

Date: March 7

Time: 11:00 AM

Location: Maryland Hall 110

Speaker: Dr. W. Brent Lindquist

SUNY Stony Brook

Title: "*The geometry of primary drainage*"

Abstract

We show that arc menisci configuration under primary drainage in capillary tube cross sections and, by extension, in throats in the void structure of rock and soil, can be understood in terms of the computational geometry theory of medial axis analysis. The solution for arc meniscus configuration is developed for cross sections of arbitrary, simply connected polygonal shape at both entry- and over-pressure values during primary drainage for arbitrary values of wetting angle. Using this solution technique, we have obtained highly accurate solutions of entry pressure arc meniscus radius for over 21,500 throats obtained from analysis of computed tomography images in a suite of 4 Fontainebleau core samples ranging from 7.5% to 22% porosity. We show that the ratio A/P , of throat area to throat perimeter, is an excellent predictor of entry pressure meniscus radius (and hence entry pressure) for primary drainage for real pores, while inscribed radius and area equivalent radius over-predict entry pressure meniscus radius by factors of 1.5 to 3, and are consequently poor predictors.