:10.1002/tect.20055.
32. Tao, Y., and **M. K. Sen**, 2013, Seismic interferometry in plane wave domain, *Geophysics*, 78(4), Q35-Q44.
33. Zhang, R., **M. K. Sen**, and S. Srinivasan, 2013, Multi-trace basis pursuit inversion with spatial regularization, *Journal of Geophysics and Engineering*, 10, doi:10.1088/1742-2132/10/3/035012.
34. Tao, Y., and **M. K. Sen**, R. Zhang, and K. Spikes, 2013, A robust stochastic inversion workflow for time-lapse data: hybrid starting model and double difference inversion, *Journal of Geophysics and Engineering*, 10, doi:10.1088/1742-2132/10/3/035011.
35. Tao, Y., and **M. K. Sen**, 2013, Subtracting non-Gaussian noise in reverse time migration, *Geophysical Prospecting*, doi: 10.1111/1365-2478.12016.
36. Yang, L., and **M. K. Sen**, 2013, Time-space domain dispersion-relation-based finite-difference method with arbitrary even-order accuracy for the 2D acoustic wave equation, *Journal of Computational Physics*, 232(1), 327-345. <http://dx.doi.org/j.jcp.2012.08.025>.
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- Jervis, M., P. L. Stoffa, and **M. K. Sen**, 1993, 2-D Velocity Estimation Using a Genetic Algorithm, *EOS Trans. AGU*, 74(16), 201.
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- Sen, M. K.**, and P. L. Stoffa, 1992, Multilayer AVO inversion by genetic algorithms, *Proceedings of the SEG/EAGE Summer Research Workshop*, Big Sky, Montana, 581-589.
- Saikia, C. K. , **Sen, M. K.** , Helmberger, Donald V., Analysis of regional phases from NTS seismograms recorded in Los Angeles Basin, *Seismological Research Letters* (Mar. 1, 1991)
- Sen, M. K.**, and P. L. Stoffa, 1990, Pre-stack migration in shot-geophone coordinates using the split-step Fourier algorithm, presented at the *SEG/Midwest Meeting*, Mar. 25-27, Midland, Texas.
- Stoffa, P. L., **M. K. Sen**, J. T. Fokkema, W. Kessinger, and R. Tatalovic, 1990, Pre-stack Shot Point and Common Midpoint Migration Using the Split-step Fourier Algorithm, *Proceedings of the 52nd European Association of Exploration Geophysicists Meeting and Technical Exhibition*, Copenhagen, Denmark.
- Tajima, F., and **M. K. Sen**, 1990, Spectral characteristics of the aftershocks of the Loma Prieta earthquake, presented at the *1990 Western Pacific AGU meeting*.
- Tatalovic, R., P. L. Stoffa, J. T. Fokkema, and **M. K. Sen**, 1990, Velocity Estimation Using the Pre-stack Split-step Fourier Migration Algorithm for Plane Wave Decomposed CMP Data, *Proceedings of the EAGE/SEG Research Workshop on Estimation and Practical Use of Seismic Velocities*, Cambridge, UK.
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- Sen, M. K.**, 1989, Modeling of wave propagation in the Los Angeles basin, *EOS Trans. AGU*, 70(43), 1192.
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- Cohee, B. P., P. G. Somerville, and **M. K. Sen**, 1989, Strong ground motions in the Seattle-Portland region from hypothesized Mw=8 subduction earthquakes, *EOS Trans. AGU*, 70(43), 1191.
- Sen, M. K.**, C. K. Saikia, and J. P. McLaren, 1988, Modeling ground motion attenuation in the Mississippi embayment, *EOS Trans. AGU*, 69(16), 408.
- Saikia, C. K., and **M. K. Sen**, 1988, Analysis of regional seismograms from quarry blasts near the southern Mississippi embayment, *EOS Trans. AGU*, 69(16), 408.
- Sen, M. K.**, 1988, High frequency body wave synthetic seismograms in laterally varying media (presented at the *SSA eastern section meeting* at Penn State University).
- Frazer, L. N., and **M. K. Sen**, 1986, Notes on two wide angle P. E. (presented at the *ASA meeting* at Cleveland, Ohio).
- Sen, M. K.**, N. R. Chapman, S. Mallick, and L. N. Frazer, 1986, Analysis of multipath sound propagation in an oceanic wedge (presented at the *AGU Fall Meeting*).
- Sen, M. K.**, and L. N. Frazer, 1985, Computation of multifold path integral synthetic seismograms, *Earthquake Notes*, 55, 9.
- Frazer, L. N., and **M. K. Sen**, 1985, Multifold phase space path integrals, *Earthquake Notes*, 55, 9.
- Frazer, L. N., and **M. K. Sen**, 1983, Notes on two asymptotic methods of computing synthetic seismograms in laterally variable media, *Earthquake Notes*, 54, 78.



