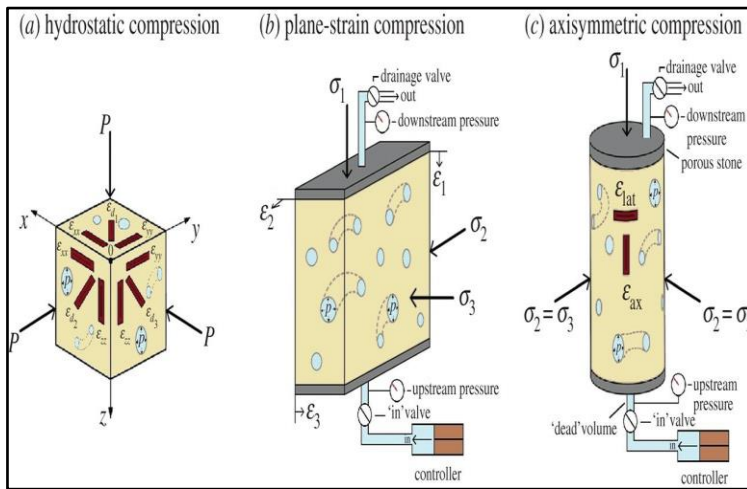




Geomechanical Testing for Geo-Energy Applications

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Shallow sedimentary formations are being considered for geo-energy applications, including CO₂ and nuclear waste storage and geo-energy production. Proper functioning of the related projects requires accurate characterization of hydro-mechanical behavior of the rock. Experimental techniques were developed to saturate high-permeable (sandstones and limestones) and low-permeable geomaterials (shales) with different fluids, including oil, water, brine, and carbon dioxide. High-pressure conventional triaxial, oedometric, and plane strain compression testing methods were utilized to measure poroelastic, inelastic, failure, and flow properties. Additionally, chemical and viscous effects were detected and predicted to have important implications for long-term storage projects.

About the speaker: Dr. Makhnenko received his undergraduate degree in mechanics and applied mathematics at Lomonosov Moscow State University, Russia, in 2007. He then obtained his MS (2009) and PhD (2013) in geological and civil engineering from the University of Minnesota-Twin Cities. From 2013 to 2016, Roman worked as a postdoctoral researcher and lecturer at the Swiss Federal Institute of Technology in Lausanne (EPFL, Switzerland). Since December 2016, he is an assistant professor in geotechnical engineering at the University of Illinois. Dr. Makhnenko has expertise in geomechanics and development of novel methods in laboratory characterization of fluid-saturated geomaterials under elevated temperatures and pressures with applications to deep CO₂ storage, gas shales, and hydraulic fracturing.

11:00 AM

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