

Date: **October 15th**

Time: **10:30 AM**

Location: **Olin 305**

Speaker: **Dr. Dr. Daniel Anderson**
 George Mason University

Title: **"On Gravity Currents in Heterogeneous Porous Media"**

Abstract

Dr. Anderson's presentation will explore the problem of a moving free surface in a water-saturated porous media that has either a homogeneous or a periodically heterogeneous permeability field. According to Dr. Anderson, We will identify scaling relations and derive similarity solutions for the homogeneous, constant coefficient case. We will derive averaged solutions using homogenization for a vertically periodic, a horizontally periodic, and a two-dimensional periodic case. Using effective coefficients, we will then connect these homogenized solutions to the similarity scaling solution derived for the homogeneous case. By simplifying to a thin limit, retaining variations of the porous media in the horizontal direction, we will derive a homogenization solution in agreement with the general horizontally layered solution and an expression for the leading order correction. We will implement two numerical solution approaches and show that self-similar scaling and agreement with leading order averaging emerge in finite time. Finally, we will examine the accuracy and convergence rate of the leading order and correction terms for both the interior and the boundary of the domain.