1125-92-1119 **Hayriye Gulbudak*** (hayriye.gulbudak@asu.edu), Hayriye.Gulbudak@asu.edu, and **Vincent Cannataro**, **Necibe Tuncer** and **Maia Martcheva**. *A Multi-Scale Model of Vector-Host Infection Dynamics and Evolution.* Preliminary report.

The within-host interaction of a pathogen and a host's immune system governs the pathogen's transmission potential between hosts. After a host is infected, the pathogen population grows inside the host, triggering an immune response of pathogen-speci c antibodies, which help clear the infection. Pathogen and antibody dynamics are often monitored in laboratory experiments and modeling their interaction may inform our understanding of disease spread. In this study, we formulate a novel immunological model to capture the within-host dynamics of arboviral vector-borne diseases and link it to a vector-host age-since-infection structured epidemiological model, by using a nested approach. By incorporating within-host pathogen and immune response dynamics, we are able to capture the heterogeneity that exists among infected individuals and analyze how this heterogeneity scales up and influences population-level dynamics. On the evolutionary scale, we analytically derive host and parasite fitness functions depending on intra-host pathogen-immune response antibody dynamics and by using numerical simulations, study host and pathogen evolutionary trajectories and the effect of tradeoff functions and vector initial inoculum on the coevolutionary attractor. (Received September 15, 2016)