1147-92-575   **Folashade B. Agusto*** (`fbagusto@gmail.com`), Dept. Ecology and Evolutionary Biology, University of Kansas, 1200 Sunnyside Avenue, Lawrence, KS 66049. *Controlling Dengue Transmission in Pakistan.*

In this seminar, I will present a deterministic model for dengue virus transmission. The model is parameterized using data from the 2017 dengue outbreak in Peshawar district of Pakistan. The basic reproduction number ($\mathcal{R}_0$) in the absence of any interventions for the 2017 dengue outbreak is estimated as $\mathcal{R}_0 \approx 2.64$, the distribution of the reproduction number lies in the range $\mathcal{R}_0 \in [1.21, 5.24]$ (with a mean $\mathcal{R}_0 \approx 2.64$). Optimal control theory is then applied to investigate the optimal strategy for curtailing the spread of the disease using two time-dependent control variables determined from sensitivity analysis. These control variables are insecticide use and vaccination. The results show a reciprocal relationship between the use of insecticide and vaccination; as the cost of insecticide increases the use of vaccination increases and *vice versa*. The two controls avert the same number of infections in the district regardless of the weights on the costs of the controls, this is due to their reciprocal relationship. (Received January 26, 2019)