NIMBioS
National Institute for Mathematical and Biological Synthesis

MATH BIOLOGY SEMINAR

DR. LAUREN CHILDS

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Modeling malaria development in mosquitoes: How fast can mosquitoes pass on infection?

3:30 PM*, JANUARY 28, 2020

Hallam Auditorium, Room 206@NIMBioS · 1122 Volunteer Blvd.

Reception & refreshments at 3 pm

Abstract: The malaria parasite Plasmodium falciparum requires a vertebrate host, such as a human, and a vector host, the Anopheles mosquito, to complete a full life cycle. The portion of the life cycle in the mosquito harbors both the only time of sexual reproduction, expanding genetic complexity, and the most severe bottlenecks experienced, restricting genetic diversity, across the entire parasite life cycle. In previous work, we developed a two-stage stochastic model of parasite diversity within a mosquito, and demonstrated the importance of heterogeneity amongst parasite dynamics across a population of mosquitoes. Here, we focus on the parasite dynamics component to evaluate the first appearance of sporozoites, which is key for determining the time at which mosquitoes first become infectious. We use Bayesian inference techniques with simple models of within-mosquito parasite dynamics coupled with experimental data to estimate a posterior distribution of parameters. We determine that growth rate and the bursting function are key to the timing of first infectiousness, a key epidemiological parameter.

Bio: Dr. Lauren M. Childs is an Assistant Professor in the Department of Mathematics at Virginia Tech. She develops and analyzes mathematical and computational models to examine biologically-motivated questions. A main focus of her work is understanding the pathogenesis and spread of infectious diseases, particularly those transmitted by mosquitoes, such as malaria and dengue. She considers the interactions within a host organism, such as between an invading pathogen and the immune response, and how these within-host interactions impact transmission of disease throughout a population.

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The seminar will be live streamed & recorded.

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