Pattern Formation in Fluid Injection into Granular Media: 
*Transition from Viscous Fingering to Hydraulic Fracturing*

Haiying Huang, School of Civil and Environmental Engineering
Georgia Institute of Technology

Numerical simulations of fluid injection from a circular wellbore using the discrete element method coupled with a porescale network model, showing the effect of inject rate on the grain displacement and infiltration patterns (injection rate increases from left to right and from top to bottom; colors are associated with the pore pressure magnitude).