

Controlling Induced Seismicity: Theory, Models, and Validation

Dr. Luke P. Frash
GTW New Mexico Inc

Thursday, October 1, 2026, 9 a.m. Central Time



Dr. Luke Frash is a Director of GTW New Mexico Inc. His presentation will be at 9:00 Central Time on Thursday, October 1, 2026. The topic is **“Controlling Induced Seismicity: Theory, Models, and Validation.”**

Abstract

The conventional approach to managing induced seismic risk focuses on a single well at a time by limiting injection or production flow rates and pressures in response to observed seismic activity. This approach is effective for saltwater disposal wells because of the direct link between pressure, flow rate, and seismic tendency. To improve on this method, multi-lateral wells can be used to prevent seismicity by leveraging fracture caging. Suitable for unconventional oil and gas, enhanced oil recovery, or geothermal energy applications, offset bounding wells can be configured to produce fluid during stimulation or injection operations. This serves to reduce fluid leak-off and reduce seismic risk. The concept is inspired by the EGS Collab project at Sanford Underground Research Facility where monitoring wells were able to produce more than 90% of the injected fluid before the fluid could reach the intended production well that had been positioned further out than the monitoring wells. Today, the concept is supported by theory, numerical models, and additional lab tests that collectively demonstrate the viability of seismicity control via fracture caging with multi-lateral wells. This talk presents new experiments and recent models that confirm the viability of fracture caging at the field scale. This supports our planned 8 MW geothermal pilot test to demonstrate the economic viability of a fracture caged system. Live questions and feedback are encouraged during this talk.

Biography

Dr. Luke P. Frash has more than 16 years of experience completing research on coupled rock fracture and fluid flow processes. This began with 300 mm true-triaxial laboratory hydraulic fracture tests using doublet and triplet well layouts in granite for his graduate studies at Colorado School of Mines – in collaboration with Jesse Hampton, Ingrid Tomac, Dharmendra Kumar, Marte Gutierrez, and Azra Tutuncu. From 2015, this work continued at Los Alamos National Laboratory which led to the discovery of fracture caging through an increased focus on fracture-flow coupled processes – in collaboration with Bill Carey, Nathan Welch, Yerkezhan Madenova, Bijay KC, Tim Kneafsey, Tom Doe, Pengcheng Fu, Hunter Knox, Anne Menafee, Ryan Rhodes, and many more. This work would not have been possible without support from many other researchers, most of whom are part of the ARMA community today. Now in 2026, Dr. Frash is transitioning this work into practice by founding GTW New Mexico Inc to pursue commercial geothermal development with active projects in the United States and abroad.