**Sen, M. K.**, and L. N. Frazer, 1983, Modeling reflections from laterally variable multi-layered elastic medium, *EOS Trans. AGU*, 64(45), 773.

#### **Technical Reports:**

Barhen, J., J.G. Berryman, L. Borcea, J. Dennis, C. de Groot-Hedlin, F. Gilbert, P. Gill, M. Heinkenschloss, L. Johnson, T. McEvelly, J. More, G. Newman, D. Oldenburg, P. Parker, B. Porto, **M. K. Sen**, V. Torczon, D. Vasco, and N.B. Woodward, 2000: *Optimization and Geophysical Inverse Problems*, Report of a Workshop at San Jose, California, Feb. 5-6, 1999. Lawrence Berkeley National Laboratory report number 46959, 33pp.

**Sen, M. K.**, P. L. Stoffa, and R. Sefiullaev, 2001, Air-borne GPR for the detection of underground facilities, Report to the Institute of Advanced Technology, University of Texas at Austin.

**Sen, M. K.**, and F. Liu, 1996, A unified approach to free surface multiple elimination methods, UTIG Technical Report TR-150.

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  $p_0$ - $p_s$  domain, UTIG Technical Report TR-133.

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

#### **INVITED LECTURES:**

### **2015**

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

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

“Transdimensional 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.
- “Fundamentals 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 Lumpur, Malaysia, November 2013.
- “Seismic inversion for reservoir characterization”, Technical University of Petronas, Kuala Lumpur, Malaysia, 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, National 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 Geophysics”, Dept of Civil Engg, Indian Institute of Sciences, 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-disciplinary science”, key-note speech, SPG, Hyderabad, India, February 2012.
- “Subsurface imaging: a cross-disciplinary 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<sup>th</sup> 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 Company, Beijing, China, March 2011.
- “Wave propagation in fractured porous media”, China University of Petroleum, 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 characterization”, 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, simultaneous 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 Hyderabad, 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 Hyderabad, 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, 4<sup>th</sup> ENAEP Ecuador (4<sup>to</sup> Encuentro Anual de la Energia y el Petroleo), Aug. 2007.

New trends in seismic Modeling of fractured reservoirs, 4<sup>th</sup> ENAEP Ecuador (4<sup>to</sup> 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 reservoirs, 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  $V_p$  and  $V_s$  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 University 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, Bartlesville, 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 the 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, Hyderabad, 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.

**SUMMARY OF STUDENT ACTIVITIES:*****CURRENT STUDENTS*****MRINAL K. SEN  
Supervisor (Current)**

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1	<b>Debanjan Datta</b>	<b>PhD Student, UT-DGS</b>
2	<b>Zeyu Zhao</b>	<b>PhD Student, UT-DGS</b>
3	<b>Anthony Barone</b>	<b>PhD Student, UT-DGS</b>
4	<b>Badr A. Alulaiw</b>	<b>PhD student, UT-DGS</b>
5	<b>Reetam Biswas</b>	<b>PhD student, UT-DGS</b>
6	<b>Jankai Vamaraju</b>	<b>MS student, Civil Engg</b>

**Co-Supervisor (Current)**

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1	<b>Qi Ren</b>	<b>PhD Student, UT-DGS</b> <i>Seismogram synthesis, imaging, and rock physics for reservoir characterization</i>
2	<b>Han Liu</b>	<b>PhD Student, UT-DGS</b> <i>Fracture modeling using DG finite element method</i>

**Committee Member (Current)**

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1	<b>Russell Carter</b>	<b>PhD Student, UT-DGS</b> <i>Reservoir characterization for carbon sequestration</i>
2	<b>Jamin Greenbaum</b>	<b>PhD Student, UTIG</b> <i>Observing ice/ocean interaction with airborne radar and gravity</i>
3	<b>Hoonyoung Jeong</b>	<b>PhD Candidate, UTIG</b> <i>Reservoir Characterization</i>

