Javier E. Flores, PhD

RESEARCH ASSISTANT PROFESSOR OF BIOSTATISTICS

University of Iowa, Clinical Trials Statistical & Data Management Center (CTSDMC)

San Benito, TX | 319.335.2284 | javier-flores@uiowa.edu

Summary

Through collaborations spanning medicine and multi-omics, psychology and soil microbiology, artificial intelligence and even astrobiology, I'm a biostatistician and data scientist whose insatiable curiosity has led to more than a few fun "backyards".

I have a proven track record of leading interdisciplinary teams to tackle complex scientific challenges, extensive experience generating novel, high-impact solutions through statistical modeling and modern AI/ML techniques and am a clear and persuasive communicator adept at aligning analytical strategies with stakeholder goals, mentoring junior scientists, and driving research from concept to implementation across diverse domains.

Key Skills

R • SAS • python • biostatistics • statistical inference • model selection • multi-omics • machine learning • artificial intelligence • communication • cross-functional leadership • adaptability • teaching • mentorship

Education

University of Iowa, PhD   **2017-2021**

Major: Biostatistics | GPA: 3.98 / 4.00

University of Iowa, MS   **2015-2017**

Major: Biostatistics | GPA: 3.96 / 4.00

University of Texas at Brownsville, BS   **2010-2014**

Major: Chemistry | GPA: 3.96 / 4.00

Experience

University of Iowa | Research Assistant Professor of Biostatistics   **Dec 2025 - present**

- *Collaborator on efforts primarily relating to the Parkinson's Progression Markers Initiative (PPMI) and the Network for Excellence in Neuroscience Clinical Trials (NeuroNEXT)*

Pacific Northwest National Laboratory | Data Scientist III   **Aug 2022 – Dec 2025**

- *Principal Investigator, Predictive Phenomics Initiative: Conceptualized and led the development of a transfer learning pipeline for improved biomarker discovery and phenotype prediction.*

- *Principal Investigator, EBSD Seed LDRD: Conceptualized and led the development of a novel, ensemble-based, AI/ML method for multi-view learning in the context of 'omic and meta-'omic data.*

- *Principal Investigator, EMSL Developer Proposal: Conceptualized and led the development of a novel, machine-learning-based recommender system for improving the automation of identifying metabolites in NMR spectra.*

- *Principal Investigator, EMSL DASH Proposal: Conceptualized and led the development of a multi-omic network visualization pipeline based on a gaussian graphical modeling approach and housed within an R-shiny web application*

- *Lead or key contributor on various other efforts, including a comparative evaluation of retrieval augmentation fine-tuning (RAFT) and retrieval-augmented generation (RAG) LLMs for biological research, development of data processing and QA/QC pipelines for GC/MS lipidomics and metabolomics data, and statistical and AI/ML-based analyses of biomolecular datasets (glmms, random forests, recurrent neural networks, DBSCAN)*
- *First author or key contributor on nearly 20 scientific publications and recognized as a rising leader among PNNL's scientists and engineers.*

Pacific Northwest National Laboratory | Data Scientist II　　　　　**Jun 2021 – Aug 2022**

- *Principal Investigator, EMSL Developer Proposal: Led the development of an R shiny web application for improved automation of the quantification of metabolites identified in NMR spectroscopy, based on an NLS optimization algorithm*
- *Developed a novel approach for false discovery rate estimation of GC-MS metabolite identification based on a generalized additive model for location, scale, and shape (GAMLSS) framework.*
- *Technical lead on various projects, e.g. anomaly detection in computer networks, theory-driven spectral similarity score investigations for GC/MS identifications.*
- *Provided experimental design support for an effort under PNNL's Mathematics for Artificial Reasoning in Science Initiative to develop interpretable, domain-aware AI models.*

University of Iowa | Statistical Consultant (Biostatistics)　　　　　**Aug 2015 – May 2021**

