Silas Bergen

Assistant Professor of Statistics & Data Science
Winona State University
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Education

University of Washington, Ph.D. Biostatistics   2014
Advisor: Adam A. Szpiro
Dissertation: *Spatial Measurement Error Methods in Air Pollution Epidemiology*

Winona State University, B.S. Statistics (*summa cum laude*)   2009

Winona State University, B.A. Music Performance (*summa cum laude*)   2009

Employment

Assistant Professor of Statistics and Data Science, Department of Mathematics and Statistics,
Winona State University, Winona, MN.   2014-present

Research Assistant, Center for Clean Air Research, Seattle, WA.   2010-2014

Teaching Assistant, University of Washington.   2011-2012

Research Assistant, Veterans Affairs Puget Sound Health Care System, Seattle, WA.   2010

Research Assistant, Kolker Lab, Seattle Children's Hospital, Seattle, WA.   2009

Mathematics and Statistics Tutor, Mathematics Achievement Center   2008-2009
Winona State University, Winona, MN.

Statistics Intern, U.S. Geological Survey, LaCrosse, WI.   2008

Teaching experience

Full undergraduate courses

Winona State University, Winona, MN   2014-present

   STAT 110: Fundamentals of Statistics
   STAT 210: Statistics
   STAT 310: Intermediate statistics
   STAT 365: Experimental design & analysis
   STAT 450-460: Mathematical statistics I-II
   DSCI 310: Data summarization and visualization

Teaching assistantships

University of Washington, Seattle, WA   2010-2014

   BIOST 536: Categorical data analysis in epidemiology
   BIOST 571: Regression methods for dependent data
   BIOST 511: Medical Biometry I

Awards

Diverse Undergraduate Research Experience (REU) in Statistics. Awarded by the American Statistical Society. One of 3 REU sites selected to conduct 10-week research experience for 4 undergraduate students targeting women, minorities, and persons with disabilities. Co-awardees: Chris Malone & Brant Deppa. Summer 2017.

Best Research Poster as voted by the faculty (Measurement error with penalized regression exposure modeling). UW Biostatistics Department Retreat. 2013.

Trainee, Biostatistics, Epidemiologic and Bioinformatic Training in Environmental Health (BEBTEH) Training Grant, University of Washington. 2010-2012.

Summa Cum Laude, Winona State University. 2009.

Outstanding Graduate, Department of Mathematics and Statistics, Winona State University. 2009.

Mu Sigma Rho. 2007-2009.

Presidential Honor Scholarship, Winona State University. 2005-2009.

Dean's List, Winona State University. 2005-2009.

Student advising

Senior capstones

Courtney Steinmueller: *Evaluating risk factors for coronary heart disease with the Framingham Heart Study.* 2018
Shane Will: *Application of clustering algorithms to finance data.* Co-advisor with Dr. Brant Deppa. 2017
Nick Schroeder: *Measuring and modeling batted ball quality.* 2017
John Emerson: *Analyzing video game sales.* 2016
Stacey Prieur: *Biomarkers of inflammation and mortality in the CHS.* 2016
Jake Dodd: *Projecting on-base percentage.* 2016

Data analytics competitions

MinneMUDAC 2017: Two Winona State teams awarded "Best Overall" and "Analytic Acumen" out of 22 undergraduate teams. Teams analyzed health insurance claims data provided by Optum. Optum Campus, Bloomington, MN. November 3-4 2017.

Midwest Undergraduate Data Analytics Competition: Winona State awarded 1st place analyzing low-income housing data from data sponsor Aeon. Winona State University, Winona, MN. April 1-2, 2017.

Research experience for undergraduates (REU)

WINSTATS REU: Through competetive application process to the American Statistical Association (ASA), Winona State was awarded one of 3 REU sites in summer 2017. The REU was funded through the ASA's *Diverse Research Experiences for Undergraduates* grant from the NSF. The WINSTATS REU recruited four students from a national pool of applicants to conduct

undergraduate research in coordination with the Minnesota Population Center using data from the Integrated Public Use Microdata Series-International (IPUMS-I).

Presentations

Kallis A, Aadland M, and **Bergen S**. *Interactive dashboard: using census microdata to map population characteristics.* Joint Statistical Meetings. Baltimore, MD. 2017.

Malone C, **Bergen S**, and Deppa B. *ASA REU Experiences at Winona State University.* Joint Statistical Meetings. Baltimore, MD. 2017.

Tourangeau E, Halbleib J, and **Bergen S**. *A universal measure of household weath from global census microdata.* Joint Statistical Meetings. Baltimore, MD. 2017.

Bergen S. *A data visualization course for undergraduate data science students.* CAUSE webinar. December 2016.

Bergen S. *A data visualization course for undergraduate data science students.* Joint Statistical Meetings. Chicago, IL. August 2016.

Bergen S. *Melding data with social justice in undergraduate statistics and data science courses.* Promoting Understanding of Statistics about Society. International Association for Statistical Education Roundtable Conference. Berlin, Germany. July 2016.

Bergen S. *Talking social justice in intro stats.* Joint Statistical Meetings. Seattle, WA. August 2015.

Bergen S and Szpiro AA. *Multi-Pollutant Measurement Error in Air Pollution Epidemiology Studies Arising from Predicting Exposures with Penalized Regression Splines.* Joint Statistical Meetings. Boston, MA. August 2014.

