INTERNATIONAL GEOMECHANICS CONFERENCE

17-19 NOVEMBER 2026
CHENGDU, CHINA

MAURICE B DUSSEAULT

UNIVERSITY OF WATERLOO

Forty years of experience across subsurface technologies. Author of 295 journal papers and 500 conference publications, with patents in subsurface technologies and government and industry consulting spanning more than 50 companies worldwide.

PRESENTATION TITLE

SEISMIC RISK ASSESSMENT AND MANAGEMENT IN SUBSURFACE PROCESSES

Maurice B Dusseault and Ali Yaghoubi, University of Waterloo, Ontario, Canada

Induced seismicity presents significant technical, financial, and regulatory challenges for subsurface projects, including CO_2 storage, geothermal energy, and hydraulic stimulation. Unexpected seismic events can impact operations, infrastructure, public confidence, and project viability. This session explores practical approaches to assessing seismic risk, estimating occurrence probability, and implementing effective management strategies such as traffic-light protocols and monitoring systems.

WHAT YOU'LL LEARN

- Understanding induced seismicity risks and impacts
- Quantitative risk assessment methodologies
- Traffic-light protocols and surveillance strategies
- Managing regulatory and stakeholder concerns
- Insights for adaptive risk management and ongoing monitoring

CASE STUDIES IN

CO_2 Sequestration
Storage-induced seismic response

Geothermal Energy Systems
Stimulation and reservoir risk

Hydraulic Stimulation
Operational pressure monitoring

Deep Geological Storage
Long-term containment integrity

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JOHN MCLENNAN

UNIVERSITY OF UTAH

Faculty member at the University of Utah since 2009, with nearly thirty years of prior industry experience at Dowell Schlumberger, TerraTek, Advantek International, and ASRC Energy Services. Co-principal investigator for the Utah FORGE project and ARMA Fellow and past president.

PRESENTATION TITLE

GEOMECHANICAL MYSTERIES OF GEOTHERMAL DEVELOPMENT

Geothermal exploration and development have grown exponentially over the last five years, across conventional hydrothermal, advanced, and enhanced geothermal systems (EGS) alike — but optimization and cost reduction remain ongoing challenges. Drawing on field and literature data from the Utah FORGE project, this session examines how geomechanical and operational insights can address three key EGS challenges: natural fracture conformance, elevated injection pressure, and water losses during circulation.

WHAT YOU'LL LEARN

- How natural fractures affect stimulation conformance
- Managing elevated injection pressure in EGS circulation
- Sources and impact of water losses between wells
- Why EGS proppant design differs from shale stimulation
- Field lessons from the Utah FORGE site

KEY CONSIDERATIONS

Fracture Conformance
Multi-stage corridor overlap at FORGE

Elevated Injection Pressure
Parasitic loads during circulation

Water Losses
Injector-producer fluid loss over time

Proppant & Conductivity
Larger-diameter proppant for EGS flow

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DEREK ELSWORTH

PENNSYLVANIA STATE UNIVERSITY

Co-director of the Center for Geomechanics, Geofluids, and Geohazards at Penn State, working in computational and rock mechanics and the transport characteristics of fractured rock, with application to geothermal energy, CO_2 and radioactive waste sequestration, unconventional hydrocarbons, and volcano instability.

PRESENTATION TITLE

FORECASTING RATES, MAGNITUDE, AND IMPACTS OF FLUID-INJECTION INDUCED SEISMICITY

ENERGY AND MINERAL ENGINEERING & GEOSCIENCES, G^3 CENTER AND EMS ENERGY INSTITUTE, PENNSYLVANIA STATE UNIVERSITY, UNIVERSITY PARK, USA

Microearthquakes are common during stimulation and fluid injection in subsurface reservoirs — beneficial in that they create connected permeability, but hazardous if they grow too large. This session explores what controls the magnitude scaling of these events relative to injection volume and rate, the role of pre-existing stress and thermal effects in bounding maximum magnitudes, and a machine-learning approach to forecasting induced seismicity using field data from the EGS-Collab and Utah FORGE projects.

WHAT YOU'LL LEARN

- How microearthquake magnitude scales with injection volume
- The role of contained vs. rupture-extending events
- How stress and thermal effects bound maximum magnitude
- Machine learning forecasts using EGS-Collab and FORGE data
- Using seismicity as a diagnostic for permeability evolution

KEY CONSIDERATIONS

Magnitude Scaling
Injection volume and rate dependence

Pressure Gradients
Space-time indicators of strength drawdown

Forecasting Models
Physics-informed machine learning

Permeability Diagnostics
Seismic moment as a reservoir signal