University of Georgia
Epidemiology and Biostatistics
919-357-7350
bcase@uga.edu
brendandaisy.github.io
brendandaisy1
brendandaisy

Bren Case

Infectious disease modeling • Bayesian statistics • Experimental design

Education

2018–2023 **Ph.D. Computer Science**, *University of Vermont*, Burlington, Vermont.
- Thesis: Bayesian experimental design for control and surveillance in epidemiology
- Advisors: Laurent Hébert-Dufresne and Jean-Gabriel Young

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
- Advisor: Per Kristian Lehre

2013–2017 **B.A. Mathematics**, *Oberlin College*, Oberlin, Ohio.
- Minor: Computer Science

Experience

2023-present **Postdoctoral Associate**, *University of Georgia*.

2018-2023 **Graduate Research Assistant**, *University of Vermont*.

2019-2020 **Graduate Teaching Assistant**, *University of Vermont*.

2017-2018 **Graduate Teaching Assistant**, *University of Birmingham*.

2016-2017 **Teaching Assistant**, *Oberlin College*.

Publications

Adapting vector surveillance using Bayesian Experimental Design: an application to an ongoing tick monitoring program in the southeastern United States
B. K. M. Case, Kyndall C. Dye-Braumuller, Chris Evans, Huixuan Li, Lauren Rustin, Melissa S. Nolan.
Ticks and Tick-borne Diseases. 2024. HTML PDF

The unintended consequences of inconsistent pandemic control policies
Benjamin Althouse, Brendan Wallace, **B. K. M. Case**, Samuel Scarpino, Antoine Allard, Andrew Berdahl, Easton White, Laurent Hébert-Dufresne.
BMC Global and Public Health. 2023. HTML PDF

Accurately summarizing an outbreak using epidemiological models takes time
B. K. M. Case, Jean-Gabriel Young, Laurent Hébert-Dufresne.
Royal Society Open Science. 2023. HTML PDF

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.

Frontiers in Marine Science. 2023. HTML PDF

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. HTML PDF

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. HTML

Self-adaptation in nonelitist evolutionary algorithms on discrete problems with unknown structure
Brendan Case and Per Kristian Lehre.
IEEE Transactions on Evolutionary Computation. 2020. HTML PDF

Presentations

Conference talks

Jul 2023 **Restricted Marginal Divergence: an efficient Bayesian measure of practical identifiability for nonlinear systems in biology and epidemiology**, *Society for Mathematical Biology Annual Meeting*, Columbus, Ohio.

Feb 2023 **Adapting Survey Designs for Vector Surveillance Using Bayesian Decision Theory: An Application to an Ongoing Tick Monitoring Program in the Southeastern United States**[1], *National Big Data Health Science Conference*, Columbia, South Carolina.

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.

Posters

Oct 2023 **Adapting vector surveillance surveys using Bayesian Experimental Design: an application to an ongoing tick monitoring program in the southeastern United States**, *ASTMH 2023 Annual Meeting*, Chicago, IL.

Mar 2022 **Parameter inference in epidemiological modeling: a perspective from Bayesian experimental design**[2], *NERCCS 2022: Fifth Northeast Regional Conference on Complex Systems*, Buffalo, NY.

[1] best presentation award
[2] best poster award

Sep 2019 **QuEST timeline: highlights from the first year**, *NSF National Research Traineeship annual meeting*, Evanston, IL.

Invited talks and lectures

2/28 2024 **Forecasting state and national flu hospitalizations: performance so far for the 23-24 season**, *Center for the Ecology of Infectious Diseases (CEID)*, University of Georgia.

9/21 2023 **Bayesian experimental design for control and surveillance in epidemiology**, *Infectious Disease Interest Group (IDIG)*, University of Georgia.

9/8 2023 **Bayesian experimental design for control and surveillance in epidemiology**, *Chaves Lab*, Indiana University.

9/14 2022 **Introduction to epidemiological models and disease forecasting**, *EPID 394: Infectious Disease Epidemiology*, University of South Carolina.

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.

6/23 2022 **Introduction to tidy data and network science in R**, *Big Data Health Science Center T35 trainees*, University of South Carolina.

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.

11/15 2019 **The Rest of the Tidyverse**, *BIOL 381: Foundations of Quantitative Reasoning*, University of Vermont.

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*.

Professional Service and Leadership

Apr 2022 **Vermont Science Olympiad**, *Judge*, Burlington, VT.
Organized all materials and evaluated Experimental Design event

2014-2015 **Boys and Girls Club**, *Tutor*, Oberlin, OH.
After-school program providing local kids with food and tutoring in reading and math

Reviewer

PLoS Computational Biology; npj Complexity; Spatial Statistics; Physical Review E; Ticks and Tick-borne Diseases; Frontiers in Ecology and Evolution; Swarm and Evolutionary Computation.

Organizer

Jul 2023 **Recent advances in parameter identifiability of mathematical models in mathematical biology**, *Co-organizer, Symposium at the Society of Mathematical Biology Annual Meeting*, Columbus, Ohio.

Advanced Schools & Workshops

4/10–4/14 2023 **Multi-scale modeling of malaria**, *American Institute of Mathematics*, San Jose, California.

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*.

Selected Software

- MarginalDivergence.jl: a psuedo-Bayesian method for practical identifiability of differential equation models. (Julia)
- Conditional Sampling.jl: sampling from joint distributions conditional on variable transformations (Julia)
- Adaptive targeted sampling using R-INLA (R, RMarkdown)

Skills & Expertise

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