# BIOGRAPHICAL SKETCH

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NAME: Brown, Grant

eRA COMMONS USER NAME (credential, e.g., agency login): GDBROWN1

POSITION TITLE: Associate Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

| INSTITUTION AND LOCATION | DEGREE *(if applicable)* | Completion Date MM/YYYY | FIELD OF STUDY |
|---|---|---|---|
| University of Iowa | B.A. | 05/2010 | International Studies |
| University of Iowa | B.S. | 05/2010 | Statistics |
| University of Iowa | M.S. | 05/2012 | Biostatistics |
| University of Iowa | Ph.D. | 05/2015 | Biostatistics |

## A. Personal Statement

In my role as faculty in Biostatistics at the University of Iowa, I have contributed to a wide range of projects, analyses, and efforts from the institutional level to international collaboration. Both my applied work and methodological research emphasize computational techniques, and I bring a broad background to such efforts; qualifications include extensive work with Bayesian hierarchical models, longitudinal methods, and spatial statistics. I have supervised PhD work in spatial statistics and causal analysis, and am well placed to continue to pursue these research areas here at the university of Iowa.

Ongoing and recently completed projects that I would like to highlight include:

NIH U01 CA258400-02
Oleson, J. Role: Co-Investigator
2022-2025
Development of Small Area Interactive Risk Maps for Cancer Control Efforts

NIH R01 NS127114-01
Mohr, N., Brown, G.D., Gutierrez, S.; Role: Co-PI
2022-2026
Geospatial modeling for stroke care

NIH R01 AA027266-05
Gilbert, P. Role: co-investigator
2019-2024
Recovery Definitions and Behavior Change Processes in Recovery outside of Treatment

## B. Positions, Scientific Appointments, and Honors

### Positions and Scientific Appointments
2022-Present    Associate Professor, Department of Biostatistics, University of Iowa

| 2015-2022 | Assistant Professor, Department of Biostatistics, University of Iowa |
| 2013-2014 | Statistical Consultant, College of Nursing, University of Iowa |
| 2013 | Team Teacher, Department of Biostatistics, University of Iowa |
| 2012 | Programmer, HOBU Inc. |
| 2009-2015 | Research Assistant, Center for Public Health Statistics, University of Iowa |

## Professional Memberships
2022-present International Anesthesia Research Society (IARS)
2015-2023 American Statistical Association (ASA)
2015-2023 International Biometric Society (ENAR)

## Honors and Awards
| 2018 | 2018 Opioid Ideas Lab Fellow, Office of Research and Economic Development, University of Iowa |
| 2019 | CPH Faculty Teaching Award, College of Public Health, The University of Iowa |
| 2023 | Delta Omega Honorary Society inductee |

### C. Contributions to Science

1. **Studying complex, population-level infectious disease processes has formed one of my core research areas, and prepares me to model data with complex longitudinal structure.** ID modelling has, to date, provided my greatest scholarly impact and involved most of my student mentees. While the current project is not focused on ID problems, the complex dynamics of infectious disease processes nevertheless share many challenges, both computational and conceptual, with the processes under study in the current work. In 2014-2015 I developed a general spatial compartmental model class to address an Ebola outbreak in West Africa. These models and the associated software development were targeted at the format of typical surveillance data: cases reported by administrative regions over time. Such models simplify the complex process of disease progression within a host into discrete states (e.g., susceptible, infectious, removed), and then model the spread of pathogens at a population level. In application, these methods allow improved surveillance, estimates of the efficacy of public health measures, quantification of the role of different modes of transmission, and forecasts, among other things. Since this time, I have developed methodology for improved reproductive number estimation, advanced research into simulation-based Bayesian inference for compartmental models, and worked with PhD. students to extend these techniques to novel settings at the individual and population levels, as well as to settings with incomplete or unreliable diagnostic data.

   a. Pabon-Rodriguez, F.M., Brown, G.D., Scorza, B.M., Petersen, C.A. (2024) Within-host Bayesian joint modelling of longitudinal and time-to-event data of *Leishmania* infection. _PLoS One._ doi: 10.1371/journal.pone.0297175 **[PMCID: PMC10857584]**
   b. Hernandez, H.G., Brown, G.D., Lima, I.D., Coutinho, J.F., Wilson, M.E., Nascimento, E.L.T., Jeronimo, S.M.B., Petersen, C.A., Oleson, J.J. (2023) Hierarchical spatiotemporal modeling of human Visceral Leishmaniasis in Rio Grande do Norte, Brazil. _PLoS Neglected Tropical Diseases_. doi: 10.1371/journal.pntd.0011206 **[PMCID: PMC10101641]**
   c. *Ward, C., Brown, G.D., Oleson, J. Incorporating infectious duration-dependent transmission into Bayesian epidemic models. (2022) Biometrical Journal. 00, 1-19. doi: 10.1002/bimj.202100401**[PMID: 36285663]**
   d. Ward, C., Brown, G., Oleson, J. (2021). An Individual Level Infectious Disease Model in the Presence of Uncertainty from Multiple, Imperfect Diagnostic Tests. _Biometrics_. doi: 10.1111/biom.13579 **[PMCID: PMC8653294]**

