

Brendan Case

Infectious disease modeling • Bayesian statistics • Experimental design

Burlington, Vermont

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Summary

PhD candidate in Computer Science combining mechanistic modeling and Bayesian statistics for the study of epidemiology and biology. I am particularly interested in using these tools for uncertainty quantification, informing how data should be collected, and for assessing control options from a decision-theoretic perspective.

Education

2018– **Ph.D. Computer Science**, *University of Vermont*, Burlington, Vermont.

- Co-advisors: Laurent Hébert-Dufresne and Jean-Gabriel Young
- Anticipated completion: August 2023

2017–2019 **MRes. Natural Computation**, *University of Birmingham*, Birmingham, UK.

- Thesis: Self-adaptation in non-elitist evolutionary algorithms: a rigorous analysis on discrete problems with unknown structure
- Committee: Per Kristian Lehre (advisor), Thomas Jansen, Ata Kaban

2013–2017 **B.A. Mathematics**, *Oberlin College*, Oberlin, Ohio.

- Minor: Computer Science

Publications

Spatial epidemiology and adaptive targeted sampling to manage the Chagas disease vector *Triatoma dimidiata*

B. K. M. Case, Jean-Gabriel Young, Daniel Penados, Carlota Monroy, Laurent Hébert-Dufresne, Lori Stevens

PLOS Neglected Tropical Diseases. 2022. [doi:10.1371/journal.pntd.0010436](https://doi.org/10.1371/journal.pntd.0010436)

Flowers as dirty doorknobs: Deformed wing virus transmitted between *Apis mellifera* and *Bombus impatiens* through shared flowers

Phillip Alexander Burnham, Samantha Alger, **Brendan Case**, Humberto Boncristiani, Laurent Hébert-Dufresne, Alison Brody

Journal of Applied Ecology. 2021. [doi:10.1111/1365-2664.13962](https://doi.org/10.1111/1365-2664.13962)

Self-adaptation in nonelitist evolutionary algorithms on discrete problems with unknown structure

Brendan Case and Per Kristian Lehre

IEEE Transactions on Evolutionary Computation. 2020. [doi:10.1109/TEVC.2020.2985450](https://doi.org/10.1109/TEVC.2020.2985450)

Preprints

The unintended consequences of inconsistent pandemic control policies

Benjamin Althouse, Brendan Wallace, **Brendan Case**, Samuel Scarpino, Antoine Allard, Andrew

Berdahl, Easton White, Laurent Hébert-Dufresne
MedRxiv. 2020. doi:10.1101/2020.08.21.20179473

Under review

Microbial dysbiosis precedes signs of sea star wasting disease in wild populations of the *Pycnopodia helianthoides*

Andrew R. McCracken, Blair M. Christensen, Daniel Munteanu, **B. K. M. Case**, Melanie Lloyd, Kyle P. Herbert, Melissa H. Pespeni

Under review.

Presentations

Conference talks

- Jun 2019 **Hidden geometry of infestation in Chagas disease vectors: an approach from epidemiological network theory**, *Laboratorio de Entomología Aplicada y Parasitología Research Symposium*, Guatemala City, Guatemala.
- May 2019 **Modeling disease spillover using multipartite networks**, *NetSci 2019*, Burlington, VT.
- Apr 2019 **Modeling disease spillover in bees: exploring dilution effects**, *UVM Student Research Conference*, Burlington, VT.

Conference posters

- Mar 2022 **Parameter inference in epidemiological modeling: a perspective from Bayesian experimental design¹**, *NERCCS 2022: Fifth Northeast Regional Conference on Complex Systems*, Buffalo, NY.
- Sep 2019 **QuEST timeline: highlights from the first year**, *NSF National Research Traineeship annual meeting*, Evanston, IL.

Teaching

Teaching Assistant

- Spring 2020 **Computability and Complexity**, *University of Vermont*.
- Fall 2019 **Modeling Complex Systems**, *University of Vermont*.
- Spring 2018 **Software Workshop I**, *University of Birmingham*.
- Fall 2017 **Data Structures and Algorithms**, *University of Birmingham*.
- Spring 2017 **Foundations of Analysis**, *Oberlin College*.
- Spring 2017 **Algorithms**, *Oberlin College*.
- Fall 2016 **Discrete Mathematics**, *Oberlin College*.

Workshops & Invited Lectures

- 9/14 2022 **Introduction to epidemiological models and disease forecasting**, *EPID 394: Infectious Disease Epidemiology*, University of South Carolina (virtual).
[Slides](#).

¹best poster award

- 8/2 2022 **Spatial epidemiology and adaptive targeted sampling to manage domestic Triatomine infestations in Guatemala**, *UPENN-Tulane-UPCH Zoonotic Disease Research Lab*, University of Pennsylvania (virtual).
[Slides](#).
- 10/25 2021 **Bayesian Geostatistics and Adaptive Sampling**, *TGIR Adventures in Modeling*, University of Vermont.
- 8/16–8/23 2021 **QuEST Coding Workshop for Incoming Trainees**, University of Vermont.
[Notes](#).
- 11/15 2019 **The Rest of the Tidyverse**, *BIOL 381: Foundations of Quantitative Reasoning*, University of Vermont.

Professional Service and Leadership

- Oct 2022 *Reviewer*, *Frontiers in Ecology and Evolution*
- Apr 2022 *Reviewer*, *Swarm and Evolutionary Computation*.
- Apr 2022 *Judge*, Vermont Science Olympiad. Event: Experimental Design.
- Feb 2022 *Reviewer*, *Physical Review E*.
- Aug 2021 *Reviewer*, *Swarm and Evolutionary Computation*.

Advanced Schools & Workshops

- 12/15–12/20 2019 **Complex Networks Winter Workshop**, *Université Laval*, Quebec City, Canada.
- 6/3–6/5 2019 **VectorBase Workshop**, *Universidad del Valle de Guatemala*, Guatemala City, Guatemala.

Scholarships

- 2022 **T35 Research Traineeship**, *National Institute for Allergy and Infectious Diseases & University of South Carolina Big Data Health Science Center*, award 5T35AI165252-02.
- 2018-2023 **QuEST National Research Traineeship**, *National Science Foundation & University of Vermont Graduate College*, award DGE-1735316.
- 2013-2014 **Conservatory Dean's Scholarship**, *Oberlin College*.

Skills & Expertise

- Programming languages R (tidyverse, tidygraph, sf/raster, caret), Julia (DifferentialEquations), Python (graph-tool)
- Statistical programming Stan, R-INLA, nimble, Turing.jl
- Visualization ggplot2, ggraph, Inkscape

Community Service

- 2020-2022 Food Not Bombs, volunteer cook, *Burlington, VT*.

2018-2019 GoodGym, general member, *Birmingham, UK*.
2014-2015 Boys and Girls Club, tutor, *Oberlin, OH*.