- *Analyzed cross-sectional and longitudinal datasets using various statistical methods (e.g. glms, glmms, clustering analyses, contingency table analyses, nonparametric methods, quantile regression, difference-in-differences analysis).*
- *Collaborated with medical and public health professionals on primarily injury-epidemiological research.*
- *Awarded the Willilam R. Clarke Graduate Research Assistant Award for demonstrating excellence in service as a collaborating member of research team(s).*

University of Iowa | Summer REU Advisor (Seasonal)　　　　　**May 2016 – July 2019**

- *Co-developed project concepts for incoming undergraduates participating in the summer program.*
- *Co-advised multiple undergraduate teams, helping them perform biostatistical analyses and prepare a capstone presentation.*
- *Established strong rapport among students participating in the REU which aided in recruiting several students to the graduate program – many from underrepresented backgrounds.*

Grinnell College | Visiting Instructor　　　　　**Jan 2019 – May 2019**

- *Developed course materials for and taught Applied Statistics (STA209), an introductory course in statistics.*
- *Mentored two winning submissions (1st and 3rd place) to the Spring 2019 Introductory Statistics Division of the Undergraduate Class Project Competition sponsored by the American Statistical Association and the Consortium for the Advancement of Undergraduate Statistics Education.*

University of Texas at Brownsville | Tutor　　　　　**Aug 2011 – May 2015**

- *Created individualized lessons and exercises for students taking introductory through advanced courses in mathematics, biology, and chemistry (e.g. Calculus I-III, Elementary Statistics, Biology I-II, Chemistry I-II).*
- *Prepared bonus lectures with the intent of improving comprehension of identified areas of difficulty for students in select classes.*

University of Iowa | Undergraduate Research Assistant (Biostatistics)   May 2014 – July 2014

- *Analyzed the survey data from the Youth Risk Behavioral Surveillance System (YRBSS) using logistic regression to model relationships between identified risk factors and behaviors.*
- *Created a model-based risk-assessment tool to characterize high risk youth profiles.*

Autrey Pharmacy | Registered Pharmacy Technician   Aug 2010 – July 2011

- *Improved personal communication skills through regular interaction with patients*
- *Developed a keen attention to detail through filling a high volume of prescriptions daily.*

Grants

A Novel, Integrative Multi-Omics Network Visualization Tool

Principal Investigator(s): **Javier E. Flores**

Award Amount: $59,917

Funding Source: Earth and Molecular Sciences Laboratory, PNNL Directed R&D

Anticipated Project Period: 6 months (7/1/2025 – 1/1/2026)

A Robust, Ensemble Machine Learning Integration Approach for Meta- and Multi-Omic Modeling of Soil Systems

Principal Investigator(s): **Javier E. Flores**, David Degnan

Award Amount: $175,000

Funding Source: Earth and Biological Sciences Directorate, PNNL Directed R&D

Funded Project Period: 12 months (10/1/2024 – 10/1/2025)

Transfer Learning for More Efficient Experimental Design and Discovery

Principal Investigator(s): **Javier E. Flores**, Kelly Stratton

Award Amount: $516,000

Funding Source: Predictive Phenomics Initiative, PNNL Lab Directed R&D

Anticipated Project Period: 26 months (10/1/2024 – 12/1/2026)

Semi-Automated NMR Metabolite Identification via Machine Learning

Principal Investigator(s): **Javier E. Flores**

Award Amount: $224,981

Funding Source: Earth and Molecular Sciences Laboratory, PNNL Lab Directed R&D

Funded Project Period: 15 months (10/1/2022 – 12/31/2023)

Semi-Automated NMR Metabolite Profiling Software

Principal Investigator(s): **Javier E. Flores**

Award Amount: $230,232

Funding Source: Earth and Molecular Sciences Laboratory, PNNL Lab Directed R&D

Funded Project Period: 15 months (7/1/2021 – 10/1/2022)

Refereed Publications

1. **Flores JE**, Degnan DJ, Eberlim de Corilo Y, Clendinen CS and Bramer LM (in submission). The Power of Many: An Ensemble Approach to Spectral Similarity. *Anal Chem*.

