

Abstract Submitted
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Transitions in biofilm formation VERNITA GORDON, TRAVIS THATCHER, BENJAMIN COOLEY, Center for Nonlinear Dynamics and Department of Physics, University of Texas at Austin — Biofilms are multicellular, dynamic communities formed by interacting unicellular organisms bound to a surface. Forming a biofilm is a developmental process, characterized by sequential changes in gene expression and behavior as bacteria and yeast progress from discrete, free-swimming cells through stages that arrive at a mature biofilm. We are developing automated metrics to identify key transitions in early biofilm formation as cells attach to a surface, populate that surface, and adhere to each other to form early microcolonies. Our metrics use high-throughput tracking and analysis of microscopy movies to localize these transitions in space and time. Each of these transitions is associated with a loss of entropy in the bacterial system and, therefore, with biological activity that drives this loss of entropy. Better understanding of these transitions will allow automated determination of the strength and turn-on of attractive cell-surface and cell-cell interactions as biofilm development progresses.

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