Title: Evaluating Natural Fracture Growth in Shale Caprocks during cold CO₂ Injection

Abstract:
The potential growth of multiple fractures is investigated during the deformation of the caprock of a reservoir during the subsurface sequestration of CO₂. Multiple scenarios of the interaction of pre-existing natural fractures are investigated, as a function of induced stress changes due to the temperature contrast between the injected CO₂ and the reservoir. Simulations are performed at the field scale, on a simplified geologically-informed model of the Heletz pilot test site, Israel, in the framework of the EU-sponsored TRUST project. The potential reactivation and growth of pre-existing natural fractures is investigated. During cold injection, changes in the strain field around the well are tracked. The progression of the temperature plume is observed to cause a local release of stresses that in turn causes short propagation episodes, which mostly focus on downward growth. Although some upwards growth is modeled, growth is expected to prominently occur towards the reservoir.

Bio:
Dr. Adriana Paluszny obtained a degree in Computational Engineering from the Universidad Simón Bolívar, Caracas, Venezuela. She then completed her PhD in Computational Geomechanics at Imperial College London in 2009, and shortly thereafter became a Post-Doctoral Research Associate in the Rio Tinto Centre for Advanced Mineral Recovery at ICL. She is currently a Research Fellow in the Department of Earth Science and Engineering at ICL, where she works on CO₂ sequestration, hydraulic fracturing in shale, rock drilling, effective permeability of fractured rocks, and emerging methods in computational fracture mechanics. She was recently awarded a Royal Society Tata University Research Fellowship. She has published two dozen journal papers, and eleven ARMA/ISRM papers, on topics such as numerical modelling of fracture growth, fluid flow through fractured and porous media, and rock fragmentation.