SOUTH DAKOTA MINES
An engineering, science and technology university

Department of Geology and Geological Engineering
GGE Research Highlights…

https://sites.google.com/sdsmt.edu/subsurface-geomechanics-lab/home

Please visit Dr. Ye's research page to learn more about his research!

SDSM&T Geology & Geological Engineering
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GGE Research Highlights…

Dr. Zhi Ye's research primarily focuses on reservoir geomechanics, rock mechanics, and experimental rock deformation. He aims to integrate multidisciplinary knowledge of geomechanics, geophysics, and engineering rock mechanics to understand the coupled THMC (thermo-hydro-mechanical-chemical) processes and their associated seismic response of rocks and rock fractures subjected to fluid injection within the Earth's upper crust. The objective of his research is to provide useful insights for engineering geo-energy and storage reservoirs in an effective manner while mitigating the associated environmental issues.

His current research primarily focuses on four main themes. First, in Unlocking the Potential of Enhanced Geothermal Systems (EGS), he investigates optimal hydraulic stimulation techniques to enhance and sustain reservoir permeability for economic geothermal production from hot-dry rocks. He also studies the coupled process governing fluid transport and heat extraction over time. Second, in Interpretation and Mitigation of Induced Seismicity, he explores the physical mechanisms controlling the transition between aseismic and seismic deformation during fluid injection. He examines the underlying relationships of fracture deformation, friction, permeability, and seismicity. Third, in Geomechanical Aspects of Geological Carbon Storage and Utilization, he studies the application of CO_2 as a fracking fluid for reservoir stimulation. He addresses the coupled effects of CO_2 injection on enhanced hydraulic fracturing and fluid transport in shale and geothermal reservoirs. He also investigates the physical responses of caprocks subjected to CO_2 injection. Fourth, in Development of Shale Oil & Gas Resources, he develops and tests new proppant materials for shale stimulation. Additionally, he pursues reliable interpretation methods of DFIT or minifrac tests for the determination of in-situ stress.

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