**SUMMARY OF STUDENT ACTIVITIES:*****PAST STUDENTS***

**MRINAL K. SEN**  
**Supervisor (Past)**

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- |           |                           |  |
|-----------|---------------------------|--|
| <b>1</b>  | <b>Biswajit Mandal</b>    | <b>PhD Jan 2014, National Geophysical Research Institute/<br/>Osmania University, Hyderabad India</b><br><i>Deep seismic image enhancement by common reflection<br/>stacking</i> |
| <b>2</b>  | <b>Yang Xue</b>           | <b>PhD Fall 2013, UT-DGS</b><br><i>Seismic inversion for reservoir characterization and monitoring</i>   |
| <b>3</b>  | <b>Kumar Das</b>          | <b>MS Spring 2013, UT-DGS</b><br><i>Joint Inversion of Seismic and Gravity data for determination of Shiva<br/>Crater, India</i>   |
| <b>4</b>  | <b>Mohammed Alhussain</b> | <b>PhD Spring 2013, UT-DGS</b><br><i>Frequency dependent anisotropy</i>  |
| <b>5</b>  | <b>Yi Tao</b>             | <b>PhD Fall 2012, UT-DGS</b><br><i>Seismic interferometry and inversion</i>  |
| <b>6</b>  | <b>Corey Joy</b>          | <b>MS Summer 2011, UT-DGS</b><br><i>Effective medium modeling of carbon sequestered reservoirs</i>   |
| <b>7</b>  | <b>Son Phan</b>           | <b>MS Spring 2011, UT-DGS</b><br><i>Uncertainty in reservoir parameter estimation</i>  |
| <b>8</b>  | <b>Ma Jitao</b>           | <b>PhD Spring 2009, China University of Petroleum</b><br><i>Multiple attenuation in plane wave domain</i>  |
| <b>9</b>  | <b>Jonas De Basabe</b>    | <b>PhD Spring 2009, Computational and Applied Math-UT</b><br><i>Numerical Simulation of Elastic Wave Propagation</i>   |
| <b>10</b> | <b>Samik Sil</b>          | <b>PhD Spring 2009, UT-DGS</b><br><i>Two-way travel time analysis for seismic reservoir characterization</i>   |
| <b>11</b> | <b>Tao Liu</b>            | <b>Exchange PhD Student 2009, Beijing University, Dept of Geophysics</b><br><i>Hybrid finite difference-finite element of seismic wave propagation</i>                           |

**SUMMARY OF STUDENT ACTIVITIES:*****PAST STUDENTS*****MRINAL K. SEN****Supervisor (Past) continued.....**

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- |           |                              |  |
|-----------|------------------------------|--|
| <b>12</b> | <b>Daniel Smith</b>          | <b>MS Fall 2008, UT-DGS</b><br><i>Seismic Trace Regularization and Datuming</i>  |
| <b>13</b> | <b>Abdul Aziz Al-Aslani</b>  | <b>MS Summer 2008, UT-DGS</b><br><i>Post-stack inversion for porosity estimation of carbonate reservoirs</i>   |
| <b>14</b> | <b>Tiancong Hong</b>         | <b>PhD Summer 2008, UT-DGS</b><br><i>MCMC Algorithm, Integrated 4D Seismic Reservoir Characterization and Uncertainty Analysis in a Bayesian Framework</i> |
| <b>15</b> | <b>Sanjay Sood</b>           | <b>MS Fall 2007, UT-DGS</b><br><i>Estimation of <math>Q</math> from seismic refractions data</i>   |
| <b>16</b> | <b>Reeshidev Bansal</b>      | <b>PhD Spring 2007, UT-DGS</b><br><i>Seismic Characterization of Naturally Fractured Reservoirs</i>  |
| <b>17</b> | <b>Gregory Russell Young</b> | <b>MS Spring 2007, UT-DGS</b><br><i>Effective Porosity Estimation from 3D Seismic: Marco Polo Field</i>  |
| <b>18</b> | <b>Dhananjay Kumar</b>       | <b>PhD Spring 2005, UT-DGS</b><br><i>Analysis of multicomponent seismic data from the Hydrate Ridge, offshore Oregon</i>                                   |

**SUMMARY OF STUDENT ACTIVITIES:****PAST STUDENTS****MRINAL K. SEN****Co-Supervisor (Past)**


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<b>1</b>	<b>Jiao Xue</b>	<b>PhD (Visiting Student), China University of Geosciences</b> <i>Anisotropy parameter estimation and inversion for reservoir characterization</i>
<b>2</b>	<b>Adam Allan</b>	<b>BS Fall 2009 (Dec)</b> <b>Honors Program, DGS-UT (Undergraduate)</b> <i>Regularization methods</i>
<b>3</b>	<b>Chandan Kumar</b>	<b>PhD Fall 2006, UT-DGS</b> <i>Stress estimation from fault plane reflection coefficient</i>
<b>4</b>	<b>Joost Van der Noot</b>	<b>Exchange MS Student 2005, Applied Geophysics, Delft University of Technology, Netherlands</b> <i>Stress induced anisotropy</i>
<b>5</b>	<b>Armando Sena</b>	<b>PhD Fall 2004 (Dec), UT-DGS</b> <i>Imaging and analysis of GPR data</i>
<b>6</b>	<b>Heidi Poot</b>	<b>Exchange PhD Student 2003, Applied Geophysics, Delft University of Technology, Netherlands</b> <i>Imaging methods for acoustical data</i>
<b>7</b>	<b>Chengshu Wang</b>	<b>PhD Summer 2003 (Aug), UT-DGS</b> <i>Velocity estimation of gas hydrate</i>
<b>8</b>	<b>Gijs Meek</b>	<b>Exchange MS Student 2003, Mining Engr and Applied Geophysics, Delft University of Technology, Netherlands</b> <i>Integrated subsurface modelling</i>
<b>9</b>	<b>Anubрати Mukherjee</b>	<b>PhD Spring 2002 (May), UT-DGS</b> <i>Seismic Processing in transversely isotropic media: A tau-p approach</i>
<b>10</b>	<b>Abdul-Aziz Saleh Alaslani</b>	<b>PhD Fall 2001 (Dec), UT-DGS</b> <i>Developing, testing, and evaluating wave equation based multiple removal methods for marine seismic data</i>
<b>11</b>	<b>Saleh Mohammad Al-saleh</b>	<b>MS Summer 2001 (Aug), UT-DGS</b> <i>Processing of ocean bottom cable data</i>