2. Claborne DM, **Flores JE**, Erwin SH, Durell JL, Richardson RE, Fore RA and Bramer LM (in submission). Consistency of Feature Attribution in Deep Learning Architectures for Multi-Omics. *Sci Rep*

3. Claborne DM, Jensen MH, **Flores JE**, Bramer LM and Erwin SH (in submission). GenrAItOR: Generative AI for 'Omics Research. *J Open Source Softw*

4. **Flores JE**, Cavanaugh JE, Neath AA. A new class of information criteria for improved prediction in the presence of training/validation data heterogeneity. *Comput Stat*. 2025;40(5):2389–2423. doi:10.1007/s00180-024-01559-1

5. **Flores JE**, Prymolenna AV, Logan LA, et al. nmRanalysis: an open-source web application for semi-automated NMR metabolite profiling. *Anal Chem*. 2025;97(13):7037–7046. doi:10.1021/acs.analchem.4c05104

6. Bramer LM, Nakayasu ES, **Flores JE**, et al. Data from a multi-year targeted proteomics study of a longitudinal birth cohort of type 1 diabetes. *Sci Data*. 2025;12(1):112. doi:10.1038/s41597-024-04249-1

7. Adamczyk PA, Hwang HJ, Chang T-H, **et al.** The oleaginous yeast *Rhodosporidium toruloides* engineered for biomass hydrolysate-derived (E)-α-bisabolene production. *Metab Eng*. 2025;90:92–105. doi:10.1016/j.ymben.2025.02.014

8. Webb-Robertson BM, Wu W, Flores JE, **et al.** RNA splicing events in circulation distinguish individuals with and without new-onset type 1 diabetes. *J Clin Endocrinol Metab*. 2025;110(4):1148–1157. doi:10.1210/clinem/dgae622

9. Degnan DJ, Bramer LM, **Flores JE**, et al. Evaluating retention index score assumptions to refine GC–MS metabolite identification. *Anal Chem*. 2023;95(19):7536–7544. doi:10.1021/acs.analchem.2c05783

10. Webb-Robertson BJM, Nakayasu ES, Dong F, **et al.** Decrease in multiple complement proteins associated with development of islet autoimmunity and type 1 diabetes. *iScience*. 2023;27(2):108769. doi:10.1016/j.isci.2023.108769

11. **Flores JE**, Claborne DM, Weller ZD, et al. Missing data in multi-omics integration: recent advances through artificial intelligence. *Front Artif Intell*. 2023 Feb 9;6:1098308. doi:10.3389/frai.2023.1098308

12. **Flores JE**, Bramer LM, Degnan DJ, et al. Gaussian mixture modeling extensions for improved false discovery rate estimation in GC-MS metabolomics. *J Am Soc Mass Spectrom*. 2023 Jun;34(6):1096–1104. doi:10.1021/jasms.3c00039

13. Degnan DJ, **Flores JE**, Brayfindley ER, et al. Characterizing families of spectral similarity scores and their use cases for gas chromatography–mass spectrometry small molecule identification. *Metabolites*. 2023 Oct 21;13(10):1101. doi:10.3390/metabo13101101

14. **Flores JE**, Cavanaugh JE. Akaike Information Criterion. In: Frey BB, editor. *The SAGE Encyclopedia of Research Design*. 2nd ed. Thousand Oaks (CA): SAGE Publications; 2021. p. 32–34.

15. Ramirez M, **Flores JE**, Cheng G, Peek-Asa C, Cavanaugh JE. An approach to analyzing correlated contextual factors: an application for studies on violence. *Inj Prev*. 2021 Aug;27(4):161–165. doi:10.1136/injuryprev-2020-043967.

