

# PHYSICAL MATHEMATICS SEMINAR

## THE STRUCTURE OF LEAF VENATION NETWORKS: RELATION WITH GROWTH AND TRANSPORT PROPERTIES

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### ABSTRACT:

Leaf venation patterns exhibit remarkable properties. While they are extremely diverse in their layout, their local structure satisfies a simple, universal property: the angles veins form at junctions are related to their diameters by a vectorial equation analogous to a force balance. Another prominent feature of leaf venation networks is that they often contain many loops. I will first present a cell proliferation model developed to investigate the formation of leaf venation patterns. These simulations support the notion that the local structure of leaf venation networks results from a reorganization driven by mechanical forces during growth. I will then show how the presence of loops in leaf venation networks can be interpreted in terms of their transport properties - when optimal transport networks generally exhibit a tree-like structure.

**TUESDAY, SEPTEMBER 29, 2009**

**2:30 PM**

**Building 2, Room 105**

*Refreshments at 3:30 PM in Building 2, Room 290  
(Math Department - Common Room)*



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