MARIAH C. BOUDREAU

CONTACT

(802) 582-9854

mariah.boudreau@uvm.edu

mariahcboudreau.github.io

EDUCATION

University of Vermont

August 2019 - August 2024

Ph.D. in Mathematical Sciences

Advisors: Chris Danforth & Laurent Hébert-Dufresne

Saint Michael's College

August 2015 - May 2019

B.S. in Mathematics

Minors in Computer Science & Statistics

SKILLS

Python | MATLAB | LaTex | Java | C++ | R

Statistical analysis

Communication | collaboration | problem solving | critical thinking | positive attitude

Conversational French

RESEARCH INTERESTS

Stochastic models of disease dynamics that inform scientists and decision makers.

I also enjoy working on complex problems that connect to biology, the environment, or combination or variation of those two fields.

PERSONAL INTERESTS

Cold weather activities:
Skiing | Alpine touring | Ski patrolling | Snowshoeing | Winter hiking

Warm weather activities:
Hiking | Climbing

Other interests:
Sudoku puzzles | Card games | Board games | Puzzles

PROFESSIONAL EXPERIENCE

Postdoctoral Researcher   **September 2024 - Present**
The Roux Institute at Northeastern University
- Formalizing probability generating function metapopulation modeling methods.
- Teaching lab members the advantages and disadvantages of this formalism.

Ph.D. Candidate   **August 2019 - August 2024**
University of Vermont
- Developed research for my dissertation.
- Taught entry-level mathematics courses.

Contractor   **May 2022 - July 2022**
Institute for Disease Modeling at the
Bill and Melinda Gates Foundation
- Assisted in parameterizing and developing an open-source human papillomavirus (HPV) population model.
- Developed a within-host model for HPV-induced lesions in a cervical skin layer.

RESEARCH

Stochastic Modeling
- Integrated interventions into a time-dependent probability generating function model for an epidemiology application
- Defined metrics for comparing targeted and random vaccination strategies with the result of that model
- Supported development of an open-source Human papillomavirus (HPV) population model
- Developed a mechanistic model using master equations to give HPV viral load parameter estimates for population model listed above
- Conducted a sensitivity analysis for a probability generating function model through simulations for an epidemiology application

Data Science
- Processed blood work data for the Lived Experience Measured Using Rings study at the University of Vermont
- Analyzed the relationship between blood work data and Oura ring sleep data

Other
- Analyzed ski resort trail networks using network measures
- Processed elevation data for ski trails
- Workshopped preliminary analysis for lemur food networks

PUBLICATIONS AND OTHER WRITINGS

August 2024

M.C. Boudreau, J.A. Cohen & L. Hébert-Dufresne
Within-host infection dynamics with master equations and the method of moments: A case study of human papillomavirus in the epithelium
ArXiv

July 2024

R.M. Stuart, J.A. Cohen, C.C. Kerr, P. Mathur, R.G. Abeysuriya, M. Zimmerman, D.W. Rao, **M.C. Boudreau**, S. Lee, L. Yang & D.J. Klein
HPVsim: An agent-based model of HPV transmission and cervical disease
PLOS Comp. Biol. 20(7), e1012181

September 2023

M.C. Boudreau, A.J. Allen, N.J. Roberts, A. Allard & L. Hébert-Dufresne
Temporal and probabilistic comparisons of epidemic interventions
Bull. of Math. Biol. 85(12), 118

February 2022

A.J. Allen, **M.C. Boudreau**, N.J. Roberts, A. Allard & L. Hébert-Dufresne
Predicting the diversity of early epidemic spread on networks
Phys. Rev. Research 4(1), 013123