Date: **March 25th, 2005**

Time: **10:30 AM**

Location: **Olin 305**

Speaker: **Dr. Uri Shavit**
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Title: **"Stitching Free Flows and Porous Media Flows"**

Abstract

Environments that combine porous regions (also called 'permeable' or 'obstructed' regions) and free flow regions are characterized by a complex flow regime (e.g., canopy flows). Although the flow field in these regions controls most of the processes that take place in the systems around them, no good prediction tools are available.

Such flows cover a large variety of regimes but share many of their characteristics. For example, unlike classical boundary layer flows, the velocity profiles around the interface resemble a mixing-layer type, consisting of an inflection point that plays a crucial role in the flow stability and transport phenomena.

We have recently developed a solution to the macroscopic laminar velocity profile across the interface of artificial porous structures. Fractal and non-Fractal geometries were used to develop the theory that led to a modification of the Brinkman equation (MBE). The MBE was than tested using detailed Particle Image Velocimetry (PIV) measurements and 2D and 3D numerical solutions.

We found that the Modified Brinkman Equation (MBE) provides an excellent tool to calculate the macroscopic velocity profile but it is limited to low *Re* number flows when the inertia is negligible.