Dr. Daniel Frobish

Grand Valley State University
Statistics
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Education

Doctor of Philosophy (PhD), Northern Illinois University, 2006.
Major: Mathematical Sciences, specialization in Statistics
Dissertation Title: Recurrent Events Models with Change-Points

Master of Science (MS, MSc), Illinois State University, 1998.
Major: Mathematics

Teacher Certification, Illinois State University, 1996.
Major: Secondary Mathematics

Bachelor of Science (BS, BSc), University of Illinois, 1994.
Major: Mathematics

Professional Positions

Academic

Associate Professor, Department of Statistics, Grand Valley State University. (August 2012 - Present).

Assistant Professor, Department of Statistics, Grand Valley State University. (August 2006 - August 2012).

Instructor, Division of Statistics, Northern Illinois University. (2005 - 2006).

Teaching Assistant, Mathematical Sciences Department, Northern Illinois University. (1998 - 2005).

Research Assistant, Biological Sciences Department, Northern Illinois University. (2001 - 2004).

Instructor, Divsion of Mathematics, Kishwaukee College. (1998 - 2003).

Teaching Assistant, Mathematics Department, Illinois State University. (1996 - 1998).

Instructor, Mathematics Department, Heartland Community College. (1995 - 1998).

Teaching Assistant, High Potential Students Program, Illinois State University. (1995 - 1996).

Professional Memberships

American Statistical Association.

SCHOLARSHIP

Contracts, Grants, and Sponsored Research

Grant

Alayont, F., McNair, J., Ruetz III, C., Snyder, E., Bergman, D., & Frobish, D., "An integrated empirical, theoretical, and statistical study of turbulent particle transport in streams," Sponsored by GVSU CSCE, Grand Valley State University, $8,195.00. (April 2012 - March 2013).

Frobish, D. (Co-Principal), & Ratkowiak, K. (Co-Principal), "Modeling Residential Foreclosures in Kent County," Grand Valley State University, $6,000.00. (2009).

Intellectual Contributions

Refereed Journal Articles

Published

Frobish, D., Ebrahimi, N., & Pham, D. (2016). Semiparametric Estimation of Change-Points for Recurrent Events Data. *Communications in Statistics: Computation and Simulation, 45*(9), 3339-3349, doi: 10.1080/03610918.2014.944654

Sisson, A., Wampler, P., Rediske, R., McNair, J., & Frobish, D. (2013). Long-term field performance of the Biosand Filter in the Artibonite Valley, Haiti. *American Journal of Tropical Medicine & Hygiene, 88*(5), 862-867

McNair, J., Sunkara, A., & Frobish, D. (2012). How to analyze seed germination data using statistical time-to-event analysis: nonparametric and semiparametric methods. *Seed Science Research, 22*, 77-95

McNair, J., Sunkara, A., & Frobish, D. (2012). Online supplement to: How to analyze seed germination data using statistical time-to-event analysis: nonparametric and semiparametric methods. *Seed Science Research, (in press)*

Kintzel, P. E., Campbell, A. D., Yost, K. J., Brinker, B. T., Arradaza, N. V., Frobish, D., Wehr, A. M., & O'Rourke, T. J. (2011). Reduced time for urinary alkalinization before high-dose methotrexate with preadmission oral bicarbonate. *Journal of Oncology Pharmacy Practice*

Frobish, D., Ebrahimi, N., & Polansky, A. (2009). Parametric Estimation of Change-Points for Panel Count Data in Recurrent Events Models. *Journal of Statistics and Applications, 4*, 45-66

Frobish, D., & Ebrahimi, N. (2009). Parametric Estimation of Change-Points for Actual Event Data in Recurrent Events Models. *Computational Statistics and Data Analysis, 53*, 671-682

Berg, A.T., Smith, S.N., Frobish, D., Levy, S.R., Testa, F.M., Beckerman, B., & Shinnar, S. (2005). Special Education Needs of Children with Newly Diagnosed Epilepsy. *Developmental Medicine & Child Neurology, 47*, 749-753

Submitted

McNair, J., Frobish, D., Rice, E., & Thum, R. Alternative study designs and nonparametric statistical methods for adaptive management studies of invasive plants. *Invasive Plant Science and Management*

Willette, J., Tsoi, M., Frobish, D., & VanderBroek, A. Intrathecal Administration of Enalapril for Prevention of Experimentally Induced Digital Flexor Tendon Sheath Adhesions in Horses. *Veterinary Surgery*

Book Review

Published

Frobish, D. (2014). Review of the book *Handbook of Survival Analysis*, by John Klein, Hans van Houwelingen, Joseph Ibrahim, Thomas Scheike. *Journal of the American Statistical Association* 109, 1328-1330.

