1158-34-284 **Susmita Sadhu*** (susmita.sadhu@gcsu.edu). *Analysis of long term transient dynamics in a three species predator-prey model with two timescales.*

Several ecosystems exhibit long lasting transient behaviors before experiencing regime shifts under seemingly constant environmental conditions. In this talk, I will present a singularly perturbed three-species model consisting of two predators competing for their common prey with explicit interference competition. In a neighborhood of the so-called "singular Hopf" bifurcation, the system exhibits long lasting transient dynamics, which may last for hundreds of generations, in form of chaotic mixed mode oscillations or relaxation oscillations before the system approaches its asymptotic state. To analyze the underlying mechanisms responsible for generations of such transient dynamics and transitions to its asymptotic states, the model will be reduced to a suitable normal form. A set of conditions will be obtained to determine whether a trajectory would exhibit another cycle of transient dynamics (leading to a population outbreak) before reaching its asymptotic state. These conditions can serve as early warning signs for sudden population shifts in an ecosystem. (Received March 03, 2020)