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J.E. (Elyse) Borgert

EDUCATION

The University of North Carolina at Chapel Hill — **Chapel Hill, NC**
Ph.D. Statistics and Operations Research — *2019 – 2024*
Advised by Jan Hannig and J.S. Marron

University of Florida — **Gainesville, FL**
B.S. Mathematics — *2015 – 2019*
Magna Cum Laude

PROFESSIONAL POSITIONS

Postdoctoral Research Associate — **Chapel Hill, NC**
The University of North Carolina at Chapel Hill — *March 2025 –*

Postdoctoral Research Scientist — **Clay Center, NE**
U.S. Meat Animal Research Center — *July 2024 – March 2025*

Graduate Research Assistant — **Chapel Hill, NC**
The University of North Carolina at Chapel Hill — *August 2020 – August 2024*

Technology Analyst — **New York, NY**
Morgan Stanley — *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, Nonparametric statistics, Shape statistics, Variance component models, Topological data analysis

PUBLICATIONS

Preprints

[1] **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," *Accepted with major revisions at Journal of the American Statistical Association*, arXiv: `2409.13938 [stat.AP]`.

[2] **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]`.

[3] Y. M. Golightly, **J. E. Borgert**, S. Xiang, E. Wellsandt, L. Arbeeva, 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.

[4] 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.

[5] 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," *Under reivew at Osteoarthritis and Cartilage Open*, Manuscript available upon request.

[6] **J. E. Borgert** and R. M. Thallman, "Multiple trait mixed model equations with singular (co)variance matrices," *In preparation*, Draft available upon request.

[7] 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

[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," *To appear in Journal of Animal Science*, 2025+.

[9] **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.

[10] **J. E. Borgert** and J. S. Marron, "Comments on: Shape-based functional data analysis," *TEST*, 2024. DOI: 10.1007/s11749-023-00914-6.

[11] W. Hamilton, **J. E. Borgert**, T. Hamelryck, and J. Marron, "Persistent topology of protein space," *Research in Computational Topology 2*, p. 223, 2022.

[12] 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

[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.

PRESENTATIONS

Elastic Shape Analysis of Movement Data — **Topic-Contributed Talk**
Joint Statistical Meetings — *August 2025*

Elastic Shape Analysis of Human Movement Data — **Invited Seminar**
University of Nebraska Medical Center — *May 2025*

A Bernstein-von Mises Theorem for Generalized Fiducial Distributions — **Contributed Talk**
IMS International Conference on Statistics and Data Science — *December 2024*

Elastic Shape Analysis of Human Movement Data — **Invited Seminar**
The Mathematical Laws of Morphology and Biomechanics Seminar Series — *November 2024*

Foundational Thinking in Statistics **Invited Talk**
NCERA225: Implementation and Strategies for National Beef Cattle Genetic Evaluation *November 2024*

Foundational Methods for Object Oriented Data Analysis and Statistical Inference **PhD Defense**
Statistics & Operations Research Department, University of North Carolina at Chapel Hill *April 2024*

Foundational Methods for Object Oriented Data Analysis and Statistical Inference **Invited Seminar**
U.S. Meat Animal Research Center *February 2024*

Modes of Variation and Data Integration for Manifold Data **Poster**
IMSI Object Oriented Data Analysis in Health Sciences: Theory and Applications Workshop *July 2023*

A Bernstein-von Mises Theorem for Generalized Fiducial Distributions **Poster**
Bayesian, Fiducial, Frequentist Conference *May 2023*

Persistent Topology of Protein Space **Invited Talk**
Joint Mathematical Meetings *April 2022*

Persistent Topology of Protein Space **Poster**
IMSI Topological Data Analysis Workshop *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) **Chapel Hill, NC**
The University of North Carolina at Chapel Hill *Fall 2020*

STOR 455: Methods of Data Analysis (Instructional Assistant) **Chapel Hill, NC**
The University of North Carolina at Chapel Hill *2019 – 2020*

PROFESSIONAL & DEPARTMENTAL SERVICE

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