

# CAITLIN WARD

Mathematical Sciences 476  
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## EDUCATION

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|-----------|---|
| 2018-2021 | <b>University of Iowa</b><br>PhD, Biostatistics      Advisors: Dr. Jacob Oleson and Dr. Grant Brown<br>Dissertation Title: Bayesian Methods for Spatio-Temporal Epidemic Models to<br>Accurately Capture Complex Dynamics of Disease Spread |
| 2016-2018 | <b>University of Iowa</b><br>MS, Biostatistics  |
| 2012-2016 | <b>Iowa State University</b><br>BS, Statistics, <i>Summa Cum Laude</i> , Minors in Mathematics and Russian Studies  |

## RESEARCH INTERESTS

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|---------------------------------|--------------------------|
| Bayesian statistics             | Statistical Computing    |
| Infectious disease epidemiology | Spatio-temporal modeling |

## EMPLOYMENT

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| Aug 2021-Present  | <b>University of Calgary</b><br><i>Postdoctoral Fellow</i> , Department of Mathematics & Statistics<br>Behavioral Change in Infectious Disease Systems<br>Supervised by Drs. Rob Deardon and Alexandra Schmidt | Calgary, AB, CA   |
| Sept 2021-Present | <b>University of Iowa</b><br><i>Adjunct Assistant Professor</i> , College of Nursing   | Iowa City, IA, US |
| 2016-2021         | <b>University of Iowa</b><br><i>Graduate Research Assistant</i> , Department of Biostatistics<br>Biostatistics Consulting Center<br>Center for Public Health Statistics<br>Public Policy Center                | Iowa City, IA, US |

## TEACHING

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| Institution/Course   | Role           | Semester    | Delivery Method     | Class Size |
|--|----------------|-------------|---------------------|------------|
| <b>University of Calgary</b>                                     |                |             |                     |            |
| STAT:205 Introduction to Statistical Inquiry                     | Instructor     | Spring 2022 | In-person (planned) | Cap 180    |
| <b>University of Iowa</b>  |                |             |                     |            |
| BIOS:4120 Introduction to Biostatistics                          | Instructor     | Summer 2019 | In-person           | 7          |
|  | Instructor     | Fall 2019   | Online              | 27         |
|  | Instructor     | Spring 2020 | Online              | 33         |
|  | Instructor     | Summer 2020 | Online              | 65         |
| BIOS:4110 General Biostatistics<br>Topic: Epidemic Modeling      | Guest Lecturer | Summer 2021 | Online              | 15         |
| EPID:5540 Public Health Surveillance<br>Topic: COVID-19 Modeling | Guest Lecturer | Fall 2020   | Hybrid              | 16         |