Bergen S and Szpiro AA. Measurement error with penalized regression exposure modeling. University of Washington Biostatistics Annual Department Retreat. Leavenworth, WA. September 2013. (Voted Best Poster by the faculty).

Bergen S, Paciorek C, and Szpiro AA. *Accounting for measurement error when using penalized regression exposure models.* Environment and Health – Bridging South, North, East, and West. Basel, Switzerland. August 2013.

Bergen S, and Szpiro AA. *Optimal Penalty Parameter Selection to Minimize the Impact of Exposure Measurement Error in 2-Stage Air Pollution Epidemiology Analyses.* Joint Statistical Meetings. Montreal, QC. August 2013.

Workshops

Bergen, S and Iverson, T. *Web Scraping and Data Visualization with Python and Tableau.* May 2017
2017 U.S. Conference on Teaching Statistics, Penn State University

Malone, C and **Bergen, S**. *Teaching Data Science.* May 2015
2015 U.S. Conference on Teaching Statistics, Penn State University

Bergen, S. *Building R packages.* Aug 2012 & Aug 2013
UW Biostatistics Summer Computing Course, University of Washington.

Bergen, S. *Implementation of Mixed Models in* R. Feb 2012
BIOST 571 (Regression Methods for Dependent Data), University of Washington.

Refereed publications

Kim S-Y, Sheppard L, **Bergen S**, Szpiro AA, Sampson PD, Kaufman JD, and Vedal S. Prediction of fine particulate matter chemical components with a spatio-temporal model for the Multi-Ethnic Study of Atherosclerosis cohort. *Journal of Exposure Science and Environmental Epidemiology.* 26:520-528. 2016.

Bergen S, Sheppard L, Kaufman JD, and Szpiro AA. Multipollutant measurement error in air pollution epidemiology studies arising from predicting exposures with penalized regression splines. *Journal of the Royal Statistical Society: Series C – Applied Statistics.* 65(5):731-753. 2016.

Chan SH, Van Hee VC, **Bergen S**, Szpiro AA, DeRoo LA, London SJ, Marshall JD, Kaufman JD, and Sandler DP. Long-term air pollution exposure and blood pressure in the Sister Study. *Environmental Health Perspectives.* 123(10):951-958. 2015.

Bergen S and Szpiro AA. Mitigating the impact of measurement error when using penalized regression to model exposure in two-stage air pollution epidemiology studies. *Environmental and Ecological Statistics.* 22(3):601-631. 2015.

Kim S-Y, Sheppard L, Kaufman JD, **Bergen S**, Szpiro AA, Larson TV, Adar SD, Diez Roux AV, Polak JF, and Vedal S. Individual-level concentrations of fine particulate matter chemical components and subclinical atherosclerosis: A cross-sectional analysis based on two advanced exposure prediction models in the Multi-Ethnic Study of Atherosclerosis. *American Journal of Epidemiology.* 180(7):718-728. 2014.

Benca JP, Carlisle MH, **Bergen S**, and Strömberg CAE. Applying morphometrics to early land plant systematics: A new Leclercqia (Lycopsida) species from Washington State. *American Journal of Botany.* 101(3):510-520. 2013.

Bergen S, Sheppard L Sampson PD, Kim S-Y, Richards M, Vedal S, Kaufman JD, and Szpiro AA. A national prediction model for components of $PM_{2.5}$ and measurement error corrected health effect inference. *Environmental Health Perspectives.* 121(9):1017-1025. 2013.

Sampson PD, Richards M, Szpiro AA, **Bergen S**, Sheppard L, Larson TV, and Kaufman JD. A regionalized national universal kriging model using partial least squares regression for estimating annual $PM_{2.5}$ concentrations in epidemiology. *Atmospheric Environment.* 75:383-392. 2013.

Bowker JD, Carty D, Smith CE, and **Bergen S**. Chloramine-T margin-of-safety for fry, fingerling and juvenile rainbow trout. *North American Journal of Aquaculture.* 73(3):259-269. 2011.

Brenton L, **Bergen S**, Higdon R, and Kolker E. Quantifying protein function specificity in the gene ontology. *Standards in Genomic Sciences.* 2(2):238-244. 2010.

R Packages and Documentation

Bergen S and Lindström J. Comprehensive Tutorial for the Spatio-Temporal R Package. 2013.

Lindström J, Szpiro AA, Sampson PD, **Bergen S**, and Oron AP. SpatioTemporal: an R package for spatio-temporal modelling of air pollution. 2013.

Service

Consulting

Director, Winona State Statistical Consulting Center   2018-present
Allison Quam, Winona Area Public Schools schoolboard   2017-present
Jen Prochnow, DNP thesis   2017

Peer review

Computational Intelligence and Neuroscience
Environmental Health
Environmental Science & Technology
Statistics in Medicine

Department committees

Student opportunities and social activities   2014-present
Recruitment committee (chair)   2016-present

All-University Committees

Grade Appeals Committee   2016-present
Lyceum Committee   2017-present

Technical expertise

Fluent: R, R Markdown, LaTeX, JMP, Tableau
Experience: Python, git, html, jekyll, hugo