16. Ramirez M, Woods-Jaeger B, Peek-Asa C, **et al.** Comparing two approaches to help parents support their children's social and emotional recovery after a serious accidental injury. *Patient-Centered Outcomes Research Institute*. 2020. doi:10.25302/07.2020.CER.130602918

17. **Flores JE**, Cavanaugh JE. Partial Likelihood. *Wiley StatsRef*. 2018 Dec 10;1-5. doi:10.1002/9781118445112.stat05932.pub2

18. Neath AA, **Flores JE**, Cavanaugh JE. Bayesian multiple comparisons and model selection. *WIREs Comput Stat*. 2018;10:e1420. doi:10.1002/wics.1420

19. Hatzenbuehler ML, **Flores JE**, Cavanaugh JE, et al. Anti-bullying policies and disparities in bullying: a state-level analysis. *Am J Prev Med*. 2017 Aug;53(2):S187-S195. doi:10.1016/j.amepre.2017.02.004

Presentations

1. **Flores, J. E.**, & VonKaenel, E. (2025). Data requirements for the use of transfer learning to optimize experimental design. Presented Virtually at the 2025 Pacific Northwest National Laboratory Techfest.
2. **Flores, J. E.** (2024). nmRanalysis: An open-source web application for semi-automated NMR metabolite profiling. Invited Poster Presented at the 2024 Environmental and Molecular Sciences Laboratory Science and Technology Advisory Committee Meeting.
3. **Flores, J. E.** (2024). Mathematics and government service panel. Invited Panelist for the Career Paths in the Mathematical Sciences Workshop Hosted by the Institute for Mathematical and Statistical Innovation at the University of Chicago.
4. **Flores, J. E.** (2023). Unsupervised learning. Presented at the 2023 Environmental and Molecular Laboratory Summer School Program.
5. **Flores, J. E.** (2023). The power of simulation: Using simulation to answer statistical questions. Presented at the 2023 Environmental and Molecular Laboratory Summer School Program.
6. **Flores, J. E.**, & Prymolenna, A. V. (2022). Semi-automated NMR metabolite profiling software. Presented Virtually at the 2022 Pacific Northwest National Laboratory Techfest.
7. **Flores, J. E.** (2022). nmRanalysis: Open-source software for semi-automated NMR metabolite quantification. Presented at the 2022 Environmental and Molecular Sciences Laboratory Integration Meeting.
8. **Flores, J. E.** (2021). Playing in PNNL's Backyard. Invited Presentation for the "Statistical Scientists of the Math Alliance: A Focus on Diversity & Recent Graduates" Invited Program at the 2023 Joint Statistical Meetings.
9. **Flores, J. E.** (2021). Unsupervised learning. Presented Virtually at the Pacific Northwest National Laboratory.
10. **Flores, J. E.**, & Cavanaugh, J. E. (2021). A-i-(don't)-c the future: A new class of selection criteria geared towards(better) prediction. Presented Virtually at the Joint Mathematics Meetings.
11. **Flores, J. E.**, & Cavanaugh, J. E. (2020). A-i-(don't)-c the future: A new class of selection criteria geared towards(better) prediction. Presented Virtually at the Joint Statistical Meetings.
12. **Flores, J. E.**, Neath, A. A., & Cavanaugh, J. E. (2018). A bayesian model selection approach to multiple comparisons. Presented at the Joint Statistical Meetings, Vancouver, BC.
13. **Flores, J. E.**, Neath, A. A., & Cavanaugh, J. E. (2018). A bayesian model selection approach to multiple comparisons. Presented at the University of Iowa Research Week Symposium, Iowa City, IA.
14. **Flores, J. E.**, Neath, A. A., & Cavanaugh, J. E. (2018). A bayesian model selection approach to multiple comparisons. Presented at the James F. Jakobsen Memorial Graduate Conference, Iowa City, IA.
15. **Flores, J. E.**, & Cavanaugh, J. E. (2017). Multiple comparisons: A bayesian model selection approach (with an application to the effect of state policy in reducing disparities in bullying). Presented at the University of Iowa Department of Biostatistics Preceptorship Symposium, Iowa City, IA.
16. Neath, A. A., **Flores, J. E.**, & Cavanaugh, J. E. (2017). Bayesian multiple comparisons and model selection. Presented at the University of Iowa Department of Biostatistics Journal Club, Iowa City, IA.
17. **Flores, J. E.**, Hatzenbuehler, M. L., Cavanaugh, J. E., Onwuachi-Willig, Angela, & Ramirez, M. R. (2017). Anti bullying policies and disparities in bullying: A state-level analysis. Presented at the University of Iowa Research Week Symposium, IowaCity, IA.
18. **Flores, J. E.**, Hatzenbuehler, M. L., Cavanaugh, J. E., Onwuachi-Willig, Angela, & Ramirez, M. R. (2017). Anti bullying policies and disparities in bullying: A state-level analysis. Presented at the James F. Jakobsen Memorial Graduate Conference, Iowa City, IA.

