

TEMPLE UNIVERSITY MATHEMATICS COLLOQUIUM

Isaac Klapper

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will speak on

Modeling of Microbial Biofilm Communities

ABSTRACT: Single-celled, microbial organisms are estimated to make up a large fraction of extant biomass. Many of these microbial communities exist in the biofilm form. (A biofilm is a dense aggregation of microorganisms that are embedded in a hydrated polymer matrix of their own secretion.) The distinction between microorganisms in the biofilm state and those in free aqueous suspension (i.e., planktonic) is important. Microorganisms in biofilms function very differently because they are subject to physical, chemical, and biological phenomena that have less impact on conventional planktonic cultures. Multicellular phenomena such as diffusion gradients, intercellular communication, differentiation, and extracellular electron transfer operate in biofilms and make them scientifically rich topics of investigation and also inherently complex. Mathematical models are therefore valuable complementary approaches to analyzing and understanding these systems. Resulting models are inherently interdisciplinary; the rich interaction of microbiology, chemistry, and physics requires theory grounded in the mathematics. In this talk, I will discuss a class of biofilm models based on continuum mechanics principles that present a natural platform for combining the relevant biology, chemistry and physics, and will present a few important implications that these models predict.

MONDAY, JANUARY 23, 2012

LECTURE AT 4:00 PM

COFFEE, TEA, AND REFRESHMENTS FROM 3:40 PM

ROOM 617, WACHMAN BUILDING

DEPARTMENT OF MATHEMATICS