1154-34-798 **Yun Kang*** (yun.kang@asu.edu), Sciences and Mathematics, Mesa, AZ 85212, and **Jun Chen** (yun.kang@asu.edu), **Komi Messan** (yun.kang@asu.edu), **Marisabel Rodriguez-Messan** (yun.kang@asu.edu), **Brian Sweeney** (yun.kang@asu.edu) and **Gloria Hoffman** (yun.kang@asu.edu). *Population Dynamics of Honeybees: Interplay Effects of Parasites and Nutrition.* Preliminary report.

Honeybees are important pollinators worldwide and pollinate about one-third of the food we consume. The incidence of honeybee colony collapsing has been increased under increasing stress due to global warming, pesticides, mites, viruses and nutrition status. In this talk we would start with experimental data and the related analysis from Dr. Gloria Hoffman. The data suggests that low initial bee populations lead to collapse in September while mites and viruses can lead to collapse in December. Feeding bee colonies also has a mixed effect, where it increases both bee and mite populations. Based on the data, we provide our modeling approach by using nonlinear distributed delay differential equations. Our proposed model includes both age structure of honeybees and mites. Some of our interesting founding from our proposed model is including but not limit to: (1)Initial populations are important for the survival of colony; (2) Mite can destabilize honeybee populations and potentially lead to the colony collapsing; and (3) delay term can also destabilize the honeybee-mite interaction dynamics. Our ongoing work is validating our proposed model with data. If time permits, we will also discuss how nutrient and seasonality affect honeybee population dynamics. (Received September 10, 2019)