Deciphering mechanisms underpinning pathogen ecology and evolution

Faculty:

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Project Description:

Understanding why pathogens evolve the way they do is central to overcoming infectious disease challenges. Ranging from the amino acid substitutions that alter how a virus is recognized by antibodies, to the demographic shifts that reshape who gets infected and when, to the ecological pressures that determine where and how fast mosquito-borne diseases spread. This PhD project offers the opportunity to make these discoveries using a deeply data-driven, interdisciplinary approach that combines epidemiological analysis, mathematical modeling, and molecular or immunological data. The ultimate aim is not just mechanistic understanding for its own sake, but to generate insights that enable interventions to be better designed, more targeted, and resilient to the ever evolving infectious disease landscape.

The research group has active interests spanning antibody dynamics and immune correlates of protection, infection burden estimation, the interplay between human societal changes and transmission, and innovative tools for data collection in resource-limited settings. Students are welcome to develop projects within these themes or propose directions of their own.