MARIAH C. BOUDREAU

CONTACT

(802) 582-9854

mariah.boudreau@uvm.edu

mariahcboudreau.github.io

EDUCATION

University of Vermont

August 2019 - Summer 2024 (est.)

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, R, MATLAB, LaTeX, Java, C++

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

RELEVANT COURSEWORK

Differential Equations (DE) | Advanced Ordinary DE | Partial DE, Linear Algebra | Numerical Analysis | Numerical Partial DE | Principles of Complex Systems | Modeling of Complex Systems I & II | Probability and Statistics | Bayesian Statistics | Philosophy of Science, Technology, and Enrvironment | Philosophy of the Mind, Free Will and Neuroethics

PERSONAL INTERESTS

Hiking, skiing, alpine touring, Crossfit and sudoku puzzles

PROFESSIONAL EXPERIENCE

Ph.D. Candidate

University of Vermont — August 2019 - Present

- Graduate Research Assistant
- Graduate Teaching Assistant

Contractor

Institute for Disease Modeling at the Bill and Melinda Gates Foundation — May 2022 - July 2022

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

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, 118 (2023)

February 2023

R.M. Stuart, J.A. Cohen, C.C. Kerr, R.G. Abeysuriya, M. Zimmerman, D.W. Rao, **M.C. Boudreau**, & D.J. Klein
HPVsim: An agent-based model of HPV transmission and cervical disease
MedrXiv

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, 013123

In Progress

M.C. Boudreau, J.A. Cohen & L. Hébert-Dufresne
Working title: *Epithelium dynamics model with master equations: a case study with Human Papillomavirus*
Draft available upon request

In Progress

M.C. Boudreau, C.M. Danforth & L. Hébert-Dufresne
Working title: *Sensitivity analysis of stochastic polynomials, and its application to epidemic forecasting and random graphs*
Draft available upon request