

UNIVERSITY of HOUSTON

Department of Mathematics

Scientific Computing Seminar

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**A sequential discontinuous Galerkin method
for three-phase flows in porous media**

Monday, APRIL 4, 2022
3 PM- 3:50 PM
Room 646 PGH

Abstract: In this talk, we first present and analyze a sequential discontinuous Galerkin method for the incompressible three-phase flow problem in porous media. We show existence and uniqueness of a discrete solution and obtain a priori error estimates. Then, we present a formulation for the black oil problem which uses as primary unknowns the liquid pressure and the aqueous and liquid saturations. This choice of primary variable produces a well-posed numerical scheme without any stringent restriction on the data, and without the introduction of nonphysical quantities. The equations are solved sequentially using an implicit time stepping scheme. We demonstrate the convergence properties of the method numerically, and present different realistic simulations such as injection problems in highly heterogeneous media, and viscous fingering.