Presentations Given

Lane, M. (Presenter & Author), Rediske, R. (Author Only), McNair, J. (Author Only), Rediske, R. R. (Author Only), & Scull, B. (Author Only), Great Lakes Beach Conference, "Using survival analysis methods to analyze censored E. coli concentrations in recreational water.," International Association of Great Lakes REsearch, Saginaw. (October 18, 2019).

Frobish, D., & K. B., Statistics Department Seminar, "Dimension Reduction for Survival Analysis with Cure Model," Allendale MI. (2017).

Frobish, D., Big Data Conference, GVSU, GVSU. (2013).

Stephenson, P., Curtiss, P., Frobish, D., Gabrosek, J., & Helmholdt, E. J., Pentathlon Events, Regional Tournament, Michigan Science Olympiad, "Statistics in Sport: Bean Bag Toss/Logisitic Modeling, Putt Putt Golf/Correlation, Football Toss/Distributional Shape, Airplane Throw/Geometric Distribution, and Soccer Kick/Histograms," Regional Math & Science Center, GVSU, Allendale, MI. (March 23, 2013).

Frobish, D., GVSU Statistics Department Seminar Series, "Presentation of A Discovery Learning Approach to STA 312: The Rossman and Chance Textbook." (2009).

Frobish, D., Math-in-Action Conference, "Presentation of Michigan Statistics Poster Competition," Grand Rapids, MI. (2009).

Stephenson, P., Gabrosek, J., & Frobish, D., California Symposium on Statistics and Operations Research in Sports, "Assessing the Accuracy of Sports Predictions and Calls by Umpires," Section on Sports Statistics, American Statistical Association, Atherton, CA. (October 18, 2008).

Stephenson, P., Gabrosek, J., & Frobish, D., Joint Statistical Meetings (JSM), "Assessing the Accuracy of Sports Predictions," American Statistical Association, Denver, CO. (August 5, 2008).

Frobish, D., GVSU Statistics Department Seminar Series, "Presentation of Estimation of an Unknown Change-Point for Recurrent Events Data, Frobish et al," Grand Valley State University, Allendale, Michgian. (2007).

Research in Progress

"Predicting survival based on genetic expression levels" (On-Going). Research related to sabbatical in Fall 2012

"A Survey of the Theoretical Basis of qPCR and ddPCR Sample Concentration Estimates" (Writing Results). (2022 - Present). This manuscript provides a careful and critical review of the theoretical underpinnings of qPCR and ddPCR concentration estimates for environmental samples. It includes detailed derivations of the concentration estimators and statistical methods, as well as examples with real data.

"How to analyze censored concentration data using nonparametric and semiparametric methods of survival analysis" (Writing Results). (May 2019 - Present). Many studies in applied ecology and environmental science collect chemical or microbiological concentration data to characterize and compare different sampling locations. Very often, a significant proportion of the data in such studies consist of instrument readings that are less than the lower limit of quantification (LLOQ) for the analytical method employed, meaning that the readings are not valid estimates of concentration; all that is known is that the true concentrations are less than the LLOQ. Presence of such left-censored data prevents the use of traditional statistical methods, such as analysis of variance. The most common method used by scientists and engineers for handling left-censored concentration data is to replace each censored value with one-half the LLOQ and then analyze the completed data set with traditional statistical methods. While simple, this approach is arbitrary, has no statistical justification, and typically yields data that violate basic assumptions of the statistical method employed, such as normality of residuals. Various other methods of dealing with left-censored data are sometimes

employed (though much less commonly), but most of them are either alternative methods of inventing fictitious data (so-called replacement methods) or require unverifiable assumptions about the specific probability distribution from which the data are assumed to have been sampled. In this paper, we advocate application of rigorous nonparametric and semiparametric methods from the statistical discipline called survival analysis to concentration data that include censored values. These statistical methods are specifically designed for censored data and do not require distributional assumptions. While their possible use for concentration data has been mentioned by a few previous authors, no adequate presentation has appeared in the literature to date. Our intention in this paper is to more fully describe this class of statistical methods as applied to concentration data instead of event times, give worked examples of their application to real and simulated data sets, compare their performance with two of the most commonly used replacement methods, and provide examples of R and SAS code for carrying out all the types of analysis we discuss.

