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Carleton College
Mathematics and Statistics Department
1 North College St.
Northfield, MN 55057

Education

Ph.D in Statistics, August 2004
School of Statistics, University of Minnesota, Minneapolis, MN
Dissertation: *A Bayesian method for using mean constraints in finite population sampling*
Advisor: Glen Meeden

B.S. in Mathematics, May 1999
Department of Mathematics and Statistics, University of Minnesota, Duluth, MN
Major Concentration: Statistical and Actuarial Sciences
Minors: Applied Computer Science, Economics

Professional Exerience

Chair of the Department of Mathematics and Statistics, Carleton College, 2020-present

Associate Professor of Mathematics and Statistics, Carleton College, 2014 - present

Assistant Professor of Mathematics, Carleton College, 2007-2014

Clare Boothe Luce Assistant Professor of Mathematics, Colby College, 2004-2007

Instructor, School of Statistics, University of Minnesota, September 2001-December 2003

Teaching Assistant, School of Statistics, University of Minnesota, September 2000 - May 2001

Publications

- St. Clair, K., Danieu, A., Fieberg, J. A comparison of sampling designs for estimating Zebra mussel abundance. (*in preparation*)
- St. Clair, K., Emmet, R., Gray, B. Modeling abundance and occupancy of SAV using data collected from multiple sampling methods. (*in preparation*)
- St. Clair, K., Park, J.Y., Gray, B., Capters, R.S. Modeling occupancy probabilities hierarchically, given misclassification and spatial dependence. submitted.
- Wittkop, C., Bartley, J.K., Krueger, R., Bouvier, A., Georg, R.B., Knaeble, A.R., St. Clair, K., Piper, C., Breckenridge, A. (2020) Influence of provenance and transport process on the geochemistry and radiogenic (Hf, Nd, and Sr) isotopic composition of Pleistocene glacial sediments, Minnesota, USA. *Chemical Geology* **532**. https://doi.org/10.1016/j.chemgeo.2019.119390
- ArchMiller, A., Dorazio, R., St. Clair, K., Fieberg, J. (2018) Time series sightability modeling of animal populations. *PLOS ONE*. https://doi.org/10.1371/journal.pone.0190706
- Fieberg, J., Alexander, M., Tse, S., St. Clair, K. (2013). Abundance estimation with sightability data: a Bayesian data augmentation approach. *Methods in Ecology and Evolution*. doi: 10.1111/2041-210X.12078.
- St. Clair, K., Giudice, J., Dunton, E. (2012). A comparison of models using removal effort to estimate animal abundance. *Journal of Applied Statistics*, **40**(3), 527-545.
- St. Clair, K., Chihara, L. (2012). Team-Based Learning in a Statistical Literacy Class. *Journal of Statistics Education* **20**(1), http://www.amstat.org/publications/jse/v20n1/chihara.pdf.
- St. Clair, K., O'Connell, D. (2012). A Bayesian model for estimating population means using a link-tracing sampling design. *Biometrics* **68**(1), 165-173.
- Koshnick, R., Lilly, K., St. Clair, K., Finnegan, M., Warshaw, E. (2007). Use of diagnostic tests by dermatologists, podiatrists, and family practitioners in the United States: Pilot data from a cross-sectional survey. *Mycoses* **50**, 463-469.
- St. Clair, K., Weisberg, S. (2009). *Computing Primer for Applied Linear Regression, Third Edition, Using JMP*. Available at: http://users.stat.umn.edu/ sandy/alr.website/Links/JMPprimer.pdf.
- St. Clair, K., Weisberg, S. (2009). *Computing Primer for Applied Linear Regression, Third Edition, Using SPSS*. Available at: http://users.stat.umn.edu/ sandy/alr.website/Links/SPSSprimer.pdf.
- Warshaw, E. M., St. Clair, K. R. (2005). Prevention of onychomycosis reinfection in patients with complete cure of all ten toenails: Results of a double-blind, randomized, placebo-controlled study of prophylactic miconazole powder 2%. *Journal of the American Academy of Dermatology* **53**, 717-20.