Software

1. **Flores, J. E.**, Prymolenna, A. V., Lewis, L. A., Winans, N. M., Eder, E. K., Kew, W., Young, R. P., & Bramer, L. M. (2023). nmRanalysis. https://nmRanalysis.emsl.pnnl.gov/app/nmranalysis
2. **Flores, J. E.** (2022). picR. https://cran.r-project.org/web/packages/picR/index.html
3. **Flores, J. E.** (2017). BMSMC. https://github.com/javenrflo/BMSMC

Leadership & Service

Panelist   2024-2025
University of Iowa Summer Institute in Biostatistics

Co-Director   2023-2023
2023 Earth and Molecular Sciences Laboratory Summer School Program

Student Representative   2018-2021
University of Iowa, Department of Biostatistics Student Advisory Committee

President   2018-2019
University of Iowa, College of Public Health Graduate Student Association

President   2018-2019
University of Iowa, Department of Biostatistics Student Organization

Student Representative   2018-2019
University of Iowa, Graduate and Professional Student Government

Student Representative   2017-2018
University of Iowa, College of Public Health Dean Search Committee

Vice President   2016-2018
University of Iowa, Department of Biostatistics Student Organization

Chair of Operations and Logistics   2016-2018
University of Iowa, College of Public Health Graduate Student Association

Student Representative   2015-2016
University of Iowa, Graduate Student Senate

Student Representative   2015-2016
University of Iowa, College of Public Health Diversity Committee

Honors & Awards

Scientist and Engineer Rising Leader   2023
Pacific Northwest National Laboratory

Hancher-Finkbine Distinguished Student Leader Award   2020
University of Iowa (One of the university's highest honors)

William R. Clarke Graduate Student Research Assistant Award   2019
University of Iowa, Department of Biostatistics

Research Week Poster Award   **2018**

University of Iowa, College of Public Health

Leon F. Burmeister Graduate Student Service Award   **2017**

University of Iowa, Department of Biostatistics

Kathryn M. Chaloner Memorial Scholarship   **2016**

University of Iowa, Department of Biostatistics

Alfred P. Sloan Scholar   **2015**

University of Iowa, Sloan Center of Exemplary Mentoring

Iowa Recruitment Fellowship   **2015**

University of Iowa, Graduate College

Diversity Recruitment Fellowship   **2015**

University of Iowa, College of Public Health Diversity Committee

Summa Cum Laude   **2014**

University of Texas at Brownsville, College of Science

University President's List   **2010-2014**

University of Texas at Brownsville

University Dean's List   **2010-2014**

University of Texas at Brownsville, College of Science

University Scholar   **2010**

University of Texas at Brownsville

Texas Top 10% Scholar   **2010**

University of Texas at Brownsville

References

Available upon request.