UNIVERSITY OF CENTRAL FLORIDA

NANOSCIENCE TECHNOLOGY CENTER
ADVANCED MATERIALS PROCESSING & ANALYSIS CENTER

GRADUATE RESEARCH SEMINAR SERIES

Friday
October 14, 2016

12:15 PM

Research Pavilion
NSTC
Room 169

Pizza and drinks will be provided

Mechanics and Dynamics of Salt-Induced Actin Bundles

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Dr. Hyeran Kang's Group

The assembly of actin filaments into bundles plays a central role in cell structure and force generation. Filopodia at the leading edge of a cell are highly dynamic bundled structures, which generate force against the cell membrane preventing it from collapse caused by external distortions. Actin-binding proteins as well as divalent cations in solution induce bundle formation in vitro. However, molecular mechanisms underlying salt-induced actin bundles are not well understood. In the present work, we evaluate the mechanical and dynamic properties of actin bundles at varying divalent cation concentrations. Using total internal reflection fluorescence (TIRF) microscopy, we measure the bending stiffness of actin bundles determined by persistence length analysis. Real-time formation of bundles is characterized by dynamic light scattering (DLS) and directly visualized using TIRF microscopy. Our results show that divalent cations stiffen actin bundles, and bundle formation involves a kinetic and thermodynamic process. The work reveals the mechanism of how bundle mechanics are regulated in cells and has implications for cytoskeletal mechano-sensing.