

BI-CO MATHEMATICS COLLOQUIUM

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“Modeling Heterogenous Biofilms”

Monday, December 7, 2015

Talk at 4:00 – Park 338

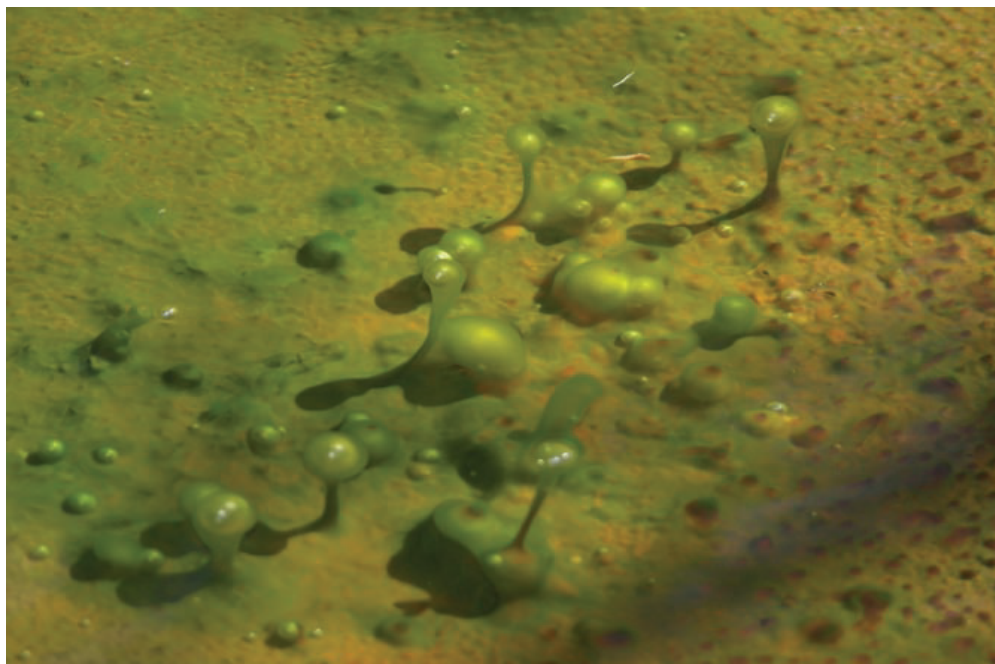
Tea at 3:30 – Park 355, Math Lounge

Abstract:

Free-living biofilms have been subject to considerable attention, and basic physical principles for them are generally accepted. Many host-biofilm systems, however, consist of heterogeneous mixtures of aggregates of microbes intermixed with host material and are much less studied. Here we study models in order to analyze a key property, namely transport limitation and argue a continuous crossover between two regimes is possible:

- 1) a homogenizable mixture of biofilm and host that in important ways acts effectively like a homogeneous macro-biofilm and
- 2) a relatively sparse distribution of separated microbiofilms within the host matrix with independent local microenvironment.

We will discuss various possible additions/extensions. Numerical solutions for the systems are developed based on a discontinuous Galerkin finite element framework using mesh adaptivity with high order quadratures to resolve fine-scale effects.



BRYN MAWR COLLEGE