"Statistical methods for analyzing spatially autocorrelated point-intercept data" (On-Going). (August 2015 - Present). This is collaborative research with Dan Frobish of GVSU's statistics department. The purpose is to develop valid statistical methods for analyzing point-intercept data from plant populations, where the data exhibit spatial autocorrelation. This is the norm in plant populations, but no appropriate statistical method currently exist.

"Survival Analysis of Residential Foreclosures in Kent County accounting for Spatial Correlation" (On-Going). (August 2015 - 2017). Our goal is to study different methods of accounting for spatial correlation when using survival analysis techniques. We have data from the Community Research Institute that deals with how long residential properties remain in foreclosure, and we will use these data to illustrate the methods that we use.

"Research Experience for Undergraduates" (On-Going). (October 2015 - 2016). In conjunction with colleagues in the math department, we applied for and secured funding for an REU in summer 2015. I will be supervising two students for 8 weeks, and we will research different ways to handle large numbers of predictor variables in the context of survival analysis, while accounting for the possibility of cure.

"An Integrated Empirical, Theoretical, and Statistical Study of Turbulent Particle Transport in Streams" (On-Going). (2015). This ongoing work is funded by a CSCE Interdisciplinary Research Initiative project and involves collaborators from several GVSU department, each focused on a different but related facet of turbulent particle transport in streams.

"Transdisciplinary Water Quality Studies". (January 2010 - December 2014). Access to clean water is a critical need in developing countries and we have moved from laboratory based studies on biosand filtration to assessments and intervention programs in developing countries. We are working in collaboration with Peter Wampler in Geology, Joe Verschaeve in Sociology, and Azizur Molla in Public Health on a transdisciplinary research approach for water quality studies in developing countries (Haiti and Ghana). Our proposal to USAID for Haiti was not funded in 2013 and we have decided to adopt a GVSU focused strategy to work on international water issues. Peter and I obtained approval for an Honors course (with laboratory) on World Water Issues that will be offered Winter 2015. The goal is to train students on biosand filter construction, water quality testing, and the importance of understanding the cultural factors in the development of water quality interventions. Our goal is to have trained students assist in the collection of water quality data on Study Abroad trips to Ghana and Haiti in addition to provide support for small intervention efforts. Joe has been working with a group of individuals in Ghana and as facilitated in the formation of an NGO called International Sustainability Health Education and Water (ISHEW). We have several students that are in the World Water Issues class that are interested in working on a biosand filter project with ISHEW during the 2015 Ghana Study Abroad trip. We continue to present conference papers (2017) American Public Health Association in addition to expanding our network of contacts.

Editorial Activity

Journal Article Submission, IEEE/ACM Transactions on Computational Biology and Bioinformatics. (2019).

Journal Article Submission, Journal of Statistical Computation and Simulation. (2019).

"Computational Statistics and Data Analysis", Journal Article Submission, Computational Statistics and Data Analysis. (2016).

"Statistical analysis of a Weibull extension with bathtub-shaped failure rate function", Advances in Statistics, Journal Article Submission. (2014).

"Migration bias in two-sample mark-recapture estimators of stream fish abundance", Other, James McNair, AWRI. (2014).

"Journal of Statistics Education", American Statistical Association, Journal Article Submission, Journal of Statistics Education. (2013).

Journal Article Submission, Journal of Statistics Education. (2010).

Journal Article Submission, Journal of Statistics Education. (2010).

Journal Article Submission, Computational Statistics and Data Analysis. (2009).

Journal Article Submission, Journal of Statistics Education. (2009).

Journal Article Submission, Journal of Statistics Education. (2009).

Journal Article Submission, Journal of Statistics Education. (2008).

TEACHING

Teaching Experience

Grand Valley State University

STA 699, Independent Study, 1 course.
STA 215, Intro Applied Statistics, 35 courses.
STA 216, Intermediate Applied Stats, 9 courses.
STA 310, Introduction to Biostatistics, 2 courses.
STA 312, Probability and Statistics, 14 courses.
STA 317, Nonparametric Statistics, 3 courses.
STA 321, Applied Regression Analysis, 5 courses.
STA 345, Statistics in Sports, 7 courses.
STA 412, Mathematical Statistics I, 1 course.
STA 415, Mathematical Stats 2, 4 courses.
STA 418, Computing and Graphics with R, 1 course.
STA 518, Computing and Graphics with R, 1 course.
STA 610, Appl Stats for Health Prof, 11 courses.
STA 622, Stats Methods for Biologists, 3 courses.
STA 628, Survival Analysis, 9 courses.
STA 680, Special Topics in Statistics, 2 courses.
STA 699, Independent Study in Survival Analysis, 1 course.

