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A MATHEMATICAL MODEL OF  
COMMUNICATION BETWEEN CELLS TO  
DETERMINE THE TIP/STALK FATE

Tuesday, December 6, 4:00 pm - 5:00 pm  
Pearce Hall, Room 227

The tip/stalk cell fate decision in blood vessel growth is a growing and active research field in both biology and mathematics. This talk will introduce a mathematical model of endothelial cells in the tip/stalk fate decision process modulated by the proteins, Notch and Delta. Researchers have observed that the Delta ligand has two activities; trans-activation of Notch receptors in neighboring cells and cis-inhibition of Notch within its own cell. High Delta and low Notch forms a tip cell, conversely, low Delta and high Notch will produce a stalk cell. In this talk, we will introduce the role of the Notch receptor and the Delta ligand in the cell. Second, we will describe the mathematical model. Third, we summarize the sensitivity analysis of signal in response to Delta production rate. Finally, we demonstrate how these proteins determine the tip/stalk fate between two cells when the Delta production rates are different.