



Mês de: Março 2011

BIOMATEMÁTICA

Dia 01 de Março (terça-feira), às 16h, na Sala B3-01

Multi-level modeling of the stochastic spatio-temporal dynamics of
phototrophic biofilms

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Abstract:

Phototrophic biofilms are complex microbial communities encased in an extracellular polymeric matrix and fueled by a significantly present photosynthesizing fraction (e.g. cyanobacteria) existing in symbiosis with heterotrophic bacteria. In the present work we present our ongoing work on the development of several integrated, quantitative approaches to model the spatio-temporal dynamics of the biofilm life cycle, in particular an SDE model predicting the deterministic development of biofilm biomass as well as the frequency and size of detachment events, and a flux-balance based PDE model for 1-dimensional distributions of the different biofilm components. We furthermore report on our advances in bringing both models in coherence with experimental data of biofilm physiology and morphology, which is a challenging endeavor due to the highly stochastic nature of biofilm development, requiring the application and combination of advanced tools for time series and statistical analysis.

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