McCormick

Northwestern Engineering

# Mathematical Modeling of Thrombus Formation Under Flow

## Presented By :

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Vascular injury triggers two intertwined processes, platelet deposition and coagulation, and can lead to the formation of intravascular clots (thrombi) that may grow to occlude a blood vessel. Formation of a thrombus involves complex biochemical, biophysical, and biomechanical interactions that are dynamic and spatially-distributed, and occur on multiple spatial and temporal scales. In this talk I will discuss my previously developed spatial-temporal mathematical model of these interactions with which I looked at the interplay between physical factors (flow, transport to the clot, platelet distribution with-in the blood) and biochemical ones in determining the growth of the clot. Then I will describe an extension to that model that includes a reduction of the advection and diffusion of the coagulation proteins in regions of the clot with high platelet number density. The effect of this reduction, in conjunction with limitations on fluid and platelet transport through dense regions of the clot, can be profound. These results suggest a possible physical mechanism for limiting thrombus growth.

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**Technological Institute M416**

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