

A Numerical Exploration of Hydraulic Fracture Interference

Dr. Christine Detournay

Thursday May 13, 2021, 9 a.m. Central Time



Dr. Christine Detournay, Principal Engineer, Itasca Consulting Group, will speak on Thursday, May 13, 2021.

The topic is “A Numerical Exploration of Hydraulic Fracture Interference.”

Abstract

Laboratory and large-scale experiments are invaluable tools to study fracture interference. To support this effort, we use 3D numerical simulations to predict and investigate possible modes of fracture interference and clarify the underlying mechanisms. The benefit of physically based numerical modeling is that it offers the advantages of unrestricted experimentation possibilities and repeatability. The qualitative aspect of the findings may uncover surprising results that demand experimental confirmation and may lead to increased understanding. A short inventory of cases of fracture interference, observed over the past 10 years of using a 3D lattice-based numerical code is presented in this talk. The stress shadow effect is one of the main factors influencing fracture interference, and the effect is shown in a simple stress analysis.

Biography

Christine Detournay started working as a consultant for Itasca in 1986, where she is now a Principal Engineer. She holds a Geoengineering degree from the University of Liege, Belgium and a MSc and PhD degrees in Civil Engineering from the University of Minnesota. Her expertise is in the development of numerical models for application to coupled fluid-thermo-mechanical problems. She has contributed in the development of several Itasca codes, including FLAC, FLAC3D, 3DEC, and XSite. She is a principal developer for the groundwater-flow and thermal logic in FLAC3D and has been involved in the implementation of several of the constitutive models available with Itasca continuum codes. She has worked in consulting and development for various projects related to the oil and gas industry, including hydraulic fracturing, as well as

on projects pertaining to underground waste repository, geothermal applications, slope stability, soil liquefaction and CO₂ sequestration. She has co-authored more than 65 publications, including conference papers, journal papers, and book chapters.