





MARIAH C. BOUDREAU

CONTACT

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EDUCATION

University of Vermont

August 2019 - May 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
Statistical analysis
Communication, collaboration, problem solving, critical thinking, positive attitude
Conversational French

RESEARCH INTERESTS

Mathematical modeling for biological applications

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 Environment, 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
- Collaborated on parameterization and 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
- Prepared statistical analysis between blood work data and Oura ring sleep data

Other

- Analyzed the ski resort trail networks using network measures
- Workshopped preliminary analysis for lemur food networks

PUBLICATIONS AND OTHER WRITINGS

M.C. Boudreau, A.J. Allen, N.J. Roberts, A. Allard & L. Hébert-Dufresne
Temporal and probabilistic comparisons of epidemic interventions
Bulletin of Mathematical Biology (in press) September 2023

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 In Progress

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 February 2022

R.M. Stuart, J.A. Cohen, C.C. Kerr, R.G. Abeyasuriya, M. Zimmerman, D.W. Rao, **M.C. Boudreau**, & D.J. Klein
HPVsim: An agent-based model of HPV transmission and cervical disease
MedRxiv February 2023