Directed Student Learning

Master's Thesis Committee Member, Biology. (2019 - 2020). Advised: Molly Lane

Dissertation Committee Member, "Bivariate Cure Rate Model Using Copula Functions in Presence of Censored Data and Covariates," Statistics. (2019). Advised: Jie Huang

Master's Thesis Committee Member, Biology. (2017 - 2018). Advised: Emma Rice

Supervised Research, "Honors Project," Statistics. (2017). Advised: Brianna King

Dissertation Committee Member, "Extensions of Two-Part Tests to Compare K Independent Populations," Statistics. (2007). Advised: Marwan Daoud

SERVICE

University Service

Committee Member, Data Science Task Force. (2021 - Present).

Faculty Advisor, Advisor to minors. (2020 - Present).

Committee Chair, Assessment committee. (2019 - Present).

Assistant/Associate Unit Head. (2019 - Present).

Committee Member, Curriculum committee. (2019 - Present).

STA 215 coordinator. (2019 - Present).

Director, Banner Override. (2017 - Present).

Liaison to Math/Stat Tutoring Center. (2012 - Present).

Committee Member, PSM Admissions Committee. (2010 - Present).

Director, department of statistics fantasy football league. (2008 - Present).

Faculty Mentor, Internship Mentoring. (2008 - Present).

Task Force Member, Assistant Unit Head Task Force. (2019).

Committee Member, Mentoring Task Force. (2019).

Committee Member, Search committee for part-time secretary. (2019).

Data Fest. (2017 - 2019).

Committee Chair, Statistics Department Golf Outing. (2011 - 2019).

Faculty Advisor, Delta Sigma Phi. (2010 - 2019).

Attendee, Meeting, recruitment events. (2008 - 2019).

Unit Head. (July 6, 2019 - July 20, 2019).

Director, Biostatistics Masters Program. (August 2018 - December 2018).

Committee Member, Michigan Statistics Poster Competition. (2017 - 2018).

Task Force Member, Affiliate Personnel Review Task Force. (2017).

Task Force Member, Applied Statistics PSM Task Force. (2017).

Committee Member, CLAS Faculty Council. (2017).

Student Recruitment Event Participant, Laker Experience Day. (April 7, 2017 - 2017).

Faculty Mentor, McNair Scholar Program. (2017).

Committee Member, Personnel Committee. (2017).

Faculty Mentor, Steelcase internship mentor. (2017).

Committee Chair, Syllabi of record review. (2017).

Task Force Chair, Personnel Review. (2016 - 2017).

Faculty Mentor, Graduate Assistant Supervisor. (2012 - 2017).

Co-Advisor, Math/Stat Club. (2009 - 2017).

Task Force Member, Advisor Task Force. (2016).

Task Force Member, Laker Experience Day. (2016).

faculty facilitator, Lexical Ambiguity Study. (2016).

representative, Majors Fair. (2016).

Task Force Member, STA 216 task force. (April 2016 - 2016).

Committee Chair, STA 216 textbook search committee. (2016).

Committee Member, Statistics Deparment Personnel Committee. (2016).

Faculty Mentor, Undergraduate research project. (2016).

Committee Member, Faculty Facilities Planning Advisory Committee. (2013 - 2016).

Committee Member, Faculty Facilities Planning Advisory Committee. (2012 - 2016).

Committee Chair, Statistics Poster Competition. (2008 - 2016).

Task Force Member, Statistics Career Day. (November 20, 2015).

Committee Member, Affiliate faculty search committee. (May 2015 - August 2015).

Faculty Mentor, Internship mentoring. (January 1, 2015 - April 30, 2015).

Faculty Mentor, Mentoring new faculty. (January 1, 2015 - April 30, 2015).

Committee Member, Search Committee. (August 2014 - March 2015).

Committee Member, classroom visit for visiting faculty member. (2014).

Faculty Mentor, graduate student mentoring. (2014).

substitute teaching. (2014).

Committee Member, summer assessment. (2014).

Committee Chair, Data Analytics Committee. (2013 - 2014).

Faculty Mentor, Consulting with colleague. (2013).

Faculty Mentor. (2013).

Faculty Mentor, Graduate Assistant Supervisor. (2013).

Faculty Mentor, Internship Mentoring. (2013).

Committee Member, Search Committee. (2013).

Committee Member, STA 312 task force. (2013).

Super Staturday. (2013).

statistical consultant, Statistical consulting, Community Research Institute. (2008 - 2013).

Committee Chair, STA 216 content task force. (2012).