- St. Clair, K. (2004). *A Bayesian method for using mean constraints in finite population sampling.* PhD Thesis, University of Minnesota.

Undergraduate Research Projects

- Katie Chavez, Bryan Kim, Jay Na, Aaron Prentice, Jin Ruan, J. Liralyn Smith (2019-20). Respondent Driven Sampling. (Senior comprehensive project)
- Alana Danieu, Nick Fredrickson, Emily Kaegi, Clara Livingston (2017-18). Survey designs for distance sampling: A study of zebra mussels. (Senior comprehensive project)
- Graham Earley, Nikita Fomichev, Willa Langworthy, Rui Shen (2016-17). A comparison and modeling of the network structure of Donald Trump and Hilary Clinton subreddits. (Senior comprehensive project)
- Robbie Emmet (2016). Bayesian abundance and occupancy modeling of submersed aquatic vegetation using overlapping rake and biomass measurements.
- Huaiyu Wang, Hilary Marshall, Sophia Davis, Peter Briggs (2013-14). Design and implementation of an ordinal mixed-effects regression model to measure abundance of submersed aquatic vegetation. (Senior comprehensive project)
- Michael Alexander, Tanner Martin, Scarlett Tse (2011-2012). Implementing a hierarchical Bayesian model to estimate moose abundance using data augmentation. (Senior comprehensive project)
- Jun Young Park (2011-2012). Modeling occupancy using presence/absence data collected using alternating sampling methods. (partial funding by a grant from the USGS)
- Jun Young Park and Prasit Dhakal (summer 2011). Studying use of the Dirichlet process prior in a catch-effort hierarchical model for animal abundance. (funded by a Carleton grant from the Howard Hughes Medical Institute and the Carleton College Mathematics Department)
- Robert Carlton, Gorkem Celebioglu, Daniel O'Connell, Eric Tiede (2009-2010). Statistical forecasting and time series analysis for 3M. (Senior comprehensive project)
- Daniel O'Connell (summer 2009). Planning and writing simulation studies of Bayesian models for estimating population means when using a link-tracing sampling design. (funded by a Carleton grant from the Howard Hughes Medical Institute)
- Christina Knudson, Edward Kuhn, Bassirou Sarr (2008-09). Bayesian hierarchical modeling of statewide ozone levels for the Minnesota Pollution Control Agency. (Senior comprehensive project)
- Mary Warlaumont (2007). Designing, implementing, and analyzing a pediatric clinic survey to study parental knowledge of certain pediatric health issues.

- Malcolm Itter (2006). Northern hardwood succussion models. (Senior honors project in Biology)
- Malcolm Itter (2005-06). A study of the design of the USDA Annual Forest Inventory and Analysis and creation of realistic simulated population data for the inventory. (funded by the Clare Boothe Luce Program at The Henry Luce Foundation)
- Nicolas Mwai (summer 2005). Learn the interface between the R and C languages, organize and increase the efficiency of computer code used for simulations using the Polya posterior. (funded by the Clare Boothe Luce Program at The Henry Luce Foundation)

