

J.E. (Elyse) Borgert

EDUCATION

The University of North Carolina at Chapel Hill

Ph.D. Statistics and Operations Research

Advised by Jan Hannig and J.S. Marron

Chapel Hill, NC

2019 – 2024

University of Florida

B.S. Mathematics

Magna Cum Laude

Gainesville, FL

2015 – 2019

PROFESSIONAL POSITIONS

Postdoctoral Research Associate

The University of North Carolina at Chapel Hill

Chapel Hill, NC

March 2025 –

Postdoctoral Research Scientist

U.S. Meat Animal Research Center

Clay Center, NE

July 2024 – March 2025

Graduate Research Assistant

The University of North Carolina at Chapel Hill

Chapel Hill, NC

August 2020 – August 2024

Technology Analyst

Morgan Stanley

New York, NY

Summer 2017 & 2018

RESEARCH INTERESTS

Applications of statistics in: {clinical & translational medicine, predictive modeling for biological systems, animal breeding models for genetic prediction and selection}, Data integration, Fiducial inference, Foundations of statistics, Functional data analysis, Local asymptotic theory, Machine learning for complex & high-dimensional data, Mixed effects models, Nonparametric statistics, Shape statistics, Topological data analysis

PUBLICATIONS

Preprints

- [1] **J. E. Borgert** and J. Hannig, “A Bernstein-von Mises Theorem for Generalized Fiducial Distributions,” *R&R at Bayesian Analysis*, arXiv: 2401.17961 [math.ST].
- [2] Y. M. Golightly, **J. E. Borgert**, S. Xiang, E. Wellsandt, L. Arbeeve, R. F. Loeser, S. P. Messier, A. E. Nelson, and J. Marron, “Influence of Sociodemographic and Clinical Features on Ground Reaction Force Variability Among Individuals with Symptomatic Knee Osteoarthritis,” *R&R at Osteoarthritis and Cartilage*, Manuscript available upon request.
- [3] B. N. Engle, R. M. Thallman, **J. E. Borgert**, J. W. Keele, W. M. Snelling, C. Gondro, and L. A. Kuehn, “A Biologically Motivated Nonlinear Latent Variable Genetic Model,” *Accepted with revisions at Journal of Animal Science*, Manuscript available upon request.
- [4] **J. E. Borgert** and R. M. Thallman, “Multiple trait mixed model equations with singular (co)variance matrices,” *In preparation*, Draft available upon request.

- [5] A. N. Buck, **J. E. Borgert**, H. Lee, L. Arbeeva, Y. M. Golightly, S. P. Messier, B. G. Pietrosimone, A. E. Nelson, and J. S. Marron, “Vertical Ground Reaction Force Variability is Associated with Clinical Features in Individuals with Knee OA and Overweight/Obesity: A Novel Machine Learning Analysis of the IDEA Trial,” *In preparation*, Draft available upon request.

In print

- [6] **J. E. Borgert**, J. Hannig, J. D. Tucker, L. Arbeeva, A. N. Buck, Y. M. Golightly, S. P. Messier, A. E. Nelson, and J. S. Marron, “Elastic Shape Analysis of Movement Data,” *To appear in Journal of the American Statistical Association*, 2025+. arXiv: 2409.13938 [stat.AP].
- [7] A. M. Kostic, L. Arbeeva, X. Jiang, Y. M. Golightly, S. P. Messier, R. F. Loeser, **J. E. Borgert**, J. Marron, M. R. Kosorok, and A. E. Nelson, “Determining Optimal Diet/Exercise Treatment Assignment for Patients with Symptomatic Knee Osteoarthritis Using Baseline Gait Forces,” *Osteoarthritis and Cartilage Open*, p. 100691, 2025.
- [8] R. M. Thallman, **J. E. Borgert**, B. N. Engle, J. W. Keele, W. M. Snelling, C. Gondro, and L. A. Kuehn, “A vision of how low-coverage sequence data should contribute to genetic evaluation in the future,” *Journal of Animal Science*, skaf294, 2025.
- [9] **J. E. Borgert** and J. S. Marron, “Comments on: Shape-based functional data analysis,” *TEST*, 2024. DOI: 10.1007/s11749-023-00914-6.
- [10] W. Hamilton, **J. E. Borgert**, T. Hamelryck, and J. Marron, “Persistent topology of protein space,” *Research in Computational Topology* 2, p. 223, 2022.
- [11] B. R. Miller, A. M. Morse, **J. E. Borgert**, Z. Liu, K. Sinclair, G. Gamble, F. Zou, J. R. Newman, L. G. Leon-Novelo, F. Marroni, *et al.*, “Testcrosses are an efficient strategy for identifying cis-regulatory variation: Bayesian analysis of allele-specific expression (BayesASE),” *G3*, vol. 11, no. 5, 2021.

