

SPECIAL SEMINAR

MULTISCALE MODELING OF THE ACTIN CYTOSKELETON

The actin cytoskeleton provides a dynamic backbone for cells, playing a crucial role in cellular contraction, mobility, and division. To perform these functions, cells use a variety of proteins interacting with actin in order to control assembly and disassembly of actin polymers with precise control in space and time. The study of structure and dynamics of cytoskeletal networks using theory or simulation poses a truly multi-scale challenge, as small changes at the atomic level have ramifications for mechanical properties at the micron scale. In this talk, I will present our recent work studying cytoskeletal assemblies spanning all of these length scales. I will focus on two recent studies: (1) enabling new studies of atomic-level processes occurring inside of molecular complexes such as actin filaments. In our method, fluctuations from the complex are incorporated into simulations of protein subsystems via a relative entropy minimization approach; (2) a joint experimental/modeling effort where we discovered a mechano-inhibited actin nucleating protein involved in cell division, and dissected the mechanism of this mechanosensitivity.

Thursday, Jan. 11, 2018 at 3:30 pm in Room 1315



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