University of Miami
Institute for Theoretical and Mathematical Ecology
in cooperation with the
Department of Mathematics
College of Arts and Sciences

Colloquium

Professor Maia Martcheva

University of Florida

will present

"Vaccine Induced Pathogen Type Replacement"

Thursday, April 24, 2008
5:00- 6:00 pm, Ungar Bldg. rm 506

Refreshments served at 4:30 p.m. in UB 521

Abstract

Many pathogens in nature exist in multiple variants, called strains. Vaccines, designed to protect the population from disease-causing microparasites, protect well against several of the strains included in the vaccine, but only partially or not at all against the rest of the strains. This property of the vaccines is called differential effectiveness. Vaccination campaigns with differentially effective vaccines lead to reduction in the number of cases caused by the strains in the vaccine but often also to rise in the number of cases caused by the non-vaccine strains -- a property called strain replacement. Differential effectiveness of the vaccines causes strain replacement but would strain replacement occur if the vaccines protect 100% against all pathogen strains involved ("perfect" vaccines)?

In this talk I would address this question and show that the answer is "yes". Strain replacement with perfect vaccination can occur if some coexistence mechanism, such as super-infection, mediates the coexistence of the strains. Do all coexistence mechanisms lead to strains replacement with "perfect" vaccination? What is common for the mechanisms that do those that and do not?