**SUMMARY OF STUDENT ACTIVITIES:****PAST STUDENTS****MRINAL K. SEN****Co-Supervisor (Past) continued.....**

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- |           |                               |   |
|-----------|-------------------------------|---|
| <b>12</b> | <b>Faqi Liu</b>               | <b>PhD Summer 1999 (Aug), UT-DGS</b><br><i>Free surface multiple elimination operators and their applications</i>                         |
| <b>13</b> | <b>Mehmet Tanis</b>           | <b>PhD Fall 1989 (Dec), UT-DGS</b><br><i>A Comparison of Migration Methods in Laterally Varying Media</i>                                 |
| <b>14</b> | <b>Ganyuan Xia</b>            | <b>PhD Summer 1997 (Aug), UT-DGS</b><br><i>Prestack Migration and Inversion</i>   |
| <b>15</b> | <b>Carlos Calderon-Macias</b> | <b>PhD Summer 1997 (Aug), UT-DGS</b><br><i>Feedforward NN, Hopfield network and mean field annealing in seismic waveform inversion</i>    |
| <b>16</b> | <b>Faruq Akbar</b>            | <b>PhD Summer 1997 (Aug), UT-DGS</b><br><i>Three-dimensional prestack plane-wave Kirchhoff depth migration in laterally varying media</i> |
| <b>17</b> | <b>Eddy Luhurbudi</b>         | <b>MA Spring 1997 (May), UT-DGS</b><br><i>Traveltime calculation in 3-D</i>   |
| <b>18</b> | <b>Raghu Chundururu</b>       | <b>PhD Spring 1996 (May), UT-DGS?</b><br><i>Hybrid linear/nonlinear inversion of geophysical data</i>                                     |
| <b>19</b> | <b>Setiyono Kriyanti</b>      | <b>MS Fall 1996 (May), UT-DGS</b><br><i>Comparison of Multiple Elimination Methods</i>  |

**SUMMARY OF STUDENT ACTIVITIES:****PAST STUDENTS****MRINAL K. SEN****Committee Member (Past)**

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- |           |                            |   |
|-----------|----------------------------|---|
| <b>1</b>  | <b>Vladimir Bashkardin</b> | <b>PhD Summer 2014, UT-DGS</b><br><i>Slope tomographic method in an Eulerian framework for seismic macrovelocity estimation</i>   |
| <b>2</b>  | <b>Sarah Coyle</b>         | <b>MS Summer 2014, UT-DGS</b><br><i>Inversion of Seismic Data with and without Rock Typing</i>  |
| <b>3</b>  | <b>Lauren Becker</b>       | <b>MS Spring 2014, UT-DGS</b><br><i>Sub-basalt Imaging with Wide-aperture Seismic Data</i>  |
| <b>4</b>  | <b>Meijuan Jiang</b>       | <b>PhD Spring, UT-DGS</b><br><i>Pore-stiffness, aspect ratio and composition effects on rock-physics modeling in the Haynesville Shale</i>  |
| <b>5</b>  | <b>Erik Leuro</b>          | <b>PhD Spring 2014, UT-DGS</b><br><i>Radar interferometry measurement of land subsidence in El Paso</i>   |
| <b>6</b>  | <b>Makoto Sadahiro</b>     | <b>MS Spring 2014, UT-DGS</b><br><i>Processing Algorithm Development</i>  |
| <b>7</b>  | <b>Terence Campbell</b>    | <b>PhD Fall 2013, UT-DGS</b><br><i>Corrections for distortion polarization in reflected shearwave for isotropic and anisotropic medium</i>  |
| <b>8</b>  | <b>Sharif Morshed</b>      | <b>MS Fall 2013, UT-DGS</b><br><i>Characterization of the Marcellus Shale</i>   |
| <b>9</b>  | <b>Sandy Suhardja</b>      | <b>PhD Fall 2013, UT-DGS</b><br><i>Tomographic Imaging of passive earthquake data</i>   |
| <b>10</b> | <b>Isaac Smith</b>         | <b>PhD Summer 2013, UT-DGS</b><br><i>Spiral Troughs of Mars: Formation, Evolution and Links to Climate from Subsurface Mapping and Process Modeling</i>                                   |
| <b>11</b> | <b>Yu Xia</b>              | <b>MS Summer 2013, UT-DGS</b><br><i>Seismic Image of the Rio Grande Rift</i>  |
| <b>12</b> | <b>Masoumeh Kordi</b>      | <b>PhD Spring 2013, UT-DGS</b><br><i>Characterization of reservoir heterogeneity at the Cranfield Oil Field, in the context of CO<sub>2</sub> sequestration and enhanced oil recovery</i> |

