Silas Bergen

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Education

University of Washington, Ph.D. Biostatistics Dissertation: *Spatial Measurement Error Methods in Air Pollution Epidemiology* Advisor: Adam A. Szpiro	2014
Winona State University, B.S. Statistics (*summa cum laude*)	2009
Winona State University, B.A. Music Performance (*summa cum laude*)	2009

Employment

Associate Professor of Statistics and Data Science, Department of Mathematics and Statistics, Winona State University, Winona, MN.	2019-present
Assistant Professor of Statistics and Data Science, Department of Mathematics and Statistics, Winona State University, Winona, MN.	2014-2019
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

Teaching experience

Full undergraduate courses

2014-present

Winona State University, Winona, MN

STAT 110: Fundamentals of Statistics
STAT 210: Statistics
STAT 301: Statistical thinking for healthcare
STAT 303: Introduction to engineering statistics
STAT 310: Intermediate statistics
STAT 360: Regression analysis
STAT 365: Experimental design & analysis
STAT 380: Advanced statistical modeling
STAT 405: Biostatistics
STAT 450-460: Mathematical statistics I-II
DSCI 210: Data science
DSCI 310: Data summarization and visualization

Teaching assistantships 2010-2014

University of Washington, Seattle, WA

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

Grants & Awards

Identifying risk to Bald Eagles from Wind Energy Development in the Upper Midwest. Awarded by American Eagle Foundation. Co-PI with Trish Miller, Conservation Science Global. $19,950.27. September 2019.

Promotion to Associate Professor with Tenure. Winona State University. June 2019.

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-PIs: Chris Malone & Brant Deppa. $38,666. 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

Aubrie Ziebell: *Analyzing the effects of climate change*. 2023
Dylan Steberg: *Exploring bald eagle data over Lake Superior.* 2023
Sam Wooden: *What Advanced Baseball Statistics Factor Most into a Player's Wins Above Replacement*. 2022
Mikolaj Wieczorek: *Detecting Diabetic Retinopathy to Prevent Blindness*. 2019
Connor Demorest: *Modeling Baseball Players Chance of Being Inducted into the Hall of Fame*. 2019
David Stampley: *A Measure of Skill: Analyzing an Overwatch Player's Skillset*. 2018
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
Tyler Kelemen: *Applying supervised learning methods to baseball data.* 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 at Target Field 2023

Fall Data Challenge 2022: supervised "best overall" and "best visualization" undergraduate teams

Fall Data Challenge 2021: supervised "best visualization" undergraduate teams

Police Data Challenge 2017 (hosted by American Statistical Association): supervised "best overall" undergraduate team.

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 competitive 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

Bergen S. *What belongs together? Using elemental groupings and Gestalt principles to help students design more insightful data visualizations.* Breakout session. US Conference on Teaching Statistics, Penn State University. 2023.

Cannon A, **Bergen S**, Hancock S, and Kotz B. *How to build (and sustain) a data science program*. Topic contributed panel. Joint Statistical Meetings. Washington, DC. 2022.

Bergen S, Malone C, and Wieczorek J. *Fundamentals of data visualization for education*. Breakout session. US Conference on Teaching Statistics, Virtual. 2021.

Bergen S. *Teaching the Gestalt Principles to Help Undergraduate Students Design Effective Tables and Graphs.* Contributed refereed. Symposium on Data Science and Statistics, Virtual. 2020.

Bergen S, Iverson T, Malone C. *Extending the Grammar of Graphics beyond ggplot2.* Symposium on Data Science and Statistics. Poster presentation. Bellevue, WA. 2019.

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. 2016.

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

Bergen S. *Talking social justice in intro stats*. Joint Statistical Meetings. Seattle, WA. 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. 2014.

Bergen S and Szpiro AA. Measurement error with penalized regression exposure modeling. University of Washington Biostatistics Annual Department Retreat. Leavenworth, WA. 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. 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. 2013.

Workshops

Bergen S and Iverson T. *Data visualization: best practices and principles in R, Tableau, and Python.* Symposium on Statistics and Data Science, Bellevue WA. 2019.

