

Mathematics Faculty Search Mathematical Biology

Candidate interview for
assistant professor



Jessica M. Conway
U of British Columbia
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Conway is a postdoc in the Mathematical Biology Group at UBC. She earned her PhD from Northwestern. During Conway's recent research activity in mathematical epidemiology and immunology, she:

- Created a branching process model of viral load in treated HIV+ individuals to investigate different mechanisms for viral production. Analyzed model via stochastic simulation. Developed novel numerical method based on probability generating functions to further analyze model and compare with clinical data.
- Developed stochastic model of early HIV infection to evaluate the efficacy of post-exposure prophylaxis (PEP) to prevent infection and consider the emergence of drug resistance in the case of failed PEP.
- Worked on thermodynamic model of HIV virus/dendritic cell binding dynamics to improve understanding of HIV infection initiation at the cellular level.

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TEACHING DEMO

401 Carver
Friday, February 24 at 9:00 a.m.

HOSPITALITY

404 Carver
Thursday, February 23 at 3:45 p.m.

COLLOQUIUM

268 Carver
Thursday, February 23 at 4:10 p.m.

HIV treatments for infection prevention: Stochastic Model Predictions

Drug treatments for HIV very effectively control infection. They can also be used to prevent the initiation of HIV infection, either in advance of risky exposure (termed pre-exposure prophylaxis, PrEP), or very shortly after accidental exposure to the virus (termed post-exposure prophylaxis, PEP). To investigate this use of HIV treatments, we developed a multi-type, continuous-time branching process model of the early stages of HIV infection within-host. We numerically extract probability distributions and extinction probabilities for viral-load from equations for the probability generating function, derived from the related Chapman-Kolmogorov equation. Using our model we can make predictions regarding the efficacy of PrEP and PEP depending on factors such as drug type, post-exposure initiation time, and duration of treatment.