- 13 **Yang Wang** **MS Spring 2013, UT-DGS**  
*Upper Mantle Seismic Structure*
- 14 **Alexander Lamb** **MS Spring 2012, UT-DGS**  
*Characterization of Woodford Shale*
- 15 **Kwon Taek Oh** **MS Spring 2012, UT-DGS**  
*Rock physics description of Shale Gas 'Reservoir'*
- 16 **William Burnett** **PhD Spring 2011, UT-DGS**  
*A General Transform for Reversible Seismic Data Processing by Non-stationary Filtering*
- 17 **Alireza Shahin** **PhD Spring 2011, UT-DGS**  
*Time Lapse Seismic Response to Production*
- 18 **Ankesh Anupam** **MS Engineering Summer 2010 (Aug), UT-DGS**  
*Hierarchical modeling of fractures for naturally fractured reservoirs*
- 19 **Bryce Wagner** **PhD Spring 2010, UT-DGS**  
*An analysis of salt welding*
- 20 **Fang Ye** **MS Spring 2010 (May), UT-DGS**  
*Fracture Estimation in the Bakken Shale from 3C-3D Data*
- 21 **Na Shan** **MS Fall 2010, UT-DGS**  
*Isotropic and Anisotropic Seismic Characterization of Woodford Shale*
- 22 **Fang Ye** **MS Spring 2010 (May), UT-DGS**  
*Fracture Estimation in the Bakken Shale from 3C-3D Data*
- 23 **Chunlei Chu** **PhD Fall 2009, UT-DGS**  
*Seismic modeling and imaging with the fourier method [electronic resource] : numerical analyses and parallel implementation strategies*

**SUMMARY OF STUDENT ACTIVITIES:****PAST STUDENTS****MRINAL K. SEN****Committee Member (Past) continued.....**

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- |           |                                   |  |
|-----------|-----------------------------------|--|
| <b>24</b> | <b>Enrique Rosero<br/>Ramirez</b> | <b>PhD Fall 2009, UT-DGS</b><br><i>Evaluating enhanced hydrological representations in Noah LSM over transition zones [electronic resource] : an ensemble-based approach to model diagnostic</i> |
| <b>25</b> | <b>Chaoshun Hu</b>                | <b>PhD Fall 2008, UT-DGS</b><br><i>Stochastic tomography and Gaussian beam depth migration</i>   |
| <b>26</b> | <b>Sasha Peter Carter</b>         | <b>PhD Summer 2008, UT-DGS</b><br><i>Evolving subglacial water systems in East Antarctica from airborne radar soundin</i>  |
| <b>27</b> | <b>Ali Mansour Aljadher</b>       | <b>MS Summer 2008, UT-DGS</b><br><i>Imaging of R3 profile of Chicxulub offshore seismic data using prestack split-stip Fourier migration in the plane wave domain</i>                            |
| <b>28</b> | <b>Theresa Marie Diehl</b>        | <b>PhD Summer 2008, UT-DGS</b><br><i>Gravity analyses for the crustal structure and subglacial geology of West Antarctica, particularly beneath Thwaites Glacier</i>                             |
| <b>29</b> | <b>Komars<br/>Eskandaridavand</b> | <b>PhD Spring 2008 (May), UT Dept of Petroleum and Geosystems Engineering</b><br><i>Petroleum Engineering</i>  |
| <b>30</b> | <b>Irina Filina</b>               | <b>PhD Fall 2007 (Dec), UT-DGS</b><br><i>Geophysical investigations of subglacial lakes Vostok and Concordia, East Antarctica</i>  |