Academic Civic Engagement Projects

- Data Dash Board (Winter and Spring 2017). Students wrangled data from multiple sources to construct interactive graphics that display benchmark data for the Northfield Promise Initiative. Dashboard were created both as an Rstudio Shiny app and using Tableau. https://stclairstatsapps.shinyapps.io/Northfield-Promise-Benchmarks/
- Statistical Consulting (Math 280: 2013-14, 2016-18; Summer Program 2014, 2016, 2017), funding from Carleton College's HHMI grant from 2013-2016. Clients have included Adopsource, Carleton ITS, Carleton Rec Center, Health Finders, Hennepin County Human Services and Public Health Department, Northfield League of Woman Voters, Northfield Public Schools, Northfield United Way, Rice County Department of Community Corrections, Swift Weather, Tea Garden
- Northfield Senior Center (NSC) Surveys (2012). Students from two introductory statistic courses brainstormed survey questions for a NSC membership satisfaction survey and a non-member NSC perceptions and attitude survey. Four students from these classes then edited these questions and wrote the surveys in Survey Monkey during a 5 week independent study.
- Elementary school students' nutrition survey (2011). Five students from my Introduction to Sampling Techniques course studied the effectiveness of nutrition education programs designed by a Carleton Plant Biology class for elementary schools. They designed and implemented a survey to measure nutrition knowledge and attitudes before and after the education programs were implemented in six local elementary classes.

Additional Professional Experience

Southern Minnesota Stat Chat workshop organizer April 2019

• Co-organizer of a regional gathering of statistics and data science educators to discuss data science pedagogy.

Northfield Promise Data Team, June 2013 - present

• Determining methods to measure and track benchmarks in the Northfield Promise cradle-to-career continuum.

2013 Rice County Community Health Survey Planning Group, June 2013 - December 2013

• Assisting in survey planning and questionnaire design.

Supplement Writer and Manuscript Review, May 2004 - July 2004

Applied Linear Regression, 3ed. by Sanford Weisberg, Wiley Publishing

• Wrote two supplements which explain how to use the statistical software JMP and SPSS to do the computations discussed in *Applied Linear Regression*.

• Commented on the manuscript and reviewed it for errors.

Survey Analysis, January 2004 - July 2004

Consulting for Dr. Erin Warshaw, MN Veterans Research Institute, Minneapolis, MN

• Analyzed the results from a clinical trial designed to study the effectiveness of a treatment to reduce the recurrence of the nail fungal infection onychomycosis.

Survey Design and Analysis, April 2003 - May 2004

Consulting for Kia Lilly, medical student, University of Minnesota, Minneapolis, MN

• Designed and analyzed a survey intended to study confidence and methodology in the diagnosis of the nail fungal infection onychomycosis.

Talks and Poster Presentations

- Exploring the Effectiveness of Logistic Regression with Respondent-Driven Sampling Data. (Poster) Women in Statistics and Data Science conference. October 2020.
- Teaching (and more) at a small liberal arts college. Invited Panel, Joint Statistical Meetings, August 2020.
- Methods for estimating animal abundance. Creighton Univiersity, November 2019.
- Models for estimating animal abundance and species diversity. Macalaster College, February 2014.
- Sampling methods for linked populations. Summer Math Program for Women, Carleton College, July 2013.
- Sampling methods for linked populations. Summer Math Program for Women, Carleton College, July 2013.
- Spatially modeling occupancy for detection data collected using alternating survey methods. (Poster) Joint Statistical Meetings, San Diego, CA, August 2012.
- Sampling in population networks. Department of Mathematics and Statistics Colloquium, University of Minnesota-Duluth, March 2012.
- Modeling animal abundance and detection with a hierarchical catch-effort model. Joint Statistical Meetings, Miami, FL, August 2011.

- Sampling methods for linked populations. Summer Math Program for Women, Carleton College, July 2011.
- Team-based Learning for introductory statistics. Stat Chat, Macalaster College, January 2011.
- Team-based Learning for introductory statistics. Joint Statistical Meetings, Vancouver, B.C, August 2010.
- Two perspectives on finite population sampling. Student Colloquium, St. Olaf College, Northfield, MN, April 2008.
- An objective Bayesian approach to finite population sampling. Math Department Colloquium, Colby College, Waterville, ME, December 2003.

