Physics Colloquium

Prof. Jennifer Ross

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"Self-Assembly and Self-Propulsion of Active Biological Elements"

Date/Time: *Friday, 22 November 2019, 2:30pm -3:30pm*

Location: 130 Hahn Hall North

Abstract: The cell is a complex autonomous machine taking in information, performing computations, and responding to the environment. Many of the internal structures and architecture is transient and created through active processes. Recent advances in active matter physics with biological elements are opening new insights into the physics behind how cellular organizations are generated, maintained, and destroyed. I will present two recent stories on two different topics at the interface between biological and soft matter physics. The first will discuss self-organization of microtubules in the presence of "weakly interacting" crosslinkers. The second will discuss possible mechanisms for the cell to mix itself using self-propelled single molecule enzymes. These works illustrate the importance of the fundamental physics to build structures and propel matter inside living cells while informing on new physics we can learn from biological elements and materials.

Ross is an award-winning biophysicist studying the organization of the microtubule cytoskeleton and microtubule-based enzymes using high-resolution single molecule imaging techniques. She won the Margaret Oakley-Dayhoff Award from the Biophysical Society, an INSPIRE Award from NSF, and was recently named a Fellow of the American Physical Society. She has a Ph.D. in Physics from the University of California Santa Barbara, and did postdoctoral work at the University of Pennsylvania, School of Medicine. As a Cottrell Scholar, Ross has pioneered innovative teaching techniques in active learning that are being adopted around the world. Specifically, she has created a novel interdisciplinary optics course where students build their own microscopes. This course has been adapted and taught at several international short courses on microscopy including Analytical and Quantitative Microscopy (AQLM) at the Marine Biology Laboratory and the Bangalore Microscopy Course at the National Centre for Biological Science in Bangalore, India. Ross is also an advocate for women and under-represented groups.

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