

PHYSICAL MATHEMATICS SEMINAR

Flow in and around Submerged Aquatic Vegetation

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ABSTRACT:

This talk summarizes key aspects of vegetation hydrodynamics, making connections to the broader class of flow adjacent to porous layers. It will explore two case studies revealing how vegetation impacts flow and transport, and can influence vegetation spatial structure. If the vegetation is of sufficient stem density (solid volume fraction), the drag-discontinuity between the vegetation and adjacent open water generates a shear-layer at the vegetation interface. The shear-layer generates coherent vortices by Kelvin-Helmholtz (KH) instability. These vortices control the exchange of mass and momentum between the open channel and vegetated layer, influencing both the mean velocity profile, as well as the turbulent diffusivity. For submerged flexible canopies, the passage of the KH vortices generates a progressive wave along the canopy interface, termed *monami*. The KH vortices penetrate a distance d_e into the vegetation, with d_e set by the momentum absorption scale of the vegetation. This length-scale predicts both the roughness height and the displacement height of the overflow profile.



TUESDAY, NOVEMBER 2, 2010

2:30 PM

Building 2, Room 105

Refreshments at 3:30 PM in Building 2, Room 290



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