## SUMMARY OF STUDENT ACTIVITIES:

*PAST STUDENTS***MRINAL K. SEN****Committee Member (Past) continued.....**


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<b>31</b>	<b>Edgar Pinzon</b>	<b>MS Fall 2007 (Dec), UT -DGS &amp; Bureau of Economic Geology</b> <i>Fracture pattern prediction using geomechanical models incorporating diagenesis, with comparison to outcrop data (Cambrian Eriboll group sandstones, northwestern Scotland) and core observations (Tertiary Mirador Formation sandstones, Llanos foothills Colo</i>
<b>32</b>	<b>Hao Xun</b>	<b>MS Summer 2007 (Aug), UT-DGS</b> <i>A 3-D seismic investigation of the distribution of gas hydrate and free gas and their relationship to the structure and stratigraphy of Hydrate Ridge</i>
<b>33</b>	<b>Audrey Neau</b>	<b>PhD Spring 2007, L'Université de Pau, France</b> <i>Bayesian Inversion</i>
<b>34</b>	<b>Samrajit Chakraborty</b>	<b>MS Spring 2007 (May), UT-DGS</b> <i>An Int. Geologic Model of the Valhall Oil Field for Simulation of Fluid Flow &amp; Seismic Response</i>
<b>35</b>	<b>Jason Gumble</b>	<b>PhD Fall 2006 (Dec), UT-DGS</b> <i>Anisotropic analysis of 3C data for OBC &amp; comparison to 9C</i>
<b>36</b>	<b>Marc Buursink</b>	<b>Exchange Phd Student 2005/6, Boise State University, Geophysics, Boise State University</b> <i>Fresnel volume GPR tomography to characterize porosity in a heterogeneous reservoir.</i>
<b>37</b>	<b>Teresa Gomez</b>	<b>MS Spring 2005 (May), UT-DGS</b> <i>Sensitivity of P-P, SH-SH and P-SV seismic reflectivity to partial gas saturation</i>
<b>38</b>	<b>Jason Stine</b>	<b>MS Spring 2004 (May), UT-DGS</b> <i>Sensitivity of AVO reflectivity to fluid properties in porous media</i>
<b>39</b>	<b>Paul Zwartjes</b>	<b>Exchange PhD Student 2004, Acoustic Physics, Delft University of Technology, Netherlands</b> <i>Seismic Data Regularization</i>
<b>40</b>	<b>Imtiaz Ahmed</b>	<b>PhD Fall 2003 (Dec), UT-DGS</b> <i>Seismic Imaging of wide angle seismic data</i>

**SUMMARY OF STUDENT ACTIVITIES:****PAST STUDENTS****MRINAL K. SEN****Committee Member (Past) continued.....**


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<b>41</b>	<b>Matthew Morris</b>	<b>MS Fall 2003 (Dec), UT-DGS</b> <i>Analysis on P-P and P-SV AVO response</i>
<b>42</b>	<b>Omar Varela Londono</b>	<b>PhD Summer 2003 (Aug), UT-Dept of Petroleum Engineering</b> <i>Background Velocity Estimation in Laterally Varying Media</i>
<b>43</b>	<b>Junru Jiao</b>	<b>PhD Spring 2001 (May), UT-DGS</b> <i>Migration velocity estimation in 2D and 3D</i>
<b>44</b>	<b>Jean-Paul Van Gestel</b>	<b>PhD Spring 2000 (May), UT-DGS</b> <i>Structure and tectonics of the Puerto Rico-Virgin Islands platform and multi-configuration ground penetrating radar data</i>
<b>45</b>	<b>Viramaditya Sen</b>	<b>PhD Fall 1998 (Dec), UT-DGS</b> <i>Estimation of seismic velocities in the Barabso accretionary prism using iterative prestack depth migration on 3-D multichannel and ocean-bottom seismometer data</i>
<b>46</b>	<b>Mahesh Rajagopalan</b>	<b>MS Engineering Spring 1998, UT-Dept of Electrical &amp; Computer Engineering</b> <i>An image processing approach to migration for point diffractor</i>
<b>47</b>	<b>Mehmet Tanis</b>	<b>PhD Fall 1998 (Dec), UT-DGS</b> <i>A comparison of migration methods in laterally varying media</i>
<b>48</b>	<b>Fernando Campoza</b>	<b>PhD Spring 1997 (May), UT-Dept of Petroleum Engineering</b> <i>The Use of Production Data in Reservoir Description</i>
<b>49</b>	<b>Duk Kee Lee</b>	<b>PhD Spring 1996 (May), UT-DGS</b> <i>Imaging study of the upper mantle seismic velocity structure beneath the Rocky Mountains</i>
<b>50</b>	<b>Michael Jarvis</b>	<b>PhD Summer 1993 (Aug), UT-DGS</b> <i>Optimization methods for 2-D pre-stack migration velocity estimation</i>
<b>51</b>	<b>Warren Wood</b>	<b>PhD Spring 1993 (May), UT-DGS</b> <i>Least Squares Inversion of Field Seismic Data for an Elastic 1-D Earth</i>