## Peer-Reviewed Journal Publications

16. **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
15. Lence, T., Lockwood, G. M., Storm D. W., **Ward, C.**, Cooper, C. S. (2021). The Utility of Renal Sonographic Measurements in Differentiating Children with High Grade Congenital Hydronephrosis. *Journal of Pediatric Urology*. doi: 10.1016/j.jpuro.2021.07.021
14. Priya, S., Aggarwal, T., **Ward, C.**, Bathla, G., Jacob, M., Gerke, A., Hoffman, E., Nagpal, P. (2021). Radiomics side experiments and DAFIT approach in identifying pulmonary hypertension using Cardiac MRI derived radiomics based machine learning models. *Scientific Reports*. doi: 10.1038/s41598-021-92155-6
13. Priya, S., Lui, Y., **Ward, C.**, Le, N., Neetu, S., Maheshwarappa, R., Monga, V., Zhang, H., Sonka, M., Bathla G. (2021). Radiomic Based Machine Learning Performance for a Three Class Problem in Neuro-Oncology: Time to Test the Waters? *Cancers*. doi: 10.3390/cancers13112568
12. Priya, S., Agarwal, A., **Ward, C.**, Locke, T., Monga, V., Bathla G. (2021) Survival prediction in glioblastoma on post-contrast magnetic resonance imaging using filtration based first-order texture analysis: Comparison of multiple machine learning models. *The Neuroradiology Journal*. doi: 10.1177/1971400921990766
11. Priya, S., Lui, Y., **Ward, C.**, Le, N., Neetu, S., Maheshwarappa, R., Monga, V., Zhang, H., Sonka, M., Bathla G. (2021). Machine Learning Based Differentiation of Glioblastoma from Brain Metastasis using MRI Derived Radiomics. *Scientific Reports*. doi: 10.1038/s41598-021-90032-w
10. Priya, S., Aggarwal, T., **Ward, C.**, Bathla, G., Jacob, M., Gerke, A., Hoffman, E., Nagpal, P. (2021). Radiomics Detection of Pulmonary Hypertension via Texture-based Assessments of Cardiac MRI: A Machine-learning Model Comparison. *Journal of Clinical Medicine*. doi: 10.3390/jcm10091921
9. Bathla G., Priya, S., Lui, Y., **Ward, C.**, Le, N., Neetu, S., Maheshwarappa, R., Monga, V., Zhang, H., Sonka, M. (2021). Radiomics-based Differentiation Between Glioblastoma and Primary Central Nervous System Lymphoma: A Comparison of Diagnostic Performance Across Different MRI Sequences and Machine Learning Techniques. *European Radiology*. doi: 10.1007/s00330-021-07845-6
8. Priya, S., **Ward, C.**, Locke, T., Neetu, S., Maheshwarappa, R., Monga, V., Bathla G. (2021). Glioblastoma and Primary Central Nervous System Lymphoma: Differentiation Using MRI Derived First-order Texture Analysis - A Machine Learning Study. *The Neuroradiology Journal*. doi: 10.1177/1971400921998979
7. **Ward, C.**, Oleson, J., Tomblin, B., Walker, E. (2020). Modeling Population and Subject-Specific Growth in a Latent Trait Measured by Multiple Instruments over Time using a Hierarchical Bayesian Framework. *Journal of Applied Statistics*. doi: 10.1080/02664763.2020.1817346
6. Kandemirli, S., Chopra, S., Priya, S., **Ward, C.**, Locke, T., Soni, N., Srivastava, S., Jones, K., Bathla, G. (2020). Presurgical detection of brain invasion status in meningiomas based on first-order histogram based texture analysis of contrast enhanced imaging. *Clinical Neurology and Neurosurgery*. doi: 10.1016/j.clineuro.2020.106205
5. Bathla, G., Ortega-Gutierrez, S., Klotz, E., Juergens, M., Zevallos, C. B., Ansari, S., **Ward, C.**, Policeni, B., Samaniego, E., Derdeyn, C. (2020). Comparing the outcomes of two independent computed tomography perfusion softwares and their impact on therapeutic decisions in acute ischemic stroke. *Journal of NeuroInterventional Surgery*. doi: 10.1136/neurintsurg-2020-015827

4. Bathla, G., Priya, S., Samaniego, E., Deo, S. K., Fain, N. H., Soni, N., **Ward, C.**, Derdeyn, C. P. (2020). Cerebral computed tomographic angiography using third-generation reconstruction algorithm provides improved image quality with lower contrast and radiation dose. *Neuroradiology*. doi: 10.1007/s00234-020-02406-y
3. Hartley, C. C., Renner, L. M., & **Ward, C.** (2019). A New Factor Solution for the Domestic Violence–Related Financial Issues Scale (DV-FI). *Journal of Interpersonal Violence*. doi: 10.1177/0886260519860888
2. **Ward, C.**, Oleson, J., Jones, K., Charlton, M. (2018). Showcasing Cancer Incidence and Mortality in Rural ZCTAs Using Risk Probabilities via Spatio-temporal Bayesian Disease Mapping. *Applied Spatial Analysis and Policy*. doi: 10.1007/s12061-018-9276-4
1. Saletta, M., Goffman, L., **Ward, C.**, & Oleson, J. (2018). Influence of Language Load on Speech Motor Skill in Children With Specific Language Impairment. *J Speech Lang Hear Resv*. doi: 10.1044/2017-JSLHR-L-17-0066

#### *Journal Papers in Submission*

- Heeren, T., **Ward, C.**, Ashida, S., Sewell, D. (Revisions Requested). Applying Network Analysis to Assess the Development and Sustainability of Multi-Sector Coalitions. *PLOS ONE*.
- **Ward, C.**, Brown, G., Oleson, J. (Submitted). Incorporating Infectious Duration-Dependent Transmission into Bayesian Epidemic Models.
- Walker, E. A., **Ward, C.**, Oleson, J., Sapp, C., McCreery, R. W., Tomblin, J. B., Moeller, M. P., (Submitted). Language growth in children with hearing loss who received early intervention by 3 or 6 months.
- Horak, S., **Ward, C.** (Submitted). Evaluating a State Child Care Assistance Program using Administrative Data.
- Shaw, C., **Ward, C.**, Gordon, J., Williams, K. N., Herr, K. (Submitted). Characteristics of Elderspeak Communication in Hospital Dementia Care: Findings from the Nurse Talk Observational Study.
- Narayanasamy, S., Eskandari, A., **Ward, C.**, Priya, S., Aggarwal, T., Elam, J., Nagpal, P. (Submitted). Prevalence and Significance of Incidental Findings on Computed Tomography Pulmonary Angiograms: A Retrospective Cohort Study.
- Shaw, C., **Ward, C.**, Gordon, J., Williams, K. N., Herr, K. (Submitted). Elderspeak Communication and Pain Severity as Modifiable Factors to Rejection of Care in Hospital Dementia Care.

