Bay Area Geophysical Society Seminar Series

Waveforms, distributed sensing, and sparse acquisitions: strategies for adapting seismic technology for modern monitoring

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Abstract:

In the imaging and inversion problem within applied seismology today, the longstanding tension between the need for full physics models and developing uncertainty measures, on the one hand, and the need to tightly constrain acquisition and processing costs on the other, is increasing dramatically. In the research domain this motivates the search for novel acquisition and inverse methods. I will describe progress towards development and assessment of an integrated DAS (distributed acoustic sensing), VSP (vertical seismic profiling), and FWI (full waveform inversion) based program for monitoring which strikes a promising balance in the above sense. Newly designed shaped fiberoptic deployments, machine learning based uncertainty estimates, and time-lapse analysis through "targeted null-space shuttles" feature in this approach.

Author:

Kris Innanen received the BSc (Earth Science/Physics) and MSc (Physics) degrees from York University, and the PhD degree in Geophysics from the University of British Columbia in 2003. He joined the Department of Physics at the University of Houston in 2005, and the Department of Geoscience (now the Department of Earth, Energy, and Environment) at the University of Calgary in 2009. In 2016, he became the Director of the Consortium for Research in Elastic Wave Exploration Seismology (CREWES). In 2023, Kris also took on the role of Associate Dean (Research) within the Faculty of Science at the University of Calgary. In 2006, Kris received the J. Clarence Karcher award from the Society of Exploration Geophysicists, and in 2024, he and co-authors won the Best Paper award from the journal Geophysics.

Zoom meeting information:

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