**MRINAL K. SEN**  
**POST-DOCTORAL AND VISITING SCIENTISTS SPONSORED**

---

1	<b>Dr. Rui Zhang</b>	Jan-11 - Sep-12
2	<b>Dr. Ranjana Ghosh</b>	Apr-10 – Sep-12
3	<b>Dr. Deng Zhiwen</b>	Mar-10 - Sep-11
4	<b>Dr. Jonas DeBasabe</b>	Apr-09 - Sep-11
5	<b>Dr. Ma Jitao</b>	Sep-09 - Mar-10
6	<b>Puneet Saraswat</b>	Jul-10 - Aug-10 (Undergrad from ISM Dhanbad) ISM Dhanbad
7	<b>Prof. Utpal Dutta</b>	Jun-07 - Aug-10 (Summers 2007-2010) University of Alaska
8	<b>Prof. Yang Liu</b>	Sep-08 - Aug-09 China University of Petroleum
9	<b>Dr. Adrian Ciuciavara</b>	Jan-08 - May-09
10	<b>T. Vikranth Babu</b>	Jun-09 - Jul-09 (Undergrad from IIT Madras) IIT Madras
11	<b>Dr. Ravi Srivastava</b>	Mar-08 - May-09
12	<b>Dr. Armando Sena</b>	Oct-07 - Jun-09
13	<b>Dr. Jin Long</b>	May-06 - Sep-08 Post-doctoral Fellow
14	<b>Dr. A. Pal</b>	May-06 - Apr-08 Post-doctoral Fellow
15	<b>Dr. Abhijit Gangopadhyay</b>	Jan-06 - Oct-07 Post-doctoral Fellow
16	<b>Dr. Nimiisha Vedanti</b>	May-07 - Apr-08
17	<b>S. Rajput</b>	Dec-06 - Feb-07 Post-doctoral Fellow
18	<b>Joost van der Noot</b>	Jan-06 - Apr-06 Visiting Graduate Student Delft University
19	<b>S. Rajput</b>	Oct-06 – Nov-06 Visiting Graduate Student NGRI India

**MRINAL K. SEN****POST-DOCTORAL AND VISITING SCIENTISTS SPONSORED continued....**


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<b>20</b>	<b>Dr. Utpal Dutta</b>	Jul-05 - Jul-05 University of Alaska
<b>21</b>	<b>Dr. Murthi Guddati</b>	Jun-04 - Jul-04 Asst. Prof., University of North Carolina
<b>22</b>	<b>Dr. Y. Xia</b>	Jan-02 - Dec-03 Post-doctoral Fellow
<b>23</b>	<b>Dr. Qiaozhen Mu</b>	Jan-02 - Dec-03 Post-doctoral Fellow
<b>24</b>	<b>Dr. Wulfgang Bangerth</b>	Sep-03 - May-05 Post-doctoral Research Fellow (joint position Institute for Computational Engineering and Sciences (ICES) and UTIG
<b>25</b>	<b>Dr. Indrajit G. Roy</b>	Nov-00 - Aug-03 Post-doctoral Fellow
<b>26</b>	<b>Dr. Zhan Wu</b>	Sep-03 - May-04 Post-doctoral Fellow
<b>27</b>	<b>Dr. Ranjit K. Shaw</b>	Jun-02 - May-03 Post-doctoral Fellow
<b>28</b>	<b>Dr. Lopamudra Roy</b>	Jun-02 - May-03 Post-doctoral Fellow
<b>29</b>	<b>Prof. Robert Nowack</b>	Feb-01 - Feb-01 Visiting Scientist Purdue University
<b>30</b>	<b>Prof. Milton Porsani</b>	Jan-01 - Feb-01 Visiting Scientist
<b>31</b>	<b>Dr. J. Pestana</b>	Sep-98 - Aug-99 Post-doctoral Fellow
<b>32</b>	<b>Dr. Farup Akbar</b>	Jul-97 - Sep-98 Post-doctoral Fellow
<b>33</b>	<b>Dr. Roustam Seif</b>	Sep-98 - Aug-04 Research Fellow Programmer
<b>34</b>	<b>Dr. Jay Pulliam</b>	Jan-95 - Aug-97 Post-doctoral Fellow
<b>35</b>	<b>Dr. R. Phillip Bording</b>	Aug-95 - Jul-97 Post-doctoral Fellow