Iverson T, **Bergen S**, Deppa B, Hooks T, Kerby A, and Malone C. *A core curriculum for undergraduate data science.* U.S. Conference on Teaching Statistics, Penn State University. 2019.

Bergen S and Iverson T. *Data visualization: best practices and principles using Tableau Public and Python.* International Conference on Teaching Statistics, Kyoto Japan. 2018.

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

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

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

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

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

Refereed publications

Martinez O, **Bergen S,** Gareis JB. Comparison of bacterial communities in the Yamuna River (India) and the Mississippi River (USA) reveals greatest diversity at the Yamuna headwaters below the Yamunotri Glacier. In preparation.

White E, **Bergen S**, Berggren A, Brinkman L, Carman B, Crouse L, Hoffmann E, Twedt S. A More Comfortable Method for Hydrostatic Weighing: Head Above Water at Total Lung Capacity. In preparation.

Varela WL, Mundahl ND, **Bergen S**, Staples DF, Cochran-Biederman J, Weaver CR. Physical and Biological Stream Health in an Agricultural Watershed after 30+ Years of Targeted Conservation Practices. *Water* 15(3475). 2023. https://doi.org/10.3390/w15193475

Bergen S, Huso MM, Duerr AE, Braham MA, Schmuecker S, Miller TA, Katzner TE. A review of supervised learning methods for classifying animal behavioural states from environmental features. *Methods in Ecology and Evolution*, 14, 189–202. 2023. https://doi.org/10.1111/2041-210X.14019

Bergen S, Huso MM, Duerr AE, Braham MA, Katzner TE, Schmuecker S, Miller TA. Classifying behavior from short-interval biologging data: An example with GPS tracking of birds. *Ecology and Evolution*, 12, e08395. 2022. https://doi.org/10.1002/ece3.8395

Nelson HN, Treichel, AJ, Eggum EN , Martell MR, Kaiser AJ, Trudel AG, Gronseth JR, Maas ST, **Bergen S**, Hines JH. Individual neuronal subtypes control initial myelin sheath growth and stabilization. *Neural Dev* 15(12). 2020. https://doi.org/10.1186/s13064-020-00149-3

Goslee E, Chesak S, Forsyth DM, Foote J, **Bergen S**. Implementation of a Dedicated Education Unit Model for ADN Students in a Rural Primary Care Setting. *Nurse Educator*. 45(2): 97-101. 2020. https://doi.org/10.1097/nne.0000000000000711

Frie KJ, Prochnow J, Meiers S, Fiedler T, Jones C, **Bergen S**. The implementation of a dedicated education unit in a public health setting. *Public Health Nursing*. 37: 789-796. 2020. https://doi.org/10.1111/phn.12786

Snyder K, Paulson P, and **Bergen S**. A Website Assessment Tool for Patient Engagement: A Verification. *International Journal of Healthcare Management. International Journal of Healthcare Management.* 13(1): 58-64. 2020. DOI: 10.1080/20479700.2019.1616385

Fye HJ, **Bergen S**, and Baltrinic ER. The relationships between ASCA National Model implementation, supervision satisfaction, and school counselor burnout. *Journal of Counseling and Development*. 98:53-62. 2020. https://doi.org/10.1002/jcad.12299

Selvaratnam ND, Hettiarachchi D, Dantanarayana ND, **Bergen S**, Ponnamperuma L, and Selvaratnam S. Investigating the psychometric properties, and IRT analysis of the Sinhala generalized self-efficacy scale (S-GSES). *International Journal of Multidisciplinary Research.* 4(2): 73-95. 2018.

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 Stromberg 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 Lindstrom J. Comprehensive Tutorial for the Spatio-Temporal R Package. 2013.
Lindstrom 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. Assist faculty, students, and community members with data-related analyses and insights. 2018-2020; 2021-present.

Peer review

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

Department committees

Student opportunities and social activities 2014-present
Recruitment committee 2016-2020 (chair); 2021-present.

All-University Committees

Grade Appeals Committee
Lyceum Committee
Student Affairs Committee

Meetings

2019 Symposium on Statistics and Data Science: data visualization track co-organizer