Director, Professional Science Masters Program at GVSU. (August 2011 - December 2011).

Student Recruitment Event Participant, Student Visitation Day. (2011).

Super Science Saturday. (2011).

Curriculum Committee. (2010 - 2011).

Committee Member, Master's committee. (2010 - 2011).

Committee Member, Master's committee. (2010 - 2011).

assessed student learning in statistics classes, Assessment of STA 345, 412 and 415. (2010).

Committee Member, Bridge Course Committee (STA 305). (2010).

evaluated adjunct faculty member, classroom visit of adjunct faculty. (2010).

interviewer, S-STEMS interviews. (2010).

Committee Member, Search Committee. (2009 - 2010).

Committee Member, Assessment Committee. (2008 - 2010).

Faculty Advisor, Master’s committee for PA students. (2009).

Outreach/events coordinator in Statistics Department. (2009).

Faculty Advisor, Summer Student Scholar project with undergraduate student Kaitlin Ratkowiak. (2009).

Judge, Undergraduate Project Competition for CAUSE. (2009).

Faculty Mentor, Visiting Faculty member Becky Twing. (2009).

Faculty Mentor, S-STEMS mentor for undergraduate students. (2008 - 2009).

Section or Program Coordinator, Outreach and Events. (2007 - 2009).

event facilitator, Statistics Career Day. (2008).

event facilitator, Super Science Saturday. (2008).

interviewer, Faculty and Presidential scholarship interviews. (2007 - 2008).

Student Recruitment Event Participant, Student Visitation Day. (2007).

Faculty Advisor, Fraternity. (2006).

Attendee, Meeting, FTLC Teaching Seminar for First Year Faculty. (2006).

Professional Service

External Tenure Reviewer, University of Northern Florida, Jacksonville, FL. (2016).

Public Service

Task Force Member, Science Olympiad. (2006 - 2015).

judge, National statistics poster competition. (2009 - 2010).

Judge, Michigan Statistics Poster Competition. (2006 - 2007).

Consulting

Annis Water Resource Institute, GVSU. (2011 - Present).

For-Profit Business, Metrica, Grand Rapids, MI. (2016 - 2022).

Community Research Institute, Johnson Center for Philanthropy. (2013 - 2022).

For-Profit Business, Ed Koehn Ford Dealer, Greenville, MI. (2016 - 2018).

Brigham and Women's Hospital, Boston, MA. (2017).

Assisted Prof Paul Fishback with implementation of his Math 327 class, Prof Paul Fishback, Math Dept, GVSU, GVSU. (August 2015 - December 2015).

For-Profit Business, Pro Care Systems, Grand Rapids. (2014).

Development Activities Attended

Workshop, "Personnel Portfolio Workshop," GVSU, Allendale, MI. (2019).

Conference Attendance, "Regression Modeling Strategies short course," Vanderbilt University, Nashville, TN. (May 2018).

Seminar, "R for Data Science," Michigan State University, Lansing, MI, US. (2017).

Conference Attendance, "MathFest," Mathematical Association of America, Columbus, OH. (August 3, 2016 - August 6, 2016).

Conference Attendance, "Summer Undergraduate Michigan Mathematics Research Conference," University of Michigan Dearborn, Dearborn, MI. (July 15, 2016).

Conference Attendance, "Lies, Deceipt and Misrepresentation: Distortion of Statistics in America," GVSU. (March 30, 2016).

Conference Attendance, "Data Visualization at the New York Times," GVSU. (March 21, 2016).

Conference Attendance, "Data Analytics Workshop," GVSU Statistics Department, Allendale, MI, USA. (April 11, 2015).

Conference Attendance, "International Conference on Survival Analysis in Memory of John P. Klein," Medical College of Wisconsin, Milwaukee, WI, USA. (June 26, 2014 - June 27, 2014).

Seminar, "SAS Text Mining Workshop," Grand Valley State University, Allendale, MI, USA. (October 25, 2012).

Conference Attendance, "Midwest Biopharmaceutical Statistics Workshop," Ball State University, Muncie, IN, USA. (May 21, 2012 - May 23, 2012).

Conference Attendance, "Sports Statistics," Chicago Chapter of American Statistical Association, Chicago, IL, USA. (May 6, 2011).

Conference Attendance, "Winemiller Conference on Survival Analysis and its Applications," University of Missouri, Columbia, MO, USA. (October 15, 2008 - October 18, 2008).

Conference Attendance, "United States Conference on Teaching of Statistics," Ohio State University, Columbus, OH, USA. (May 17, 2007 - May 19, 2007).