

# Applied Dynamical Systems Seminar

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## **Spatial Invasion Threshold of Lyme Disease**

### **Abstract:**

A mathematical model of Lyme disease is formulated to incorporate a spatially heterogeneous structure. The basic reproduction number  $R_0$  of the disease and its computational formulae are established. It is shown that  $R_0$  serves as a threshold value between extinction and persistence in the evolution of Lyme disease. Numerical simulations indicate that spatial heterogeneity of the disease transmission coefficient increases the basic reproduction number, but spatial heterogeneity of the carrying capacity of mice alleviates the value of  $R_0$ . Moreover, the influence of host population in size, destruction of tick habitats and deployment of vaccinations is studied to give insights into optimal control of the disease. This talk is based on a joint work with Dr. Wendi Wang.