



SPG India, Jorhat Chapter organizes an online lecture on 'Interactive demonstration of travel-time tomography, Kirchhoff migration, and Full-Waveform Inversion (FWI),' on

11th September 2025

The SPG Jorhat Chapter successfully organized an online lecture on 11th September 2025, featuring Dr. Pawan Bhardwaj, Assistant Professor at the Indian Institute of Science (IISc), Bengaluru. The session, titled '*Interactive demonstration of travel-time tomography, Kirchhoff migration, and Full-Waveform Inversion (FWI)*,' provided an in-depth overview of advanced seismic imaging and inversion techniques that are critical for subsurface characterization and hydrocarbon exploration.

The program was held under the esteemed guidance of Mr. Ranbir Singh, President, SPG India, who delivered the inaugural address. Mr. Pankaj Bikash Sharmah, Vice-President, SPG Jorhat Chapter, extended a cordial welcome to the participants.

The session was focused on advanced seismic imaging techniques, with particular emphasis on travel-time tomography, Kirchhoff migration, and Full-Waveform Inversion (FWI). These state-of-the-art methodologies significantly enhance the resolution and reliability of subsurface imaging, enabling more precise interpretation and thereby supporting accurate hydrocarbon exploration and effective reservoir characterization.

The lecture offered participants a balanced blend of theoretical perspectives and interactive demonstrations. A key highlight was the emphasis on the application of ray theory and the Born approximation in formulating the Full-Waveform Inversion (FWI) technique. The underlying mathematical frameworks and derivations were articulated with clarity, effectively demystifying complex concepts and making them more accessible to the audience.

The lecture further highlighted the complementary strengths of advanced seismic methodologies, demonstrating how travel-time tomography aids in developing velocity models, Kirchhoff migration refines structural imaging, and Full-Waveform Inversion (FWI) achieves high-resolution inversion by leveraging the complete seismic waveform.

This systematic comparison enabled participants to understand the relative strengths, limitations, and practical applications of each methodology, providing valuable insights into their effective deployment in real-world exploration scenarios.

The session was exceptionally well-received, attracting the active participation of geoscientists, researchers, and students. Attendees engaged in dynamic discussions with the speaker, posing questions and exchanging insights, which fostered a collaborative learning environment. This interactive engagement not only enriched participants' comprehension of advanced seismic imaging methodologies but also facilitated a deeper appreciation of their practical applications in hydrocarbon exploration and reservoir characterization, thereby reinforcing the strategic value of such knowledge-sharing initiatives for professional development within the geoscience community.

The SPG Regional Chapter, Jorhat, extends its sincere appreciation to Dr. Pawan Bhardwaj for delivering an insightful lecture, to Mr. Ranbir Singh, for his guidance and encouragement, and to all participants for their active engagement.

The SPG Regional Chapter, Jorhat also, express our heartfelt gratitude to the Executive Director–Basin Manager, A&AA Basin, ONGC, for his steadfast guidance, strategic support, and encouragement, which were instrumental in the successful organization and execution of the program.

We sincerely acknowledge A&AA Basin for providing the essential facilities that ensured the smooth conduct of the program. Special thanks are extended to RCC Jorhat and the Infocom Section, Jorhat, for their seamless technical and infrastructure support. The SPG Regional Chapter, Jorhat, also expresses gratitude to the SPG Central Body for their continued assistance and cooperation. The program was concluded with a Vote of Thanks delivered by Mr. Ashish Chauhan, Secretary, SPG Regional Chapter, Jorhat.



(Shri Ranbir Singh, President SPG India, delivering the opening remarks through VC)



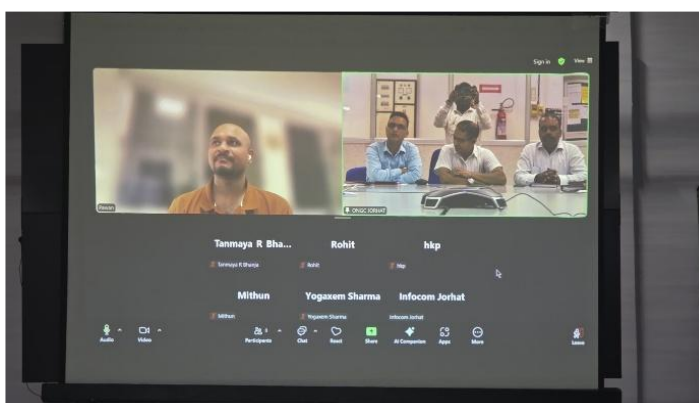
(Dr. Pawan Bhardwaj delivering the online lecture on advanced seismic imaging techniques)



(Participants attending the session both virtually and offline, engaging in discussions)



(Participants attending the session both virtually and offline, engaging in discussions)



(Interactive Q&A segment with active participation from attendees)

With encouraging participation and expert guidance, the Chapter looks forward to organizing more such engaging and impactful programs in the future.

Did you know?

- The Earth's inner core **rotates slightly faster than the surface**.
- The Earth's mantle, though solid, behaves like a **very slow-moving fluid over millions of years**.
- The Earth's crust is broken into over a dozen tectonic plates that constantly move at speeds of a few centimeters per year, **about the speed your fingernails grow**.
- The **largest earthquake ever recorded** was the 1960 Valdivia earthquake in Chile, with a magnitude of 9.5!
- Hotspots like Hawaii are caused by plumes of hot mantle rock rising from deep inside the Earth, **creating volcanic islands far from plate boundaries**.