

COLLOQUIUM
UNIVERSITY OF PITTSBURGH
SEPTEMBER 15, 2006
704 THACKERAY HALL
4:00 P.M.

SPEAKER: **PROFESSOR BEATRICE RIVIERE**

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TITLE: **COMPLEX FLOW PROCESSES WITH APPLICATIONS IN
POROUS MEDIA**

ABSTRACT: Accurately modeling complex flow processes in porous media is important in many engineering, industrial and medical applications. There is a need for high order numerical methods that can handle complicated geometries, discontinuous coefficients and adaptive unstructured meshes. One promising candidate is the class of locally conservative discontinuous Galerkin (DG) methods, which have been recently introduced.

In this talk we first present some DG methods for incompressible multiphase flow. We show simulations of benchmark problems using both implicit and explicit formulations. Mesh adaptivity and p convergence are investigated. Second, we study the coupling of surface flow with subsurface flow. Surface flow is characterized either by Stokes or Navier-Stokes equations whereas subsurface flow is characterized by Darcy equations. Special interface conditions are considered between the subregions. A priori error estimates are presented.