#### *Journal Papers In Preparation*

- Sewell, D. K., Li, H., **Ward, C.**, Pham, H., Diekema, D. K., Perencevich, E. (In preparation). Evaluating the effect of quarantining in the context of regular universal testing: A validated agent-based modeling approach to assessing interventions in academic settings.
- Shaw, C., **Ward, C.**, Herr, K. (In preparation). Presence of Rejection of Care Behaviors in Patients with Pain and Delirium.

## HONORS AND AWARDS

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- Milford E. Barnes Award, University of Iowa College of Public Health 2021
- Ada Louise Ballard and Seashore Dissertation Fellowship, University of Iowa Spring 2021
- University of Iowa Dare to Discover Banner Campaign, Featured Researcher 2021
- William R. Clarke Graduate Teaching Assistant Award, University of Iowa 2020
- University of Iowa Council on Teaching Outstanding Teaching Assistant Award 2020
- Recipient of Thank a Teacher note of appreciation through the Center for Teaching 2020, 2021
- Leon F. Burmeister Memorial Scholarship Award, University of Iowa 2018
- William R. Clarke Graduate Research Assistant Award, University of Iowa 2018
- George W. Snedecor Undergraduate Award, Iowa State University 2015

## PRESENTATIONS

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### *Invited Talks*

- Incorporating Infectious Duration-Dependent Transmission into Bayesian Epidemic Models. *Conference on Computational and Methodological Statistics*. Upcoming - Dec 2021.
- Introduction and Demonstration of an Interactive COVID-19 Forecasting Tool. University of Iowa College of Public Health Spotlight Series on COVID-19. Virtual presentation. July 2020.
- Accountable Communities of Health: Measuring Connectivity and Sustainability using Network Analysis. University of Iowa Public Policy Center. Iowa City, IA. October 2019.

### *Contributed Talks*

- An Individual Level Infectious Disease Model in the Presence of Uncertainty from Multiple, Imperfect Diagnostic Tests. Virtual presentation. *Joint Statistical Meetings*. August 2020.
- A Spatio-Temporal Infectious Disease Model in the Presence of Uncertainty from Multiple, Imperfect Diagnostic Tests. Speed poster presentation. *Women in Statistics and Data Science Conference*. Seattle, WA. October 2019.
- Modeling Population and Subject-Specific Growth in a Latent Trait Measured by Multiple Instruments Over Time Using a Hierarchical Bayesian Framework. Poster presentation. *Joint Statistical Meetings*. Denver, CO. August 2019.

## FUNDING

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*University of Iowa Libraries Open Educational Resources (OER) Grant* 2020

- “Simulation Based Inference in Introductory Statistics.” Co-Principal Investigator. Total award amount: \$6,000
  - Creation of an interactive OER with embedded Shiny applications to illustrate statistical concepts

## SERVICE

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### *Department of Biostatistics, University of Iowa*

- Biostatistics Student Organization Mentorship Chair, August 2020 - August 2021
- Graduate Student Team Leader, COVID-19 Modeling Web Application, May 2020 - August 2020
- Biostatistics Student Organization President, August 2019 - August 2020
- Administrative Committee, August 2019 - August 2020
- Web-Based Instruction Resource Committee, August 2019 - August 2020
- Biostatistics Student Organization Treasurer, August 2018 - August 2019

### *University of Iowa*

- Graduate & Professional Student Government Grant Reviewer, August 2019 - August 2020

### *Professional*

- Refereed articles for the following journals
  - Statistics in Medicine (1)
  - Journal of the American Medical Association (1)
  - JAMA Network Open (3)
  - PLOS ONE (1)
  - BMC Public Health (1)

## SOFTWARE

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- BayesSEIR - An R Package designed to simulate and fit Bayesian SEIR models of infectious disease spread using various methods to model the infectious period.  
<https://github.com/ceward18/BayesSEIR>

## PROFESSIONAL ACTIVITY

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- Member, American Statistical Association (ASA)
- Center for the Integration of Research, Teaching and Learning (CIRTL) Practitioner Level
  - Teaching as Research (TAR) project: Evaluating Student Attitudes and Engagement in a Project-Enhanced Online Introduction to Biostatistics Course
- Member, Phi Beta Kappa