



Institute Lecture

Subsurface Imaging: Challenges and Opportunities

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and
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Monday, 9th April, 2012; Time: 6:00 PM, Venue: L-1, Lecture Hall Complex

Abstract

Earth science problem statements are easy to understand but difficult to solve. The basic requirement is to obtain detailed multi-scale images of the earth's interior from surface measurements. Although the technology for and the principles behind subsurface imaging are very similar, the problem is highly ill-posed. Earthquakes recorded on worldwide network of seismometers are our primary source of data. Earthquakes typically occur at well-defined boundaries and seismometers are placed at sparse locations. Thus many parts of the earth are devoid of ray paths. To address this issue, new passive experiments are being set up with large arrays of seismometers placed on the earth in a roll-along mode. Similar principles are being used in active seismic experiments for detailed imaging of hydrocarbon reservoirs, mapping of fluid flow for hydrocarbon production, monitoring of subsurface CO₂ movements and earthquake hazard assessment. Our problem involves multi-physics and multi-scale. It is data and compute intensive. The problem can be best addressed by a multi-disciplinary approach and this offers tremendous opportunities to scientists and engineers with disparate and overlapping expertise.

About the speaker

Prof. Mrinal K. Sen received an M.Sc degree (five-year integrated) from the Indian School of Mines and Ph.D from the University of Hawaii at Manoa. He is currently a Jackson chair Professor in Applied Seismology and a faculty member in the computational and applied mathematics program at the University of Texas of Austin in USA.

In January 2012, on leave from UT Austin, Prof. Sen took over as director of the National Geophysical Research Institute at Hyderabad. Prof. Sen's research areas include seismic wave propagation, inverse problems, seismic imaging, reservoir characterization and computational geophysics. He is an expert on seismic wave propagation including anisotropy and fractures, and develops analytic and numerical techniques for forward and inverse modeling. Prof. Sen is well known for his work on global optimization methods in geophysical inversion. He is the principal author of two books on geophysical inversion, co-author of over 150 papers in peer-reviewed journals and has supervised over 50 doctoral students and post-doctoral fellows. Prof. Sen serves on several national and international committees and is an associate editor of leading journals such as Geophysics, Journal of seismic exploration and International Journal of Geophysics. He has been an instructor of several industry short courses including one on 'Full Waveform Inversion' for the Society of Exploration Geophysicists (USA), which is being offered worldwide.

Tea at 5.45 PM

All interested are welcome.

A. K. Chaturvedi
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