ACMS Applied Math Seminar

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Friday, April 20, 2018
154 Hurley Hall
3:30 – 4:30 PM

Spatio-temporal Dynamics of Synthetic Microbial Consortia

Modeling is essential in the design of genetic circuits with desired properties. I will review several examples where mathematical models have been central to the development and understanding of the dynamic of synthetic organisms. I will focus on synthetic bacterial microconsortia that exhibits emergent oscillatory behavior - when co-cultured, the interaction between two bacterial strains results in population-level transcriptional oscillations. The spatio-temporal dynamics of such consortia, including synchrony between distant parts of the population, depend sensitively on the architecture of the underlying genetic circuits. I will show how simplified mathematical models can help us understand how robust oscillations arise, and how spatially synchronous oscillations are maintained.

The Department of Applied and Computational Mathematics and Statistics

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