



UNIVERSITY of
DENVER

PHYSICS AND ASTRONOMY

Presents

The physics of intrinsically disordered proteins: How do polymers work in living systems?

Wednesday, May 31, 2017

4:00 PM

F.W. Olin Hall Room 105

2190 E. Iliff Avenue

Refreshments at 3:45PM in the Olin Rotunda



Presented by

Dr. Loren Hough

Assistant Professor

Department of Physics

Biophysics Group

University of Colorado Boulder

Many aspects of how cells divide, sense their environments, and move are controlled by ‘intrinsically disordered’ protein domains. Unlike their ordered counterparts, intrinsically disordered domains do not adopt a single stable structure. Instead, they move rapidly between many different conformations, much like other polymers long studied by physicists, chemists, and materials scientists. How and why these floppy domains have such important biological roles is poorly understood. We use both modelling and experiment to study two biologically important disordered protein systems to dissect both the advantages and consequences of disorder on these proteins' biological functions. The first is the selective barrier of the nuclear pore complex which allows for the passage of some proteins while blocking most others. This selection is based not on size or charge, but on transient interactions with a class of disordered domains called FG Nups. We show that disorder allows the transported proteins to move while bound, which is sufficient for selective transport. The second is the C-terminal tails of tubulin, which are primary sites of the regulation of microtubules. We found that the disordered tails interact with the protein surface, which may explain their role in regulating microtubule stiffness. This talk will introduce the required background to be accessible to physicists who do not work in biophysics or disordered proteins.

HOST: Dr. Barry Zink, (303) 871-3025, Barry.Zink@du.edu