

Mathematical Biology Seminar
Wednesday, March 2, 2022
Speaker: Dr. Lihong Zhao,
University of California, Merced



Title: Modeling Immunity to Malaria with an Age-Structured PDE Framework

Time: 11am

Zoom Link:

<https://ucmerced.zoom.us/j/98050375649>

Passcode: 172069

Abstract: Malaria is one of the deadliest infectious diseases globally, causing hundreds of thousands of deaths each year. It disproportionately affects young children, with two-thirds of fatalities occurring in under-fives. Individuals acquire protection from disease through repeated exposure, and this immunity plays a crucial role in the dynamics of malaria spread. We develop a novel age-structured PDE model of malaria specifically tracking acquisition and loss of immunity across the population. Using our analytical calculation of the basic reproduction number (R_0), we study the role of vaccination and immunity feedback on severe disease and malaria incidence. Using demographic and immunological data, we parameterized our model to simulate realistic scenarios. Thus, via a combination of analytic and numerical investigations, our work sheds light on the role of acquired immunity in malaria dynamics and the impact on vaccination strategies in the presence of demographic effects.

This is a joint work with Lauren Childs, Christina Edholm, Denis Patterson, Joan Ponce, Olivia Prosper, and Zhuolin Qu.

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<https://appliedmath.ucmerced.edu/node/52>

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