2. **Beyond a population level, I have focused on the study of disease progression via longitudinal dynamic models, which provide analogous structure and corresponding computational challenges compared to the study of recovery.** My research into infectious disease modelling has expanded to include immunological modelling, the study of disease progression and disease processes, and the evolution of infectious organisms in populations. This work includes a study of the timing and mechanisms whereby anti-OspA antibodies in mice administered an oral vaccine can be

transferred to offspring, and thereby provide protection against infection with and further transmission of the infectious agent of Lyme disease. This study supports an ongoing field trial to study the relationship between individual reservoir host immunological status and the ecological context. In addition, I have worked to study the population-level evolution of HIV, and supported several studies of leishmaniosis focused on the immunological trajectory of the pathogen-host interaction.

    a.  Pabon-Rodriguez, F.M., Brown, G.D., Scorza, B.M., Petersen, C.A. (2023). Bayesian hierarchical model for immune responses to Leishmania – a tick borne co-infection study. PLoS Neglected Tropical Diseases. doi: 10.1002/sim.9837 **[PMCID: PMC11123579]**

    b.  Seedorff, N., Brown, G.D., Scorza, B.M., Petersen, C.A. (2022) Joint Bayesian Longitudinal Models for Mixed Outcome Types and Associated Model Selection Techniques. Computational Statistics. 1-35. doi:10.1007/s00180-022-01280-x **[PMCID: PMC10825672]**

    c.  Phillip, K., Nair, N., Kamalika, S., Azevedo J.F., Brown, G.D., Petersen, C.A., Gomes-Solecki, M. (2021). Maternal transfer of neutralizing antibodies to B. burgdorferi OspA after oral vaccination of the rodent reservoir. _Vaccine_. 39(31):4320-4327. doi:10.1016/j.vaccine.2021.06.025. **[PMCID: PMC8495753]**

    d.  Han C., Johnson J., Dong R., Kandula R., Kort A., Wong M., Yang T., Breheny P.J., Brown G.D., Haim H. (2020). Key positions of HIV-1 Env and signatures of vaccine efficacy show gradual reduction of population founder effects at the clade and regional levels. mBio. 11(3). doi: 10.1128/mBio.00126-20. **[PMCID: PMC7373194]**

3. **My collaborative work is highly varied, bringing a diverse set of skills and experiences to the current effort.** Much of my research focus has been on statistical/machine learning and predictive modelling techniques, both in a methodological and service capacity. Since 2014, I have developed and continued to manage a series of models for the University of Iowa concerning student recruitment and success outcomes. Beginning with relatively straightforward models of enrollment for the cohort of applicants, this institutional research project has expanded to support dedicated time from myself, my colleague Knute Carter, and a rotating cast of two to three Biostatistics students. We produce weekly reports across 23 different cohort-outcome groups, both for prediction and a system of human-intelligible factors driving individual student forecasts. This work has allowed us to mentor, train, and support numerous students, and provided the inspiration for more recently published methodological work with student Nick Seedorff on interpretable black-box models. In addition, I support diverse applied research within and beyond the University of Iowa College of Public Health. This work includes the study of administrative data sources for population health, and methodological and applied work in the area of speech, language and hearing sciences. In addition, I have published several papers with Dr. Gilbert concerning AUD, and look forward to continuing our collaboration.

    a.  Seedorff, N., Brown, G. D. (2021). totalvis: A Principal Components approach to visualizing total effects in black box models. _SN Computer Science_. 2, 141. doi: 10.1007/s42979-021-00560-5 **[PMCID: NA]**

    b.  Oleson, J.J., Cavanaugh, J.E., McMurray, B., Brown, G.D. (2017). Detecting time-specific differences between temporal nonlinear curves: Analyzing data from the visual world paradigm. Statistical Methods in Medical Research. 26(6):2708-2725 doi: 10.1177/0962280215607411 **[PMCID: PMC4805515]**

    c.  Gilbert, P.A., Pro, G., Zemore, S., Mulia, N., Brown, G.D. (2019). Gender differences in use of alcohol treatment services and reasons for non-use in a national sample. Alcoholism: Clinical and Experimental Research. 43(4):722-731. doi: 10.1111/acer.13965 **[PMCID: PMC6443428]**

    d.  Polgreen, P.M. Brown, G.D., Hornick, D.B., Ahmad, F., London, B., Stoltz, D., Comellas, A. (2018). CFTR heterozygotes are at increased risk of respiratory infections: a population-based study. Open Forum Infectious Diseases. 5(11):ofy219. doi: 10.1093/ofid/ofy219 **[PMCID: PMC6210382]**