



# CoCo Seminar Series Fall 2024

## Multi-scale Modeling of Infectious Diseases

**Dr. Narmada Sambaturu**

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Industrial Engineering, Binghamton University**

**Wednesday December 4, 2024 12:00-1:00pm EST**

**Hybrid (EB-T1 & Zoom; meeting link available on**

**<http://coco.binghamton.edu/>)**



Infectious diseases are complex systems, where the outcomes are determined by the nonlinear interactions across multiple scales involving pathogenic factors, host immune responses, therapeutic interventions and public health policy. When multiple strains having the potential to recombine with each other circulate in a population, within-host infection outcomes determine the emergence and establishment of novel variants in the population. In this talk, I will present a mathematical model capturing the interaction of the host-scale emergence of recombinants, with their population-scale transmission. Using the human immunodeficiency virus as a model system, I will explore the factors affecting the prevalence of recombinants, and the relative rates of de-novo recombination and transmission that capture different epidemic curves observed in the real world.

Narmada Sambaturu is an Assistant Professor in the School of Systems Science and Industrial Engineering at Binghamton University. She was a Director's Postdoctoral Fellow at the Los Alamos National Laboratory, and obtained her PhD in Mathematical Biology from the Indian Institute of Science. She holds an MSc in Computer Science from the National University of Singapore, and a B.E in Computer Science and Engineering from Visveswaraya Technological University, India. Her research involves developing novel, multi-scale and data-driven methods to study infectious diseases in the context of heterogenous host immune responses. Her work cuts across multiple disciplines and leverages a wide array of tools including mathematical modeling, machine learning, genomics, systems biology, and epidemiology to answer questions in public health.

For more information, contact Hiroki Sayama ([sayama@binghamton.edu](mailto:sayama@binghamton.edu)).

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