

Department of Applied and Computational Mathematics and Statistics Colloquium

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will give a lecture entitled:

Mathematical Modeling of Thrombus Formation Under Flow

Abstract

To explore how blood flow affects the growth of thrombi (blood clots) and how the growing masses, in turn, feed back and affect the blood flow, we have previously developed a spatial-temporal mathematical model of blood platelet aggregation and coagulation under flow. The model includes detailed descriptions of coagulation biochemistry, chemical activation and deposition of blood platelets, and the two-way interaction between the fluid dynamics and the growing platelet mass. By accounting for the porous nature of the thrombus in the model, I am able to demonstrate how advective and diffusive transport to and within the thrombus affects its growth at different stages and spatial locations. In this talk I will present this model and recent extensions made to this model. One extension includes the reduction of the diffusivity of the coagulation proteins in regions of the clot with high platelet number density. I will show that the effect of this reduction, in conjunction with limitations on fluid and platelet transport through dense regions of the clot, can be profound. The results suggest a possible physical mechanism for limiting thrombus growth.



**Monday, November 7th, 2011
4:00 p.m. to 5:00 p.m.
127 Hayes-Healy Center**