



INTERNATIONAL GEOMECHANICS CONFERENCE

17-19 NOVEMBER 2026
CHENGDU, CHINA

TECHNICAL KEYNOTE



MARK D. ZOBACK

EMERITUS, STANFORD UNIVERSITY

Leading expert in in situ stress, fault mechanics, and reservoir geomechanics, with research spanning unconventional energy production and CO₂ sequestration. Author of two textbooks and approximately 400 technical papers, and elected to the U.S. National Academy of Engineering. Recipient of the SEG Maurice Ewing Medal, the Society's highest honor.

PRESENTATION TITLE

VISCOPLASTIC STRESS RELAXATION IN UNCONVENTIONAL GEOMECHANICS: OPTIMIZING HYDRAULIC FRACTURE PROPAGATION AND PREDICTING OPENING AND SHEAR ON SUB-HORIZONTAL PLANES

MARK D. ZOBACK, EMERITUS STANFORD UNIVERSITY | SENIOR ADVISOR, RESFRAC CORPORATION

WHAT YOU'LL LEARN

In this talk, layer-to-layer variations of lithology are demonstrated to control the magnitude of S_{hmin} and can be used to accurately predict variations in the magnitude of S_{hmin} with depth. It is well established that the success of unconventional oil and gas wells depends on the effectiveness of multistage hydraulic fracturing to stimulate production. After reviewing basic theory and a decade of laboratory studies, the talk illustrates how predictable variations of stress magnitude with depth affect hydraulic fracture propagation. In the context of VSR, cases in which there is essentially complete stress relaxation help explain occasional observations of the least principal stress being nearly equal to the overburden stress, as well as sub-horizontal hydraulic fracture propagation and shear slip on sub-horizontal planes.



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TRAINING WITH FELLOWS



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 CO₂ 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

- CO₂ 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, CO₂ 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, G³ 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