Physics Colloquium

THURSDAY, NOVEMBER 29, 2018

4:10PM – 316 Lewis Lab

Refreshment at 3:45PM

"The Mechanics of Microtubules "

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Microtubules, the largest filaments in the cytoskeleton, play an important role in cellular division, intracellular transport, and the structural shape to the cell. Each of these functions requires that microtubules be stiff when forming the scaffolding for the cell and flexible when the cell needs to divide. The mechanics of microtubules has been an active branch of research for both physicists and engineers alike for more than 30 years. However, a consensus has not been reached regarding their measured persistence length. Here we present our experimental results on microtubule mechanics and how persistence lengths may be altered by: purification, labeling, age, salt content, or the presence of microtubule-associated proteins (MAPs) which are typically found in cells.

To address these questions, we use the freely fluctuating filament assay, along with the statistics of bootstrapping, to find that combinations of these stabilizers have novel effects on the mechanical properties of microtubules.

I am an Experimental biophysicist, with the rank of Associate Professor in the Physics and Astronomy Department at the University of Wisconsin La Crosse. I started at La Crosse in 2012. La Crosse is a Primarily undergraduate institution, located between University of Minnesota-Twin Cities and Madison. It is also an hour away from Mayo. Before starting at La Crosse, I was a postdoc at University of Massachusetts Amherst with Dr. Jennifer Ross.While working in her experimental biophysics lab, I was primarily working on microtubule mechanics an dynamics. Before that, I was a Mount Holyoke Fellow andVisiting Assistant Professor. I have also taught at Syracuse and Xavier University of Louisiana. I have an undergraduate BS degree in physics from the University of Iowa, with a minor in African American Studies. My graduate work was in computation from Syracuse University. My dissertation was focused in nonlinear systems analysis, with applications to human-computer interfacing and cell-signaling. I hold three degrees from Syracuse: a MS in computer science and physics and a PhD in Physics.

I am passionate about undergraduate research. And an active member of the Physics and Astronomy Division of the Council on Undergraduate Research (CUR). My primary research interest is in the mechanics of cellular filaments, and in particular microtubules. My research provides excellent research experiences for undergrads. A little bit of microscopy, a little bit of biochemistry and a little bit of physics. A few of my students have gone on to graduate school at UC Davis, Kyoto Japan and to work at John Deere.

More info on me can be found at my profile page at: https://www.uwlax.edu/profile/thawkins/