Research Interests

- Bayesian hierarchical modeling with applications in ecology
- Finite population sampling: Bayesian and classical methods
- Inference methods for adaptive cluster sampling and link-tracing sampling designs

Research Skills

- Extensive use of R, R Markdown, Shiny apps, Winbugs, and Git/GitHub.
- Utilize Stata, SPSS, Splus, JMP, SAS, Arc, Mathematica, Microsoft Excel and C

Professional Service

- NSF Mathematical Sciences REU site review panelist (November 2010)
- Reviewer for the *Journal of Statistics Education*, *Annals of Applied Statistics*, *Ecological Applications*, *Journal of Statistical Theory and Practice*

College and Departmental Service

- Community Board on Sexual Misconduct, 2019-present
- Library and Technology Committee, Carleton College, 2016-18
- College Council, Carleton College, 2014-2016
- Department Comps Organizer, Carleton College, 2013-2014, 2016-18, 2019-20
- Member of the Civic Engagement and Service Committee, Carleton College, 2009-2013

- Math Department Colloquium Organizer, Carleton College, 2009-2010
- Member of Quantitative Inquiry, Reasoning, and Knowledge (QuIRK) steering committee, Carleton College, 2007-2010
- Math Department Community Builder, Carleton College, 2007-2009, 2010-2012
- Statistics Coordinator for the Math Department, Colby College, 2006-2007
- Actuarial Careers Advisor, Colby College, 2006-2007
- Member of the Science, Technology and Society Advisory Committee, the Cultural Events Committee, and the Health Care Advisory Committee, Colby College, 2005-2007
- Member of the Nominating Committee, Colby College, 2005-2006
- Member of the Mathematics Colloquium committee, Colby College, 2004-2006
- Faculty advisor to a resident hall book seminar, Colby College, Fall 2004

Workshops and Short Courses

- Kickoff Workshop for Project MOSAIC. Institute for Mathematics and its Applications, Minneapolis, MN, June 30-July 2, 2010.
- Spatial Regression Workshop. James P. LaSage. Carleton College, Northfield, MN, March 17-19, 2009.
- Sampling in networks. Steven K. Thompson. Joint Statistical Meetings, Denver, CO, August 3, 2008.
- Integrating Computing in the Statistics Curricula. University of California Berkeley, Berkeley, CA, July 12-17, 2008.
- Grid-based Map Analysis Techniques and GIS Modeling Workshop. Joseph K. Berry. Carleton College, Northfield, MN, March 19-21, 2008.
- Teaching with GIS workshop. Tsegaye Nega and Wei-Hsin Fu. Carleton College, Northfield, MN, December 3-5, 2007.
- New faculty teaching workshop. Carleton College, Northfield, MN, November 27-30, 2007.
- Spatial Survey Design with a Focus on Natural Resources. Don Stevens and Anthony R. Olsen. Joint Statistical Meetings, Seattle, WA, August 7, 2006.
- Hierarchical Modeling and Analysis for Spatial Data. Bradley P. Carlin, Sudipto Banerjee, Alan E. Gelfand. Joint Statistical Meetings, Minneapolis, MN, August 8, 2005.
- Adaptive sampling: a short course on new adaptive designs. Steven K. Thompson. Joint Statistical Meetings, Minneapolis, MN, August 6, 2005.

Professional Memberships

- American Statistical Association
- The International Environmetrics Society

Honors and Awards

- Broadening the Bridge Grant, Carleton College and St. Olaf College, supported by the Andrew W. Mellon Foundation. 2017-19.
- Carleton College HHMI Student Research Grant, March, 2011
- Carleton College Hewlett Mellon and Hewlett Presidential Fellowship, November 2009
- Carleton College HHMI Student Research Grant , March, 2009
- Departmental Fellowship, 1999-2000
  School of Statistics, University of Minnesota
- Magna Cum Laude, May 1999
  University of Minnesota
- Outstanding Graduating Senior Award, May 1999
  Department of Mathematics, University of Minnesota Duluth
- Grace Peterson Calculus Award, May 1996
  Department of Mathematics, University of Minnesota Duluth