This session focuses on the application of machine learning techniques to the analysis of seismic, infrasound, hydro-acoustic, remote sensing, electromagnetic, and other signals. The goals of machine learning applied to these signals include improved signal and event detection, phase identification, event discrimination, signal association, explosive yield estimation, and general signal and source characterization.

Applications of Data Science and Machine Learning in Seismology

We currently are experiencing a dramatic increase in the volume, variety, and velocity of data in seismology. Methods and tools from data science and machine learning enable characterization of different types of signals, noise reduction, event detection, phase identification, seismic source characterization, inference of Earth’s seismic structure, and novel visualizations. With all the data available to researchers and practitioners in the field of seismology and advances in computational systems, there are great opportunities for data science and machine learning algorithms to extract meaningful insights for reducing earthquake hazards, understanding plate tectonics, earthquakes and earth structures, and improving the detection and limiting the proliferation of nuclear weapons. We encourage contributions on the methods and results of combining techniques and tools from data science and machine learning with seismology.

Machine learning/Statistical Learning gives computers the ability to learn from past data or experience and addresses some tasks even difficult for human beings. Various techniques as classifications, regressions, clustering, anomaly detection and so on have already been successfully applied to seismology in various field: characterize different types of signals, noise reduction, event detection, phase identification, seismic source characterization, inference of Earth’s seismic structure, and so on. In this session, we would like to invite contributions related to apply machine learning techniques to various seismological problems to understand earthquakes and earth structures. Applying existing methods or developing new methods are all welcomed.

Data science and Seismology

We draw many insights in seismology from various types of data to reduce earthquake hazards, understand plate tectonics, earthquakes and earth structures. We currently are experiencing a dramatic increasing in the volume, variety and velocity of data in seismology. New methods and tools from data science enable us to work on large-scale datasets more efficiently in seismology. In this session, we invite contributions that applying machine learning algorithms, novel visualizations, new tools or platforms to draw interesting insights from various geophysical datasets, either small or large scale. We hope to encourage discussions on the great potential when combining techniques or tools from data science with seismology.