1116-92-213 **Wallace B Thoreson**, **Matthew J Van Hook**, **Caitlyn M Parmelee***
(s-cparmel1@math.unl.edu) and **Carina Curto**. *Model-based predictions of vesicle pool size in the ribbon synapse of photoreceptor neurons.*

Photoreceptors are cells in the retina that convert light information into changes in membrane potential by a graded release of vesicles. They contain a specialized structure, the synaptic ribbon, which tethers vesicles prior to release. We developed a model of release and replenishment that can predict both maximum pool size A and release probability P. The model takes as inputs data from pulse train experiments and helps answer a fundamental question about ribbon synapses. Experiments show that weaker stimuli produce smaller responses and stronger stimuli produce larger responses. What causes this difference in response size? We know post-synaptic response is given by the product of A, P, and quantal amplitude Q. A previous method predicts that changes in response across different stimuli result from changes in A, but this method fails to account for the dynamics of vesicle replenishment. Since our model allows both A and P to vary, we can test this theory. In contrast to the previous method, our model-based estimate for A was similar across stimulus types while P was much smaller for the weaker stimulus. This suggests that available pool size does not change with stimulus strength; instead, differences in release result from changes in release probability. (Received August 14, 2015)