Abstract Submitted
for the NWS17 Meeting of
The American Physical Society

Simulating dyneins powerstroke using Brownian dynamics[1] ELLIOTT CAPEK, JOHN WACZAK, DAVID ROUNDY, Oregon State University — Dynein is a motor protein which transports cargo along tracks inside the cell. Like related motor proteins kinesin and myosin, dynein uses cellular energy to take steps with its two foot domains. Unlike kinesin or myosin, dynein's stepping pattern is highly varied: it can take steps between zero and 60nm in both the forwards and backwards directions. It is believed that dynein takes such broad, stochastic steps because its large size and several elastic regions make it more influenced by Brownian motion. To test this, we model the motor as a 2D system of springy hinges, then simulate this model using Brownian dynamics. Preliminary results indicate such a model is capable of taking steps between zero and 25nm. These results give hope that, with further tweaking, the model may be able to generate both larger steps and backwards steps.

[1]Oregon State University URSA-Engage Grant

Elliott Capek
Oregon State University

Date submitted: 11 May 2017 Electronic form version 1.4