
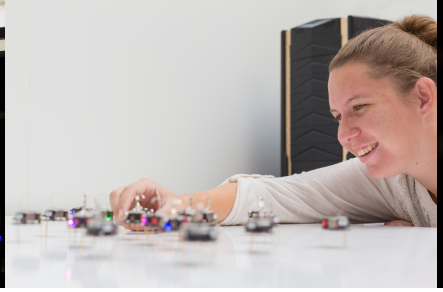


Physics colloquium

Measuring Dynamics with Digital Fourier Microscopy Techniques: From DNA Diffusing in Cytoskeletal Network to Waves at Fluid Surfaces

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Date: **10/5/18**
Time: **10:30 AM**
Location: **COB2 170**

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Abstract: The transport of large biomacromolecules, like DNA, is strongly influenced by how crowded the cellular environment is. Crowding not only hinders transport but also may compact, elongate or in other ways vary the conformation of large macromolecules. To better understand the effects of crowding within cells, **we look at DNA diffusing within well-characterized in vitro networks of actin filaments and microtubules**. Building a complete picture of how large DNA molecules move through such environments requires that we observe the conformational dynamics of single-molecules *and* that we observe ensemble dynamics over length scales large compared to the network mesh size. In this talk, I will describe a recently developed platform allowing for such measurements. We use single-molecule imaging and tracking to observe the conformational changes of DNA in varied environments. Complementing such data are measurements using **light-sheet microscopy and dynamic differential microscopy** that provide ensemble dynamics—similar to data dynamic light scattering can provide—over much larger length and timescales. Much of this talk will be devoted to **how differential dynamic microscopy can be used and our recent extensions of that method**. After discussing how differential dynamic microscopy has been used to investigate DNA dynamics, I will discuss how we are using similar microscopy methods to study **capillary waves in colloidal fluids**.

Bio: Ryan McGorty received his bachelor's degree in physics from the University of Massachusetts, Amherst, and his Ph.D. from Harvard University in 2011, advised by Professor Vinny Manoharan. His graduate work focused on digital holographic microscopy and the dynamics of colloidal particles at liquid interfaces. He worked as a postdoc at the University of California, San Francisco in the lab of Professor Bo Huang on super-resolution microscopy techniques and on light-sheet microscopy. Since 2015, he has been an Assistant Professor in the Department of Physics and Biophysics at the University of San Diego. His lab focuses on soft materials, particularly colloidal systems, and on developing novel microscopy techniques.