Stephen Berg

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Education

Ph.D. in Statistics Expected June 2020
University of Wisconsin–Madison, Madison, WI
Thesis: Statistics for Data with Spatio–temporal and Markovian Dependence: Theory, Methodology, and Computation
Advisors: Professor Jun Zhu and Professor Murray K. Clayton

M.S. in Statistics April 2017
University of Wisconsin–Madison, Madison, WI
Commended for exemplary performance on the 2017 Statistics M.S. Exam

B.S. in Mathematics May 2013
Iowa State University
Summa cum laude, Phi Beta Kappa

Research Interests

Spatial statistics	Markov chain Monte Carlo methods
Spatiotemporal statistics	Markov random field models
Environmental statistics	Stochastic approximation algorithms

Honors and Awards

- Honorable mention for quality performance as a Graduate Student Lecturer, UW–Madison Statistics Department, 2019
- Marian Danniells Mathematics Undergraduate Scholarship, Iowa State University, 2013
- Dean's List, Iowa State University, 2009-2013
- Honors Program, Iowa State University, 2009-2013
- National Merit Scholar

Publications

Berg, S., Zhu, J., Clayton, M.K., Shea, M.E., Mladenoff, D.J. (2019) A latent discrete Markov random field approach to identifying and classifying historical forest communities based on spatial multivariate tree species counts. *Annals of Applied Statistics*, vol. 13 no. 4, pp. 2312–2340.

Fernandes-Taylor, S., **Berg, S.**, Gunter, R., Bennett, K., Smith, M.A., Rathouz, P.J., Greenberg, C.C., Kent, K.C. (2018) Thirty-day readmission and mortality among Medicare

beneficiaries discharged to skilled nursing facilities after vascular surgery. *Journal of Surgical Research*, vol. 221, pp. 196–203.

Manuscripts in Preparation

Berg, S., Zhu, J., Clayton, M.K. (2019) Control variates and Rao-Blackwellization for deterministic sweep sampling. *Under revision.* arXiv: 1912.06926

Berg, S., Zhu, J., Clayton, M.K. Auto-multinomial regression and inference for spatially correlated categorical data. *In prep.*

Berg, S., Walsh, D., Zhu, J. Impact of local management policies on chronic wasting disease in Wisconsin. *In prep.*

Software Development

`automultinomial`-R package for regression and inference with spatially correlated discrete data, on CRAN and GitHub
(`https://github.com/stephenberg/automultinomial`)

`bcd`-Rcpp implementation of group lasso variable selection via block coordinate descent for common regression models
(`https://github.com/stephenberg/bcd`)

Research Presentations

Berg, S. *Department seminar*: Statistical analysis for Markov-dependent data.
Statistics Department, UW–Madison, December 2019

Berg, S., Zhu, J., Clayton, M.K., Shea, M.E., Mladenoff, D.J. *Contributed poster*: A latent discrete Markov field approach for identifying and classifying historical forest communities based on spatial multivariate tree species counts.
Joint Statistical Meetings, Denver, July 2019

Berg, S. *Student seminar*: Workshop on using rcpp to write an R package.
Statistics Department, UW–Madison, December 2018

Shea, M.E., Mladenoff, D.J., Clayton, M.K., **Berg, S.**, Elza, H. Conference talk: Are ecotones zones of intermingling or interdigitation? Pattern and scale of tree species co-occurrence in Wisconsin's tension zone.
Annual Meeting, US Chapter of International Association for Landscape Ecology, Chicago, April 2018

Research Experience

Research Assistant 2016–present
Department of Statistics, University of Wisconsin–Madison
- Advised by Professors Jun Zhu and Murray Clayton. Working on spatial statistics problems in ecology, including landscape ecology and wildlife disease modeling.

NHLBI Biostatistics Trainee 2015–2016

Department of Biostatistics and Medical Informatics, University of Wisconsin–Madison

- Advised by Professor Paul Rathouz and a collaborator from the Department of Surgery. Assisted with analysis of Medicare readmission data and contributed to a published research paper (January–August 2016)
- Advised by Professors Sijian Wang and Jun Zhu. Analyzed a dataset involving DNA methylation in breast cancer (August 2015–December 2015)

Research Assistant Summer 2015

Department of Statistics, University of Wisconsin–Madison

- Advised by Professor Jun Zhu. Developed and documented CRAN package `automultinomial` for the analysis of spatially correlated categorical data.

Research Collaborator 2016–present

Collaborator: Dr. Daniel Walsh, USGS National Wildlife Health Center (2018–present)

- Investigating effects of environmental covariates and management policies on chronic wasting disease in Wisconsin deer
- Developing statistical methodology for analyzing ecology data via differential equation models

Collaborators: Monika E. Shea and Professor David J. Mladenoff, Department of Forest and Wildlife Ecology, University of Wisconsin–Madison (2016–present)

- Analyzing vegetation data in the historical Wisconsin Public Land Survey database
- Developing statistical and computational methodology for latent Markov random field models

Teaching Experience

Graduate Student Lecturer Fall 2018, Fall 2019

Department of Statistics, University of Wisconsin–Madison

- Graduate level: Statistical Methods for Bioscience I (Stat 571). Primary instructor for the course in Fall 2018 and Fall 2019.

Teaching Assistant Fall 2014–Spring 2015

Department of Statistics, University of Wisconsin–Madison

- Undergraduate level: Introduction to Statistics (Stat 301), Spring 2015
- Undergraduate level: Introduction to Statistics for Engineers (Stat 224), Fall 2014

Selected Graduate Coursework

Statistical Theory and Methodology: Mathematical Statistics I and II, Theory and Application of Regression and Analysis of Variance I and II, Introduction to Bayesian Decision and Control, Statistical Computing, Statistical Model Building and Learning, Spectral Methods for Machine Learning and Statistics

Biostatistics: Introduction to Biostatistics, Introduction to Clinical Trials

Mathematics: Theory of Probability, Stochastic Analysis, Topics in Probability: Modern Discrete Probability, Nonlinear Optimization

Computing Skills

Programming languages: Proficient in R, C++, MATLAB, and Fortran. Some experience with Java, Julia, SAS, and Stata.

Platforms: Experienced with Unix/Linux and Windows platforms.

Others: Proficient in LaTeX and Microsoft Office.

References

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Professor Emeritus of Forestry
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Nicholas Keuler
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