MARIAH C. BOUDREAU

CONTACT

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EDUCATION

University of Vermont

2019- estimated 2024

Ph.D. in Mathematical Sciences

Advisors: Chris Danforth & Laurent Hébert-Dufresne

Saint Michael's College

2015-2019

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

PROFESSIONAL EXPERIENCE

Ph.D. Candidate

University of Vermont — August 2019 - Present
- Graduate Research Assisstant
- Graduate Teaching Assisstant

Contractor

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

RESEARCH

Stochastic Modeling

- Incorporated 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
- Parameterized and aided 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
- Performed a sensitivity analysis for a probability generating function model through simulations for an epidemiology application

Data Science

- Processing blood work data for the Lived Experience Measured Using Rings study at the University of Vermont
- Planning statistical analysis between blood work data and Oura ring data

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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
Bulletin of Mathematical Biology (in press)

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

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

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