1154-60-318 **J Darby Smith*** (jsmit16@sandia.gov), **Scott A McKinley** and **William O Hancock**.

Molecular Motor Proteins: Designing experiments through stochastic inference.

Molecular motor proteins form the basis for directed intracellular transport of structures such as vesicles and organelles. Motor protein properties, such as the unburdened velocity, detachment rate, and stall force have a rich history of estimation through experiment. Typically, a tracking particle is observed as a proxy for motor position, and the position is traced over time. Through the use of ad-hoc methods, estimates for these properties are calculated. When considering detachment dynamics, the critical force is another motor protein property of interest. The critical force is not well understood and no generally agreed upon estimates exist for various motor types. Here we examine two experimental methods in an effort to understand force-dependent stepping and detachment for motor proteins and provide guidance for designing future experiments. To accomplish this, we simulate experimental data and employ an SDE approximation model for statistical inference and uncertainty quantification. We further explore a reduced experimental model to display distinct experimental regimes and to guide future experimentation. (Received August 30, 2019)