Bay Area Geophysical Society Seminar Series

BAGS
BAY AREA GEOPHYSICAL SOCIETY

Advancing Big Data Analysis in Seismology with Machine Learning and Cloud Computing

Weiqiang Zhu

June 25, 2025 5:30 PM

265 McCone Hall

UC Berkeley Campus

Abstract: The exponential growth of seismic data from long-term monitoring (large-T) and dense seismic networks (large-N) presents both new opportunities and computational challenges for earthquake science. Advances in deep learning and cloud computing provide powerful tools to overcome these challenges, enabling detection of previously missed seismic events and revealing new insights into earthquake processes. Through continuous development of training datasets, machine learning models, and cloud workflows for mining California seismic archives, we demonstrate significant improvements in earthquake detection capabilities and data processing efficiency, analyzing decades of continuous waveforms within days. This framework extends naturally to emerging technologies such as Distributed Acoustic Sensing (DAS), which can generate up to terabytes of data per day. The convergence of big data technologies in machine learning and cloud computing provide new capabilities for seismic data analysis, enabling new scientific discoveries in earthquake science and practical applications in earthquake monitoring.:

Weiqiang Zhu is an assistant professor in the Department of Earth and Planetary Science at University of California, Berkeley. He received his Ph.D. in Geophysics and Ph.D. minor in Computer Science from Stanford University in 2021. His research centers on understanding earthquake physics and statistics by applying cutting-edge artificial intelligence and scientific computing to gain insights from large seismic datasets.

Website: https://eps.berkeley.edu/people/weiqiang-zhu

Zoom meeting ID   858 5859 7485

Login PW   BAGS4ever