Hydrofracturing in the Laboratory: Material Dependence in Simple Systems

Andrew Belmonte
Department of Mathematics and Materials Science & Engineering
W. G. Pritchard Laboratories
Penn State University
andrew.belmonte@gmail.com
http://www.math.psu.edu/belmonte

In collaboration with Chris Marone (Dept of Geosciences, G^3 Center) and Derek Elsworth (Dept of Energy and Mineral Engineering, G^3 Center), I am studying the fluid-driven fracture of simple, well-characterized materials that may act as appropriate surrogates for gas shales, with an eye to the development and detailed testing of mathematical models. Our laboratory experiments have focused on material dependence for various non-aqueous propellants, and will include the effects of material parameters (elastic properties, anisotropy, porosity) on the fracture dynamics.