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**John Fricks\*** (fricks@stat.psu.edu), 325 Thomas Bldg, University Park, PA 16802, and  
**Matthew Kutys, John Hughes** and **William Hancock**. *The Role of Neck Linker Extension in Kinesin Stepping*.

Kinesin is a two headed molecular motor which processes along a microtubule by "hand over hand" steps. In recent experiments, the neck linker of these motors have been modified with the insertion of amino acids to increase the distance (and mechanics) between the heads which bind to the motor. These modifications can have profound effects on the velocity and number of steps taken by the motor. In this talk, we will compare three different stochastic models (Markov-modulated diffusion processes) which incorporate these modifications and discuss their relationship to the experimental results. In addition, we will discuss limit theorems that allow us to connect these microscopic phenomena to a more mesoscopic scale. This is joint work with John Hughes, Matt Kutys, and William Hancock. (Received September 10, 2009)