

Fall Colloquium Series



Modeling the Adaptive Immune Response to Chronic Hepatitis B

Scott West, CPP Mathematics

Abstract: Hepatitis B virus (HBV) is one of the most common viral infections, affecting more than 300 million people worldwide. Chronic hepatitis B is a major cause of liver disease, including cirrhosis and hepatocellular carcinoma. The host's HBV-specific immune response plays a significant part in disease progression. To investigate the role of the immune reaction in chronic HBV, we develop a mathematical model using differential equations that account for these responses. We investigate the behavior of this model using linear stability analysis and numerical simulations.

Keywords: differential equations, mathematical modeling



The Impact of Temperature Dependent Sex Determination on Population Dynamics of Green Sea Turtles (*Chelonia mydas*)

Evelyn Guerra, CPP Mathematics

Abstract: The sex of turtles is determined by the incubation temperature of the eggs during the mid-trimester of development. In Green sea turtles (*Chelonia mydas*), recent studies show that sex ratios are changing, producing a female-biased sex ratio within the population. We develop a novel continuous model to analyze the dynamics of the green sea turtle population long-term. We determine the safe operating space for the proportion of eggs that become male at which the population of Green sea turtles can exist without going to extinction. When the proportion of male eggs leaves this range the overall population of turtles collapses. Additionally, we examine how temperature changes affect the sex ratios of the Green sea turtle population.

Keywords: mathematical biology, population dynamics

Wednesday, September 4, 1:05 - 1:50pm in 4-1-314