

Colloquium

Dr. Daniel Sussman

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Anomalous Interfaces in Biological Matter

Friday, February 8, 2019

2:30pm—3:30pm

210 Robeson Hall

What can we learn about dense biological tissue by viewing it as a soft, active matter system? The mechanical and dynamical properties of dense collections of cells help govern processes ranging from wound healing to embryonic development to cancer progression, and an outstanding challenge is developing tractable models that can predict and explain the amazing variety of complex phenomena that even simple cellular systems can exhibit. Recent experiments have shown, for example, that many tissues lie close to a collective rigidity transition, and I will briefly discuss how simple coarse-grained models of dense tissue can support unusual forms of mechanical integrity. I will then show that these models exhibit anomalous interfacial properties, with different measurements of the surface tension between two tissues types differing by orders of magnitude. This departure from equilibrium behavior can be understood as a generic consequence of certain topological features of the cell-cell interactions, and I will discuss the potential relevance of this mechanism for both biological processes (such as cell sorting and compartmentalization) and for designing new materials with exotic bulk and boundary behavior.

