1086-92-2031 **Dori Luli*** (dori.luli@asu.edu) and **Sharon M Crook**. *Dynamics of a Conductance-based Neuronal Network Model of Olfaction in Drosophila.*

The olfactory system of Drosophila is a favorable system for investigating the basic principles of neural coding. Olfactory receptor neurons (ORNs) detect odors and send signals to the antennal lobe (AL), where odors are represented by spatiotemporal patterns of activity that are similar across individuals. However, the exact network connectivity and the contributions of the different neuron types to AL dynamics are still to be determined. Here, we develop minimal but realistic conductance-based models for AL neurons. Each cell is represented by a system of ODEs, where channel kinetics are based on experimental data. We examine the mathematical structure of these neuron models, which include cell types that exhibit repetitive firing and bursting. We then develop a neuronal network model of the AL, where ORN input is modeled with Poisson processes, and network connections mimic chemical synapses and gap junctions as described in the literature. We investigate possible connectivity patterns with the aim of proposing interactions within the AL that account for the variety of activity patterns observed in experimental data for different odors. Computational studies are used to understand odor response profiles for different cell types and their contributions to network dynamics. (Received September 24, 2012)