

TEMPLE UNIVERSITY MATHEMATICS COLLOQUIUM

Aaron Fogelson

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will speak on

Mathematical Exploration of the Interplay of Flow, Structure, and Chemistry in Blood Clotting and Other Biological Processes

ABSTRACT: Many physiological processes involve complex interplay between fluid dynamics, moving or growing structures, and chemical reactions that influence this growth and are, in turn, affected by the dynamics of the fluid and structures. A prime example is the formation of a blood clot in response to a blood vessel injury. Cells called platelets activate and clump together at the injury. A network of enzymatic reactions takes place on the injured vessel surface and the surfaces of the platelets. A polymer network ('fibrin gel') forms around and between the platelets to firmly glue them together. All of this occurs in the face of continued blood flow which carries cells and reactants to and from the region of the injury and exerts forces on the growing clot. Mathematical modeling and computation are essential tools for probing the dynamics of this and similar complex multifaceted systems. I will discuss two very different of my group's projects looking at blood clotting: continuum modeling of platelet aggregation in large diameter blood vessels and models of the polymerization and branching dynamics during fibrin gel formation. I will also touch on several other projects concerned with modeling of clotting and similar systems and with developing computational methods to study these models.

MONDAY, FEBRUARY 18, 2013

LECTURE AT 4:00 PM

COFFEE, TEA, AND REFRESHMENTS FROM 3:40 PM

ROOM 617, WACHMAN BUILDING

DEPARTMENT OF MATHEMATICS