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Joint Environmental Science Degree Program
Presents:

Lattice Boltzmann Simulation of Liquid Flow in Porous Media

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Date & Time: Thursday Oct. 23, 3:40 – 4:30 P.M.

Location: McLane Hall (H-wing), Room 280

Abstract: Recent advances in microtomographic imaging techniques have allowed unprecedented observations of fluid behavior and interfacial geometries at micron sized scales in three dimensions. At the same time, significant progress in the development of numerical models for simulating fluid mechanics allow us to compare observations and model results, providing insight into the scales at which effective macroscopic properties emerge from their basic constituents.

One of the promising modeling techniques is the Lattice Boltzmann method that offers a relatively simple means to approximate micro-scale flow as well as fluid-fluid and fluid-solid interactions. In this presentation we compare observations of micro-scale fluid saturations and interfacial geometries with simulations of a 3D two-phase Lattice Boltzmann model. The data used in this multidisciplinary study consist of three-dimensional pore-scale images of (air-water and oil-water) drainage and imbibition experiments. The images were obtained using the GSECARS microtomography beamline at the Advanced Photon Source (Argonne National Laboratory).

The presentation will use short movies to show work in progress, such as micro-tomographic observations and Lattice Boltzmann simulations. Other techniques to characterize and generate 3D pore structures will also be discussed. The presented work is a collaboration of scientists at UCR, USDA-ARS Salinity Laboratory, Oregon State University - Corvalis, University of Amsterdam (Netherlands), Technical University of Denmark, University of Notre Dame, and University of North-Carolina - Chapel Hill.

All members of the professional, educational, and research communities are welcome. For additional information, please contact the Earth & Environmental Sciences Department office at (559) 278-3086.