## CONTRACTS AND GRANTS AT THE UNIVERSITY OF TEXAS

**Current Support**

<b>Funding Agency</b>	<b>Project/Investigators</b>	<b>Amount</b>	<b>Period</b>
Conoco-Philips	Joint Inversion of Seismic and Fluid Flow data <b>M. K. Sen</b>	\$301,000	09/01/14-08/31/15
US Dept of Energy	Seismic inversion for the estimation of crustal velocity structure– <b>Sen and Pulliam</b>	\$600,000	06/01/09-08/31/14
Shell-UT Unconventional research	Seismic inversion constrained by novel rock physics modeling and geostatistical simulation in liquid rich shales <b>Sen, Spikes, Srinivasan and Torres-Verdin</b>	\$867,783	09/01/12-12/31/2015
Various oil & service companies	<b>Sen and Spikes</b>	EDGER \$40,000 per year per sponsor	Multi-year

**COMPLETED PROJECTS**

US Dept of Energy	<b>Center for Frontiers of Subsurface Energy Security</b> 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, <b>M. K. Sen</b> , S. Srinivasan, M. Wheeler	\$3M/yr	5 years starting Aug 1, 2009
KAUST AEA			
Shell USA/UT Jackson School of Geosciences (Shell Game Changer Project)	WEMI–wave equation migration inversion <b>Sen–UTIG, Fornel-BEG</b>	\$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, <b>M. K. Sen</b>	\$500,000	06/01/06–05/31/09

**Current Support**

<b>Funding Agency</b>	<b>Project/Investigators</b>	<b>Amount</b>	<b>Period</b>
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 <b>Sen</b> 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 <b>Sen</b> –Institute for Geophysics	\$2.3 million	09/01–09/05
US Dept of Energy	Determination of crustal structure by inversion of shear-coupled PL waves using global optimization–Pulliam and <b>Sen</b>	\$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– <b>Sen</b>	\$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 <b>Sen</b> –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, <b>Sen</b> , Frohlich, and Grand	\$438,492	08/00–07/06
DTRA (Subcontract from IAT)	Airrbore GPR for the detection of underground facilities Stoffa and <b>Sen</b>	\$140,000	08/00–12/01

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NSF Ocean Sciences	“Collaborative Research: 3-D Seismic Imaging of an Active Margin Hydrate System –Oregon Continental Margin.” Nathan L. Bangs, Mrinal K. <b>Sen</b> and Yosio Nakamura	\$524,993	01/00–12/02
Joint Industry	“SLOSEIS: Slowness Analysis, Waveform Inversion and Uncertainty Estimation in VTI Media.” Mrinal K. <b>Sen</b> and Paul L. Stoffa	\$210,000	01/98–12/01
NSF Earth Sciences EAR-9725427	“Parameter Estimation in Anisotropic Media.” Mrinal K. <b>Sen</b> and Jay Pulliam	\$170,000	01/98–12/01
NSF Ocean Sciences OCE-9724555	“Acquisition of an Origin 2000 for Seismic Research.” Stoffa, Shipley, <b>Sen</b> , and Bangs	\$399,112	09/97–08/00
Mobil Oil Company	3D Multiple Attenuation Methods– Feasibility Studies–Mrinal K. <b>Sen</b>	\$12,000	01/99–12/99
NSF Ocean Sciences OCE-9503412	“Rock property estimation by AVO inversion of marine seismic data.” Mrinal K. <b>Sen</b> and Paul L. Stoffa	\$292,980	11/95–10/99
Texas Higher Education Coordinating Board	“Anisotropic Earth Model Calculations.” Mrinal K. <b>Sen</b> and Paul L. Stoffa	\$107,157	01/96–08/98
NSF Earth Science EAR-9304417	“Neural Computing in Geophysics.” Mrinal K. <b>Sen</b> and Paul L. Stoffa	\$313,469	07/93–07/96
Texas Higher Education Coordinating Board	“Hybrid Linear/nonlinear of seismic waveform inversion.” Mrinal K. <b>Sen</b> 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. <b>Sen</b>	\$60,000	01/95–12/95
ONR	“Imaging of Ocean Subbottom Structure.” Mrinal K. <b>Sen</b>	\$32,929	09/93–12/95
Cray time award	“Seismic Velocity Analysis using Neural Networks” Mrinal K. <b>Sen</b>		
Cray Research, Inc.	“Prestack Migration-Inversion of Seismic Gathers.” Paul L. Stoffa and Mrinal K. <b>Sen</b>	\$49,000	01/93–12/93

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ONR N00014-92-J-6001	“Imaging of Ocean Subbottom Structure Using Swath Mapping Data.” Mrinal K. <b>Sen</b> 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. <b>Sen</b>	\$60,000	01/92–12/92
NSF Earth Science EAR-9105922	“Non-linear inversion of plane wave seismograms using global optimization methods” Mrinal K. <b>Sen</b> 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. <b>Sen</b> 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. <b>Sen</b>	\$130,000	88–90