

**BI**

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The Ross-Macdonald framework, a suite of mathematical models for the transmission of mosquito-borne disease, made numerous simplifying assumptions including that transmission occurs in a homogeneous environment. Despite these assumptions, this modeling framework has been invaluable to the study of vector-borne disease and to informing public health policy. In recent years, more attention has been paid to the role of human movement in regions with spatially heterogeneous disease transmission. In this talk, I will introduce a metapopulation framework for vector-borne disease, based on the Ross-Macdonald model, in which human movement connects discrete populations with different levels of malaria transmission. I will discuss properties of this model, compare these properties to the homogeneous case, and will discuss the implications for

malaria control. Next, I will present some of the challenges that arise when linking this theoretical framework to a real-world problem. Finally, I will discuss an approach developed to address one of these challenges, namely identifying the appropriate network structure for the metapopulation model, using either mobile phone or geographical data.

Spatial heterogeneity, host movement, and the transmission of mosquito-borne disease.

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3:45 PM

1005 Haworth Hall

