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SEMINAR

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Applied Differential Equations to Problems in Mathematical Biology

The coalition between mathematics and biology has brought significant advances in both disciplines. Mathematics has provided tools that have allowed the modeling of biological processes. Likewise, biology has stimulated advancements in the field of nonlinear differential equations. In this talk, I will discuss the use of both ordinary and partial differential equations in a variety of biological applications. The first half of the talk will discuss the existence of traveling wave solutions for a non-local reaction-diffusion model of Influenza A. To solve this problem, we have used techniques from geometric singular perturbation theory, and to prove the existence of a traveling wave, the contraction mapping theorem. During the second half, we will analyze a deterministic metapopulation model that takes into account a time-dependent patchy environment. Variability of the patchy-environment can be challenging due to environmental changes. However, I will demonstrate the effects of spatial variations on persistence and coexistence of two competing species according to this model. Also, I will compare the analytical results of the deterministic model with simulations of a stochastic version of the model.

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10:30-11:30 AM

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