

# CAITLIN WARD

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## EDUCATION

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2018-2021	<b>University of Iowa</b> PhD, Biostatistics      Advisors: Dr. Jacob Oleson and Dr. Grant Brown Topic: Bayesian Methods for Spatio-Temporal Epidemic Models
2016-2018	<b>University of Iowa</b> MS, Biostatistics
2012-2016	<b>Iowa State University</b> 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> <i>CANSSI Distinguished Postdoctoral Fellow</i> Behavioral Change in Infectious Disease Systems Supervised by Drs. Rob Deardon and Alexandra Schmidt	Calgary, AB, CA
Sept 2021-Present	<b>University of Iowa</b> <i>Adjunct Assistant Professor</i> , College of Nursing	Iowa City, IA, US
2016-2021	<b>University of Iowa</b> <i>Graduate Research Assistant</i> , Department of Biostatistics Biostatistics Consulting Center Center for Public Health Statistics 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	Online/Hybrid	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
Iowa Summer Institute in Biostatistics Topic: Epidemic Modeling	Guest Lecturer	Summer 2021	Online	15
EPID:5540 Public Health Surveillance Topic: COVID-19 Modeling	Guest Lecturer	Fall 2020	Hybrid	16

## Peer-Reviewed Journal Publications

17. Eskandari, A., Narayanasamy, S., **Ward, C.**, Priya, S., Aggarwal, T., Elam, J., Nagpal, P. (2022). Prevalence and Significance of Incidental Findings on Computed Tomography Pulmonary Angiograms: A Retrospective Cohort Study. *The American Journal of Emergency Medicine*. doi: 10.1016/j.ajem.2022.01.064
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*

- **Ward, C.**, Brown, G., Oleson, J. (Revisions Requested). Incorporating Infectious Duration-Dependent Transmission into Bayesian Epidemic Models. *Biometrical Journal*.
- 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*.
- Shaw, C., **Ward, C.**, Gordon, J., Williams, K. N., Herr, K. (Revisions Requested). Elderspeak Communication and Pain Severity as Modifiable Factors to Rejection of Care in Hospital Dementia Care. *Journal of the American Geriatrics Society*.
- Horak, S., **Ward, C.** (Revisions Requested). Evaluating a State Child Care Assistance Program using Administrative Data. *Evaluation and Program Planning*.
- Walker, E. A., **Ward, C.**, Oleson, J., Sapp, C., McCreery, R. W., Tomblin, J. B., Moeller, M. P., (Revisions Requested). Language Growth in Children with Mild to Severe Hearing Loss who Received Early Intervention by 3 Months or 6 Months of Age. *Journal of Early Hearing Detection and Intervention*.
- 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.
- Sewell, D. K., Li, H., **Ward, C.**, Pham, H., Wilcox, K., Diekema, D. K., Perencevich, E. (Submitted). Evaluating the effect of quarantining in the context of regular universal testing: A validated agent-based modeling approach to assessing interventions in academic settings.

#### *Journal Papers In Preparation*

- Shaw, C., **Ward, C.**, Herr, K. (In preparation). Presence of Rejection of Care Behaviors in Patients with Pain and Delirium.
- Shaw, C., **Ward, C.**, Gordon, J., Williams, K. N., Herr, K. (In preparation). Reliability and Validity of an Evidence-based Elderspeak Coding Scheme.

- **Ward, C.**, Deardon, R., Schmidt, A. (In preparation). Bayesian Modeling of Dynamic Behavioral Change During an Epidemic.
- Biesheuvel M. M., Penterman P., van Schaik G., **Ward, C.**, Deardon, R., Barkema H.W. (In preparation). Transmission Parameters of Mycoplasma Bovis on Twenty Clinical Dairy Farms in the Netherlands.

## 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*

- Bayesian Modelling of Epidemics: From Population to Individual-level Models. *International Society for Bayesian Analysis World Meeting*. Short Course Co-Instructor. Upcoming - July 2022.
- Bayesian Modeling of Dynamic Behavioral Change During an Epidemic. *Statistical Society of Canada Annual Meeting*. Upcoming - June 2022.
- Epidemic Modeling: Investigating Popular Approaches in the Context of COVID-19. University of Calgary O'Brien Institute for Public Health Seminar Series. Calgary, AB. Upcoming - April 2022.
- Sound the Alarm: Modeling Behavioral Changes in Response to Epidemic Intensity. University of Minnesota. Virtual presentation. February 2022.
- Sound the Alarm: Modeling Behavioral Changes in Response to Epidemic Intensity. University of Iowa. Virtual presentation. January 2022.
- Incorporating Infectious Duration-Dependent Transmission into Bayesian Epidemic Models. *Conference on Computational and Methodological Statistics*. Virtual presentation. December 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*

- Sound the Alarm: Modeling Behavioral Changes in Response to Epidemic Intensity. *International Society for Bayesian Analysis World Meeting*. Poster presentation. Upcoming - July 2022.

- An Individual Level Infectious Disease Model in the Presence of Uncertainty from Multiple, Imperfect Diagnostic Tests. *Joint Statistical Meetings*. Virtual presentation. August 2020.
- A Spatio-Temporal Infectious Disease Model in the Presence of Uncertainty from Multiple, Imperfect Diagnostic Tests. *Women in Statistics and Data Science Conference*. Speed poster presentation. 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. *Joint Statistical Meetings*. Poster presentation. 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 using 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 describe the infectious period.  
<https://github.com/ceward18/BayesSEIR>

## PROFESSIONAL ACTIVITY

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- Member, American Statistical Association (ASA)
- Member, International Society for Bayesian Analysis (ISBA)
- 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