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Fluid flow in discrete fractures in Enhanced/Engineered Systems, consequences of interconnected fractures, buoyancy, and fracture roughness[1] DON FOX, DONALD KOCH, JEFFERSON TESTER, School of Chemical and Biomolecular Engineering — In Enhanced/Engineered Geothermal Systems (EGS), fluid flow in the discrete fracture network governs how thermal energy is "farmed" from the systems. The flow is created by an injection and production well but apart from pressure driven flow, temperature gradients will also cause natural convection in the system. Due to the roughness and shearing of the fractures, the aperture of fracture varies spatially and has been shown to be self-affine. Fracture roughness can lead to flow channeling where most of the flow is conducted through a single pathway. Knowing the flow regime is also important in understanding the behavior of tracers that are injected into the system. The tracer's residence time distribution is used to determine characteristics of the fractures and how they are possibly connected. This presentation will focus on how one would model the fluid flow in EGS and the consequences caused by interconnection, fracture roughness, and buoyancy have on fluid flow, how energy is extracted, and the behavior of tracers.

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