Peer-reviewed Abstracts

- [12] A. N. Buck, **J. E. Borgert**, H. Lee, L. Arbeeva, Y. M. Golightly, R. F. Loeser, S. P. Messier, B. Pietrosimone, A. E. Nelson, and J. Marron, “Vertical Ground Reaction Force Variability is Associated with Clinical Features in Individuals with Knee OA and Overweight/Obesity: A Novel Machine Learning Analysis of the IDEA Trial,” *Osteoarthritis and Cartilage*, vol. 33, S160–S161, 2025.
- [13] A. M. Kostic, L. Arbeeva, X. Jiang, Y. M. Golightly, S. P. Messier, R. F. Loeser, **J.E. Borgert**, D. De Marchi, J. Marron, M. R. Kosorok, *et al.*, “Determining Optimal Diet/Exercise Treatment Assignment for Patients with Symptomatic Knee Osteoarthritis Using Baseline Gait Forces,” *Osteoarthritis and Cartilage*, vol. 32, S65–S66, 2024.
- [14] L. Arbeeva, **E. Borgert**, T. Keefe, A.-C. Bay-Jensen, R. Loeser, Y. Golightly, J. Marron, and A. Nelson, “A machine learning approach to identify patterns of variation among collagen biomarkers and clinical features in a community-based cohort,” *Osteoarthritis and Cartilage*, vol. 31, no. 5, pp. 677–678, 2023.

Dissertation

- [15] **J.E. Borgert**, “Foundational Methods for Object Oriented Data Analysis and Statistical Inference,” Ph.D. dissertation, The University of North Carolina at Chapel Hill, 2024.

PRESENTATIONS

Elastic Shape Analysis of Movement Data
Joint Statistical Meetings

Topic-Contributed Talk
August 2025

Elastic Shape Analysis of Human Movement Data <i>University of Nebraska Medical Center</i>	Invited Seminar May 2025
A Bernstein-von Mises Theorem for Generalized Fiducial Distributions <i>IMS International Conference on Statistics and Data Science</i>	Contributed Talk December 2024
Elastic Shape Analysis of Human Movement Data <i>The Mathematical Laws of Morphology and Biomechanics Seminar Series</i>	Invited Seminar November 2024
Foundational Thinking in Statistics <i>NCERA225: Implementation and Strategies for National Beef Cattle Genetic Evaluation</i>	Invited Talk November 2024
Foundational Methods for Object Oriented Data Analysis and Statistical Inference <i>Statistics & Operations Research Department, University of North Carolina at Chapel Hill</i>	PhD Defense April 2024
Foundational Methods for Object Oriented Data Analysis and Statistical Inference <i>U.S. Meat Animal Research Center</i>	Invited Seminar February 2024
Modes of Variation and Data Integration for Manifold Data <i>IMSI Object Oriented Data Analysis in Health Sciences: Theory and Applications Workshop</i>	Poster July 2023
A Bernstein-von Mises Theorem for Generalized Fiducial Distributions <i>Bayesian, Fiducial, Frequentist Conference</i>	Poster May 2023
Persistent Topology of Protein Space <i>Joint Mathematical Meetings</i>	Invited Talk April 2022
Persistent Topology of Protein Space <i>IMSI Topological Data Analysis Workshop</i>	Poster April 2021

AWARDS & FUNDING

Graduate Student Travel Award, University of North Carolina at Chapel Hill	2024
NSF Mathematical Sciences Graduate Research Fellowship Honorable Mention	2020
Munroe and Rebecca Cobey Graduate Fellow, University of North Carolina at Chapel Hill	2019 – 2024

TEACHING ACTIVITIES

STOR 155: Data Models and Inference (Instructional Assistant) <i>The University of North Carolina at Chapel Hill</i>	Chapel Hill, NC Fall 2020
STOR 455: Methods of Data Analysis (Instructional Assistant) <i>The University of North Carolina at Chapel Hill</i>	Chapel Hill, NC 2019 – 2020

PROFESSIONAL & DEPARTMENTAL SERVICE

Referee for <i>Journal of the American Statistical Association</i>	1 manuscript
Referee for <i>Statistics and Computing</i>	1 manuscript
Referee for <i>Journal of Statistical Theory and Practice</i>	1 manuscript
Referee for <i>Journal of Multivariate Analysis</i>	1 manuscript
Referee for <i>Journal of Computational and Graphical Statistics</i>	2 manuscripts
Referee for <i>Sankhya A, The Indian Journal of Statistics</i>	1 manuscript
UNC STOR Graduate Liaison	2022 – 2024
UNC STOR Graduate Seminar, Organizer	2021 – 2022